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The intergenerational transmission of attachment during middle childhood in lesbian, gay, and heterosexual parent families through assisted reproduction: The mediating role of reflective functioning

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ABSTRACT

The present study examined the attachment patterns distribution of 60 lesbian mothers, 50 gay fathers, and 42 heterosexual parents through assisted reproduction and their 76 children, using the Adult Attachment Interview (AAI) and the Friends and Family Interview (FFI), respectively. The study also explored the intergenerational transmission of attachment through reflective functioning (AAI-RF). All families lived in Italy and children were aged 6–12 years ($M_{years} = 8.11$, $SD = 2.17$; 48.68% assigned female at birth). The AAI patterns distribution was similar across family types and did not significantly differ from international and national normative data. Similarly, children's FFI attachment patterns were evenly distributed between family types, and no significant differences emerged in comparison to international and national normative data referring to middle childhood samples. Mediation models revealed that, in all three family types, parents with greater AAI coherence of mind exhibited higher AAI-RF, which, in turn, was associated with increased FFI attachment security in children. Furthermore, parents' AAI coherence of mind directly influenced children's FFI attachment security. The results support and expand hypotheses regarding the intergenerational transmission of attachment in lesbian, gay, and heterosexual parent families through assisted reproduction, while offering unique indications to support these families during middle childhood.


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Introduction

Assisted reproduction (e.g. gamete donation, surrogacy) has provided new opportunities for lesbian, gay, and infertile heterosexual couples to form families (Blake et al., 2017; Bos & Gartrell, 2020; Golombok, 2015). However, for these couples, the process of family formation may be accompanied by unique challenges, linked to societal attitudes towards diverse sexual orientations and infertility, the legal recognition of non-biological parents, disclosure to children of their assisted conception origins, and expectations around biological connection and genetic heritage (Golombok, 2015). While lesbian, gay, and heterosexual parent families may differ in their strategies for coping with these challenges, the literature shows that, overall, neither parents' sexual orientation nor their assisted conception has a detrimental effect on child development or the child – parent relationship (for reviews, see Imrie & Golombok, 2020; Patterson, 2017; Zanchettin et al., 2022).

To date, very few studies on child – parent relationship quality in lesbian, gay, and heterosexual parent families through assisted reproduction have been conducted from an attachment perspective (for exceptions, see, e.g. Carone et al., 2020a, 2020b, 2023; Slutsky et al., 2016; Zadeh et al., 2017). Attachment theory emphasizes the innate human need for emotional connection and the significance of early experiences for children's socioemotional development and future relationships (Bowlby, 1969/1982). It also posits that attachment patterns may be transmitted across generations (van IJzendoorn, 1995), through the interaction between the parent's attachment state of mind, their parenting behaviors, and the child's developing attachment system (van IJzendoorn & Bakermans-Kranenburg, 2019). Such transmission must be further explored, to improve our understanding of the continuity/discontinuity of attachment patterns and intervening factors, and to develop interventions to promote secure attachment in diverse families.

Middle childhood (i.e. ages 6–12 years) is an ideal developmental period in which to explore attachment processes in lesbian, gay, and heterosexual parent families through assisted reproduction, as it tends to coincide with children's identity formation, discovery of their assisted conception origins (following parental disclosure), and questions from peers about their family structure (Golombok, 2015). All these processes and experiences may trigger changes in the child – parent attachment relationship (Kerns & Brumariu, 2016). Accordingly, the present study has two aims: first, to present, for the first time, parents' and children's attachment mental states in lesbian, gay, and heterosexual parent families through assisted reproduction; and second, to investigate the intergenerational transmission of attachment in the three family types and the mediating role of parents' reflective functioning in such transmission when children are in middle childhood.

Parents' and children's attachment patterns in lesbian, gay, and heterosexual parent families

Parents' internal working models (IWMs) of attachment (which may be assessed using the Adult Attachment Interview [AAI]) play a crucial role in the child – parent attachment relationship and impact child development throughout the lifespan (Main et al., 1985). In this vein, children who experience secure attachment relationships are more likely to develop adaptive socioemotional skills, form adult secure relationships, and demonstrate positive mental health outcomes (Fearon & Belsky, 2016; Fearon et al., 2010; Groh et al.,

2012, 2014). Also, children's experiences with their parents form their own IWMs of attachment, which influence their expectations, beliefs, and behaviors in future relationships, including their later parenting behaviors (Bowlby, 1969/1982, 1973, 1980). Previous meta-analytic attachment research provides abundant supports to these associations for heterosexual parents and their children born through unassisted conception (e.g. Badovinac et al., 2021; Deneault et al., 2022; Fearon et al., 2010; Groh et al., 2012, 2014). However, to the best of our knowledge, no data are available on the attachment patterns of lesbian, gay, and heterosexual parents through assisted reproduction. Also, no study has been conducted on the attachment of children born through heterosexual parents through gamete donation, while very little is known about the attachment of children born to lesbian mothers through donor insemination or to gay fathers through surrogacy.

A longitudinal study in the United Kingdom compared children born to lesbian mothers through donor insemination with children raised by a single heterosexual mother and children raised by two heterosexual parents when children were aged 6 (Golombok et al., 1997) and 19 years (Golombok & Badger, 2010). While the 6-year-old children of lesbian mothers and heterosexual single mothers showed greater attachment security (as measured by the Separation Anxiety Test) than their counterparts in two-parent heterosexual families (Golombok et al., 1997), no differences emerged between family types in total attachment (as measured by the Inventory of Peer and Parent Attachment; Golombok & Badger, 2010) when children were aged 19 years.

Similarly, a study found no differences in attachment security (as measured by the Security Scale Questionnaire) between school-aged children of gay fathers through surrogacy and children of lesbian mothers through donor insemination and a normative sample of children of heterosexual parents, matched for age (Carone et al., 2020a). This suggests that child attachment security in gay father families through surrogacy may be unrelated to the combination of parents' sexual orientation and child conception background. This also aligns with previous studies involving adopted preschool and adolescent children of lesbian and gay parents, which have used observation or interview measures (i.e. the Attachment Q-Sort and the Friends and Family Interview, respectively) to assess attachment (Feugé et al., 2020; McConnachie et al., 2020).

Research involving children born to lesbian mothers through donor insemination and children born to gay fathers through surrogacy cannot be generalized to children born to heterosexual parents through gamete donation because the circumstances surrounding the conception and development of children in these family forms differ. This is because many heterosexual couples pursue gamete donation due to infertility, while infertility is not the primary motivation for lesbian and gay parents to use assisted reproduction (Blake et al., 2017; Bos & Gartrell, 2020; Rubio et al., 2020). Also, while there is the general idea that parents' heterosexual orientation does not cause harm to children, concerns continue to be expressed around the possibility that being raised by lesbian mothers or gay fathers may be disadvantageous for children, though evidence runs contrary to this assumption (for discussions, see Golombok, 2015; Patterson, 2017).

Based on this, further research is needed on the attachment patterns of lesbian, gay, and heterosexual parents and their children born through assisted reproduction. The present study aims at exploring and comparing the distribution of attachment patterns among the three family types and in relation to normative data. We expect that lesbian, gay, and heterosexual parents will not significantly differ in their attachment pattern

distribution either among themselves or in comparison to normative data. While there is no previous data on AAI patterns distribution in these three groups of parents, this hypothesis is grounded in the literature, which both suggests that lesbian, gay, and heterosexual parents who use assisted reproduction are just as competent and sensitive as heterosexual parents through unassisted conception (Imrie & Golombok, 2020; Zanchettin et al., 2022), and that a secure attachment mental state is associated with higher parenting quality (George & Solomon, 2008; Shlafer et al., 2015). For similar reasons and based on the literature reviewed above, we anticipate that children in the three family types will not significantly differ in their attachment patterns, and they will be classified as secure or insecure at similar rates to normative children.

Parents' reflective functioning as a Mediator of the intergenerational transmission of attachment

Research with heterosexual parent families through unassisted conception has consistently shown a moderate level of continuity in attachment patterns between generations (e.g. Fonagy et al., 1991; Kovan et al., 2009; van IJzendoorn, 1995; van IJzendoorn & Bakermans-Kranenburg, 1997; Verhage et al., 2016). Parents with a secure attachment state of mind tend to demonstrate openness and responsiveness to their children's needs, serving as secure bases for children's exploration and safe havens for children during times of distress (Ainsworth et al., 1978; Bowlby, 1988). Conversely, parents with an insecure or unresolved attachment state of mind may struggle to regulate their emotions, experience difficulty accurately interpreting their children's cues, or display inconsistent caregiving behaviors (van IJzendoorn, 1995; Verhage et al., 2016).

An extensive literature shows that maternal behavior is the primary mechanism for attachment transmission, particularly during infancy (Ainsworth et al., 1978; Pederson et al., 2014; van IJzendoorn & Bakermans-Kranenburg, 2019). Maternal sensitivity is a key factor in this process, as it enables mothers to identify, correctly interpret, and respond to their children's needs for comfort and closeness in a sensitive manner. Mothers with an insecure or unresolved attachment pattern tend to be lower in maternal sensitivity, and therefore more likely to reject, overwhelm, or fail to regulate their children's need for proximity. These patterns of maternal behavior, associated with maternal sensitivity, have been found to predict the attachment outcomes of children during the Strange Situation Procedure (SSP) (Pederson et al., 1998; van IJzendoorn, 1995; Verhage et al., 2016). However, meta-analyses of studies involving heterosexual biological mothers and their infants have shown that, while maternal sensitivity may explain a relatively small proportion of the association between AAI mental states and child SSP attachment patterns, there remains an unexplained "transmission gap" ranging from approximately 50% (Verhage et al., 2016) to 75% (van IJzendoorn, 1995).

In the attempt to identify other mechanisms accounting for this transmission gap, Fonagy and colleagues (1998; Fonagy et al., 2002) have proposed reflective functioning (RF) – defined as the ability to understand and interpret (implicitly and explicitly) one's own and others' behavior as an expression of mental states such as feelings, thoughts, fantasies, beliefs, and desires – as a critical factor linking adult and child attachment. Accordingly, the Reflective Functioning Scale (RFS; Fonagy et al., 1998) was designed and applied to the AAI to infer parents' capacity

to understand their attachment history, in terms of mental states. Previous research with heterosexual biological mothers has confirmed that mothers with a secure AAI state of mind are better able to flexibly and coherently access and mentalize emotions and memories linked to their early attachment experiences. This sets the stage for their children to experience physical and psychological comfort and safety in their presence, which is conducive of child attachment security (e.g. Fonagy et al., 1991; Zeegers et al., 2017).

Surprisingly, while the role of RF has been extensively examined in relation to psychopathology and psychotherapy (for reviews, see Camoirano, 2017; Katznelson, 2014), only few parenting studies have examined the role of RF in the intergenerational transmission of attachment, and all of these have considered only mothers' (and not fathers') RF. In 2005, the focus on RF shifted from the mother's ability to mentalize her previous attachment experiences (in the context of the AAI) to her ability to mentalize both her child's and her own internal experiences (in the context of the Parent Development Interview) (Slade et al., 2005). Although assessments of mentalization in the parent – child relationship have contributed to explaining the transmission gap, parents' AAI-RF may still be a key mechanism for their transmission of attachment patterns to children, beyond infancy.

The developmental phase of middle childhood is characterized by significant growth in children's cognitive, linguistic, and emotional abilities. These newfound competencies bring about substantial challenges and opportunities for the child – parent attachment relationship, across all family types (Kerns & Brumariu, 2016). In addition, factors that are specific to lesbian, gay, and heterosexual parent families through assisted reproduction may further influence the intergenerational transmission of attachment, through parents' AAI-RF. For example, lesbian and gay individuals' access to parenthood following the decades in which homosexuality and parenthood were considered mutually exclusive, as well as heterosexual individuals' access to parenthood following diagnoses of infertility, may provide prime opportunities for these parents to reflect – and possibly mentalize – their own experiences of being parented, as they make decisions about how to parent, themselves. Under these circumstances, the capacity of lesbian, gay, and heterosexual parents through assisted reproduction to hold complex mental states in mind (in line with a secure attachment pattern) may facilitate their subsequent holding of their children's internal affective experiences (George & Solomon, 2008).

To date, research on the intergenerational transmission of attachment has been explored mainly in heterosexual two-parent families through unassisted conception, with children still in infancy (for exceptions, see Bernier & Miljkovitch, 2009; Miljkovitch et al., 2012), comparing parents' AAI with children's SSP. These studies have shown that the association between parents' and children's attachment patterns typically differs between mothers and fathers, suggesting a stronger intergenerational transmission of secure-autonomous attachment from mothers than from fathers (e.g. Steele et al., 1996; van IJzendoorn, 1995). Gender differences in parental mentalizing have also been found (for a review, see Charpentier Mora et al., 2023). Accordingly, a second aim of the present study is to investigate whether there is evidence of the intergenerational transmission of attachment in lesbian, gay, and heterosexual parent families through assisted reproduction and, if so, whether parents' AAI-RF mediates such relation when children are in middle childhood.

Based on previous research with heterosexual biological parent families showing the transmission of attachment patterns between generations (e.g. Fonagy et al., 1991; Kovan et al., 2009; van IJzendoorn, 1995; van IJzendoorn & Bakermans-Kranenburg, 1997; Verhage et al., 2016), there is no reason to assume that such transmission does not occur also in lesbian, gay, and heterosexual parent families through assisted reproduction. In this vein, it is expected that parent attachment security will be significantly associated with child attachment security in the three family types (direct effect). Similarly, it is anticipated that, across family types, parents' secure attachment will be associated with higher reflective functioning which, in turn, will reflect in higher attachment security in children (mediated effect).

Materials and methods

Participants

Participants were 30 lesbian mother families through donor insemination, 25 gay father families through gestational surrogacy, and 21 heterosexual parent families through gamete donation (i.e. 13 used sperm donation and 8 used egg donation). In each family, both parents and the target child ($M_{months} = 104.30$; $SD = 25.99$; 48.68% females) participated, for a total of 152 parents (i.e. 60 lesbian mothers, 50 gay fathers, 42 heterosexual parents) and 76 children. All parents identified as cisgender and White, resided in Italy, had a school-aged child, and had disclosed to their children their assisted reproduction conception. All gay couples undertook surrogacy abroad, as this procedure is legally prohibited in Italy; out of the 30 lesbian couples, 27 had donor insemination abroad, with the remaining 3 self-inseminating. Most heterosexual parents' gamete insemination occurred in Spain ($n = 9$), followed by Italy ($n = 5$), Greece ($n = 3$), Denmark ($n = 2$), Belgium ($n = 1$), and the Netherlands ($n = 1$).

The inclusion criteria for all families were that parents had lived together since the child's birth, resided in Italy, conceived through third-party assisted reproduction, and had a child aged 6–12 years. Data were collected from all children in the relevant age range (e.g. in the event of twins); however, the current study referred only to data from the oldest child. Multiple strategies were used to recruit as diverse a sample as possible. Specifically, most lesbian and gay parent families were recruited through "Rainbow Families" ($n = 34$, 61.82%) – the main Italian association of parents with minoritized sexual identities who had children through assisted reproduction – with the remainder ($n = 21$, 38.18%) recruited from the participant sample of a previous study from the research group (Carone et al., 2018b, 2020a). Heterosexual parent families were recruited through two large clinics offering assisted reproduction services in Rome and Milan ($n = 16$, 76.19%). Also, five (23.81%) families were recruited through word-of mouth from participating families. Table 1 presents the sociodemographic information for each group.

Procedure

The study was approved by the Ethics Committee of the Department of Dynamic and Clinical Psychology, and Health Studies, Sapienza University of Rome (prot. n. 0000212, 24 February 2020, project title: "Same-Sex and Different-Sex Parent Families through

Table 1. Sociodemographic information, by family type (N = 152 parents and 76 children nested within 76 families).

Family variable (N = 76 families)	All families (N = 76)		Lesbian mother families (n = 30)		Gay father families (n = 25)		Heterosexual parent families (n = 21)		X ² (df)	p
	N (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)			
Child gender assigned at birth	37 (48.68)		14 (56.00)		14 (56.00)		9 (42.86)		0.87(2)	.647
Female	39 (51.32)		16 (53.33)		11 (44.00)		12 (57.14)			
Male			14 (46.67)							
Length of parental relationship									0.13(4)	.856
Less than 10 years	3 (3.95)	1 (3.33)	1 (4.00)		1 (4.00)		1 (4.76)			
11–15 years	18 (23.68)	8 (26.67)	4 (16.00)		4 (16.00)		6 (28.57)			
More than 15 years	55 (72.37)	21 (70.00)	20 (80.00)		20 (80.00)		14 (66.67)			
	M (SD)	M (SD)	M (SD)		M (SD)		M (SD)		F(df)	p
Child age (in months)	104.30 (25.99)	108.03 (27.80)	101.80 (23.16)		101.95 (27.09)		101.95 (27.09)		0.50(2,73)	.606
Number of children	1.68 (0.62)	1.60 (0.68)	1.84 (0.55)		1.62 (0.59)		1.62 (0.59)		1.21(2,73)	.305
	All parents (N = 152)	Lesbian mothers (n = 60)	Gay fathers (n = 50)	Heterosexual parents (n = 42)						
Individual variables (N = 152 parents)	N (%)	n (%)	n (%)	n (%)						
Parent ethnicity (White)	152 (100.00)	60 (100.00)	50 (100.00)	42 (100)						
Parent educational level ^a										
High school degree or less	46 (30.26)	19 (31.67)	9 (18.00)	18 (42.86)						
Bachelor/Master's degree	65 (42.76)	26 (43.33)	21 (42.00)	18 (42.86)						
PhD/specialization	41 (26.97)	15 (25.00)	20 (40.00)	6 (14.29)						
Parent working status										
Full-time	113 (74.34)	45 (75.00)	42 (84.00)	26 (61.91)						
Part-time	33 (21.71)	14 (23.33)	7 (14.00)	12 (28.57)						
Unemployed	6 (3.95)	1 (1.67)	1 (2.00)	4 (9.52)						
	M (SD)	M (SD)	M (SD)	M (SD)						
Parent age (in years) ^b	48.11 (6.33)	47.13 (6.31)	49.90 (6.34)	47.36 (6.02)						
Parent yearly net income (€) ^c	36,161.40 (25,330.54)	26,765.85 (17,675.91)	52,214.77 (29,490.78)	31,308.00 (20,926.81)						
				16.24(2,136)						

Note: Percentages may not equal 100 due to rounding. ^aFewer gay fathers had a high school degree or less, while more gay fathers had a PhD/specialization. More heterosexual parents had a high school degree or less. ^bGay fathers tended to be older than lesbian mothers ($p = .066$, with Bonferroni's correction). ^cNot all parents indicated their yearly net income. Considering those who did it, gay fathers were more affluent than lesbian mothers and heterosexual parents ($p < .001$, with Bonferroni's correction).

Assisted Reproduction: Parenting, Attachment, Child Adjustment and Neural Correlates”). The research was originally designed so that each family would be visited at home. However, as data collection occurred during the COVID-19 pandemic (i.e. April 2021–December 2022), the research was converted to an online format, to prevent unexpected interruption due to government restrictions. This amendment was approved by the Ethical Committee.

Written informed consent was obtained from all adult participants, and verbal consent was gained from all children. Parents also gave consent for their children to participate. Each participant was reminded that their responses would be confidential and that participation in all or part of the study could be terminated at any time; such information was conveyed to the children in an age-appropriate manner, both prior to and during their participation. Individual semi-structured interviews with each parent and the participating child were administered during 2-hour Zoom meetings. Interviews were conducted by one of the four PhD students involved in the research – all of whom were trained in the study techniques and had expertise in research with diverse families through assisted reproduction.

Measures

Parents' attachment states of mind

Each parent was administered the Adult Attachment Interview (AAI; George et al., 1985; Main et al., 2002) – a semi-structured, 20-question protocol that characterizes respondents' current state of mind with respect to past child – parent attachment experiences (George et al., 1985). In the present study, the time required to administer the interview ranged from 45–150 minutes. Parents' AAI interviews were audio-recorded and transcribed verbatim prior to coding, as suggested in the protocol established by George et al. (1985), and subsequently coded using Main et al. (2002) coding scheme.

Parents were classified as *secure – autonomous* (F), *dismissing* (Ds), *preoccupied* (E), or *unresolved* (U)/*cannot classify* (CC). The U classification was given in conjunction with a best-fitting primary category, and in the three-way forced classifications, U participants were forced into their most likely organized attachment category (F, Ds, E; for a similar approach, see, e.g. Steele et al., 1996; Verhage et al., 2016). Additionally, participants' attachment mental states were operationalized into *coherence of mind* scores, whereby participants who described their experiences and relationships with caregivers in an internally consistent – but not emotionally overwrought – autobiographical manner were rated as coherent (Main et al., 2002). Given its continuous nature in the face of the relatively small sample, the coherence of mind scale was used in the mediational model as a primary indicator of parents' secure (i.e. high coherence) or insecure (i.e. low coherence) attachment (for a similar approach, see Roisman et al., 2001, 2007; Waters et al., 2018).

All interview transcripts were scored by a certified coder who was trained on the AAI and achieved high interrater reliability on 30–32 transcripts with official AAI trainers. Approximately one-third of the transcripts ($n=51$) were independently coded by a second reliable and certified coder who was unaware of participants' characteristics (except for parent gender). Interrater agreement was $\kappa = .86$ ($p < .001$) across the three major classifications, $\kappa = .81$ ($p < .001$) for the unresolved/CC status, and ICC = .80 (p

< .001) for the coherence of mind scale. Disagreements between coders were settled by conference. AAI coders were different from RF and FFI coders. In the present study, along with the use of primary F, Ds, E, and U/CC attachment classifications, the continuous variable of coherence of mind was used, as it is considered the best indicator of security in the AAI (e.g. Roisman et al., 2001; Waters et al., 2018). Specifically, higher coherence scores were assigned to AAI narratives deemed internally consistent, detailed, plausible, and not emotionally overwrought.

Parents' reflective functioning

The Reflective Functioning Scale (RFS; Fonagy et al., 1998) was applied to the AAI transcripts (i.e. only to questions that explicitly demanded an appreciation of mental states, such as: "Why did your parents behave as they did during your childhood?"), in line with the AAI-RF manual (Fonagy et al., 1998). The AAI-RF is rated on a scale of -1-9, with higher scores indicating increasingly full and sophisticated mental state accounts of subjective experiences underlying interactions. A single reliable and certified coder rated the AAI protocols for RF. Interrater reliability was assessed on 51 (33%) protocols coded by a second certified coder. The intraclass correlation coefficient was .83 ($p < .001$). RF coders were different from AAI and FFI coders.

Children's attachment mental states

Children were interviewed using the Friends and Family Interview (FFI; Steele & Steele, 2005) – a semi-structured interview that assesses the overall attachment representation in middle childhood and adolescence. FFI questions focus on significant relationships in these developmental stages (i.e. with parents, peers, siblings, and teachers) and are coded for children's overall attachment security. The FFI assesses various constructs, including coherence of mind, theory of mind, adaptive response, developmental perspective, and perception of parent(s) as available for both emotional support (i.e. safe haven needs) and instrumental support for exploration (i.e. secure base needs). Scores on these individual constructs inform the overall score for attachment security, determining one of four attachment patterns: secure-autonomous, insecure-preoccupied, insecure-dismissing, or insecure disorganized. Each pattern is scored using a four-point scale ranging from 1 (*no evidence*) to 4 (*significant evidence*), with higher scores reflecting higher levels of the relevant attachment dimension. However, a categorical classification is also possible, considering the pattern that receives the highest score (≥ 3) (for details on each pattern, see Steele et al., 2015).

The present study used the categorical F, Ds, E, and D attachment classifications—one for each child. Additionally, secure base and safe haven scores in relation to each specific parent were summed into a single security score, which was used as an index of child attachment security. Use of these scores over the coherence of mind score (as used for parents) was determined by the fact that each FFI interview generates two separate safe haven and secure base scores (one for each parent), but only one overall coherence of mind score (for each child). This approach was consistent with previous research indicating the relevance of secure base and safe haven scores as indexes of attachment security in middle childhood (Kerns et al., 2015). Moreover, it was methodologically appropriate,

considering the data's nested structure (i.e. two parents for each child). Interviews were audio-recorded and transcribed verbatim; subsequently, they were rated by a single reliable and certified coder. Interrater reliability was calculated on 25 transcripts (33%) that were rated by a second certified coder, resulting in a $\kappa = .84$ ($p < .001$) for categorical agreement on FFI patterns and $ICC = .81$ ($p < .001$) for the attachment security score. FFI coders were different from AAI and RF coders.

Across studies, the FFI demonstrated good interrater reliability and construct validity (e.g. Pace et al., 2020; Stievenart et al., 2012). Although it was originally developed for children older than 8 years (Steele & Steele, 2005), the FFI was successfully applied also to diverse samples of children younger than 8 years (e.g. Abrines et al., 2012; Psouni et al., 2020; Zadeh et al., 2017).

Children's verbal skills

Given the wide age range of the participating children, children's verbal skills were assessed using the Verbal Comprehension Index of the Wechsler Intelligence Scale for Children, IV version (VCI-WISC-IV; Orsini et al., 2012; Wechsler, 2003). The VCI-WISC-IV represents the sum of the weighted points on the similarities, vocabulary, and comprehension subtests (normative score: $M = 100.00$, $SD = 15.00$).

Data analysis

All analyses were conducted in R (R Core Team, 2021). Percentages, means, and standard deviations of the variables included in the mediation model (i.e. parents' AAI coherence of mind and AAI-RF, children's FFI attachment security) were reported using descriptive statistics. Given shared variance within the family, multi-level correlations were calculated for the associations between continuous AAI and FFI variables in each family type. Similarly, one mixed model was used to assess potential child gender and family type differences in children's FFI attachment security. Two further mixed models were used to assess potential differences in parents' coherence of mind and AAI-RF, according to parents' sexual orientation and gender.

The first hypothesis on the attachment pattern distributions between lesbian, gay, and heterosexual parents and normative international and national data (from Bakermans-Kranenburg and Bakermans-Kranenburg & van IJzendoorn's, 2009a; Cassibba et al.'s, 2013 meta-analyses, respectively) was tested using chi-square tests. Given the expected low frequency in some cells, the secure versus insecure patterns were used for comparison, while the three and four-way patterns were presented for descriptive reasons only. A similar approach was used for FFI attachment patterns distribution and comparison. In this case, the comparison with normative data was made considering only studies using interview-based attachment assessment (i.e. play-doll narratives and observed-based assessment were excluded) and children with a similar mean age of that of our sample.

The second mediational hypothesis was tested using three mediation models (one for each family type), applying 95% confidence intervals (CIs) with bootstrap percentiles and 5,000 resamples. Parents' AAI coherence of mind was entered as a predictor,

Table 2. Multilevel associations between AAI and FFI scores in lesbian and gay parent families ($N = 110$ scores nested within 55 families).

Variable	1.	2.	3.	4.	5.	<i>M</i> (observed score range)	<i>SD</i>
1. AAI coherence of mind	1	.41**	.48***	.56***	.57***	4.66 (2.00–7.50)	1.66
2. AAI-RF	.36**	1	.38**	.39***	.41**	4.60 (2.00–8.00)	1.59
3. FFI safe haven	.22	.24	1	.68***	.91***	2.38 (1.50–4.00)	0.97
4. FFI secure base	.28*	.41**	.80***	1	.92***	2.42 (1.50–4.00)	0.81
5. FFI security	.27*	.34**	.94***	.95***	1	2.40 (1.50–4.00)	0.85
<i>M</i>	4.92	4.33	2.65	2.63	2.64		
(observed score range)	(1.00–8.00)	(1.00–8.00)	(1.00–3.50)	(1.00–3.50)	(1.00–3.50)		
<i>SD</i>	1.75	1.70	0.63	0.64	0.62		

Note: Associations for gay father families are reported above the diagonal, whereas associations for lesbian mother families are reported below the diagonal.

AAI = Adult Attachment Interview. AAI-RF = Reflective functioning, coded on the AAI. FFI = Friends and Family Interview. FFI security was calculated as the sum of the FFI safe haven and FFI secure base scores. For each dimension (safe haven, secure base, security), each child had two FFI scores—one in relation to each parent. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3. Multilevel associations between AAI and FFI scores in heterosexual parent families ($N = 42$ scores nested within 21 families).

Variable	1.	2.	3.	4.	5.
1. AAI coherence of mind	1				
2. AAI-RF	.62***	1			
3. FFI safe haven	.58***	.54***	1		
4. FFI secure base	.63***	.55***	.61**	1	
5. FFI security	.66***	.59***	.92***	.895***	1
<i>M</i>	4.83	3.74	2.64	2.79	2.71
(Observed score range)	(2.00–8.00)	(1.00–7.00)	(1.50–4.00)	(1.50–4.00)	(1.50–4.00)
<i>SD</i>	1.73	1.74	0.81	0.75	0.70

Note: AAI = Adult Attachment Interview. AAI-RF = Reflective functioning, coded on the AAI. FFI = Friends and Family Interview. FFI security was calculated as the sum of the FFI safe haven and FFI secure base scores. For each dimension (safe haven, secure base, security), each child had two FFI scores—one in relation to each parent. * $p < .05$. ** $p < .01$. *** $p < .001$.

parents' AAI-RF as a mediator, and children's security as an outcome. To control for the potential confounding effect of children's verbal skills on children's FFI responses, FFI security scores were first residualized from VCI scores and then entered into the model. A post-hoc Monte Carlo power simulation was computed to obtain the statistical power of the results for the indirect effects, using the shiny and MASS add-on R packages (Schoemann et al., 2017). Of note, given that the FFI was originally developed for children older than 8 (Steele & Steele, 2005) and to check whether age indeed influenced the results, the mediational analyses were repeated controlling for children's age (younger than 8 years versus 8 years or older). Similarly, three further mixed models (one for each family type) were run to check whether attachment security scores differed based on child age. These analyses are presented as Supplemental Material.

Results

Descriptive and preliminary analysis

Tables 2 and 3 display the descriptive statistics and multilevel associations for AAI and FFI variables, by family type. WISC-IV mean scores were 122 (observed score range: 94–144),

111 (observed score range: 86–136), and 113 (observed score range: 82–138) for children of lesbian, gay, and heterosexual parents, respectively.

The mixed model indicated that the children of lesbian, gay, and heterosexual parents showed similar levels of FFI attachment security (children of lesbian parents vs. children of heterosexual parents: $\beta = .46$, $SE = .34$, $p = .180$; children of lesbian parents vs. children of heterosexual parents: $\beta = -.01$, $SE = .36$, $p = .970$). Also, neither child gender, $\beta = .30$, $SE = .39$, $p = .452$, nor the interaction between family type and child gender, (child gender*lesbian parent families vs. child gender*heterosexual parent families: $\beta = -.37$, $SE = .51$, $p = .471$; child gender*gay parent families vs. child gender*heterosexual parent families: $\beta = -.20$, $SE = .52$, $p = .712$), had a significant effect.

Regarding parents' AAI coherence of mind, one mixed model did not indicate any difference based on either parent gender, $\beta = -.15$, $SE = .20$, $p = .450$, or parent sexual orientation, $\beta = .22$, $SE = .26$, $p = .399$. Likewise, the interaction between parent gender and parent sexual orientation was not significant, $\beta = -.38$, $SE = .36$, $p = .289$.

One further mixed model indicated that mothers and fathers showed similar levels of RF, $\beta = .19$, $SE = .17$, $p = .258$ (mothers: $M = 4.30$, $SD = 1.64$; fathers: $M = 4.21$, $SD = 1.78$), while differences emerged based on parent sexual orientation, $\beta = .43$, $SE = .21$, $p = .040$, with lesbian and gay parents showing higher AAI-RF levels than heterosexual parents (lesbian/gay: $M = 4.45$, $SD = 1.65$; heterosexual: $M = 3.74$, $SD = 1.74$). Finally, there was a significant interaction between parent gender and sexual orientation, $\beta = .69$, $SE = .33$, $p = .039$. A post-hoc analysis revealed that gay fathers ($M = 4.60$, $SD = 1.59$) showed higher levels of AAI-RF than heterosexual fathers ($M = 3.29$, $SD = 1.90$; mean difference = 0.77, $SE = 0.27$, $p = .027$). Conversely, there were no significant differences between gay fathers and lesbian mothers ($M = 4.33$, $SD = 1.70$ for lesbian mothers; mean difference = 0.16, $SE = 0.22$, $p = 1.000$); between gay fathers and heterosexual mothers ($M = 4.19$, $SD = 1.47$ for heterosexual mothers; mean difference = 0.24, $SE = 0.27$, $p = 1.000$); between heterosexual mothers and lesbian mothers (mean difference = -0.08 , $SE = 0.26$, $p = 1.000$); between heterosexual mothers and heterosexual fathers (mean difference = 0.53, $SE = 0.25$, $p = .222$); or between lesbian mothers and heterosexual fathers (mean difference = 0.62, $SE = 0.26$, $p = .114$).

Parents' AAI attachment pattern distributions and comparisons with normative data

Table 4 displays the two-way (secure versus insecure) AAI distribution. The chi-square tests indicated no differences between parent groups and no differences with respect to international (Bakermans-Kranenburg & van IJzendoorn, 2009a) and national (Cassibba et al., 2013) data. For descriptive reasons, Tables 4 also displays the three- and four-way AAI distributions.

Children's FFI attachment pattern distributions and comparisons with normative data

Table 5 displays the two-way (secure versus insecure) FFI distribution. No differences emerged between family types for children's FFI attachment pattern distributions. Also, comparisons with international and national data from middle childhood samples who

Table 4. AAI two-, three-, and four-way distributions by parent gender and sexual orientation, and two-way distribution comparisons with international and national normative data.

	International normative mothers ^a				National normative mothers ^b				International normative fathers ^c				National normative fathers ^d			
	LM	HM	GF	HF	χ^2 (df)	p	Comparison with LM: with LM: .75(1) .387	Comparison with HM: with HM: .003(1) .873	χ^2 (df)	p	Comparison with LM: with LM: 1.59(1) .207	Comparison with HM: with HM: 0.19(1) .660	χ^2 (df)	p	Comparison with GF: with GF: 0.20(1) .651	Comparison with HF: with HF: 1.72(1) .190
AAI two-way	(n = 60)	(n = 21)	(n = 50)	(n = 21)	2.05(3)	.562	(n = 1284)	(n = 301)	(n = 374)	(n = 85)						
Secure	30 (50.00%)	11 (52.38%)	23 (46.00%)	7 (33.33%)			726 (56.54%)	180 (59.80%)	189 (50.53%)	39 (45.88%)						
Insecure	30 (50.00%)	10 (47.62%)	27 (54.00%)	14 (66.67%)			558 (43.46%)	121 (40.20%)	185 (49.47%)	46 (54.12%)						
AAI three-way	(n = 56)	(n = 20)	(n = 47)	(n = 20)			(n = 1362)	(n = 568)	(n = 439)	(n = 85)						
F	33 (58.93%)	13 (65.00%)	24 (51.06%)	9 (45.00%)			797 (58.52%)	336 (59.16%)	254 (57.86%)	39 (45.88%)						
Ds	12 (21.43%)	4 (20.00%)	17 (36.17%)	7 (35.00%)			336 (24.67%)	125 (22.01%)	121 (27.56%)	30 (35.29%)						
E	11 (19.64%)	3 (15.00%)	6 (12.77%)	4 (20.00%)			229 (16.81%)	107 (18.84%)	64 (14.58%)	16 (18.82%)						
AAI four-way	(n = 60)	(n = 21)	(n = 50)	(n = 21)			(n = 1284)	(n = 301)	(n = 374)	(n = 0)						
F	30 (50.00%)	11 (52.38%)	23 (46.00%)	7 (33.33%)			726 (56.54%)	180 (59.80%)	189 (50.53%)	NA						
Ds	12 (20.00%)	4 (19.05%)	15 (30.00%)	6 (28.56%)			246 (19.16%)	57 (18.94%)	89 (23.80%)	NA						
E	9 (15.00%)	3 (14.29%)	5 (10.00%)	3 (14.29%)			117 (9.11%)	35 (11.63%)	41 (10.96%)	NA						
U/CC	9 (15.00%)	3 (14.29%)	7 (14.00%)	5 (23.81%)			195 (15.19%)	29 (9.64%)	55 (14.71%)	NA						

Note: LM = lesbian mothers. HM = heterosexual mothers. GF = gay fathers. HF = heterosexual fathers. For the two-way distribution comparisons with international and national data the Ds, E, and U/CC patterns were collapsed into the “insecure” category, excepted for national normative fathers for whom the four-way distribution was not available, and therefore the “insecure” category included Ds and E patterns only. Comparisons based on the three- and four-way distributions were not carried on given the expected low frequency in some cells. Where applicable, chi square tests conducted with Yates’ correction. ^a Based on Bakermans-Kranenburg and van IJzendoorn (2009a; raw numbers communicated via email on August 4, 2022). International normative mothers were compared with lesbian and heterosexual mothers. ^b From Cassibba et al. (2013). National normative mothers were compared with lesbian and heterosexual mothers. ^c Based on Bakermans-Kranenburg and van IJzendoorn (2009a; raw numbers communicated via email on August 4, 2022). International normative fathers were compared with gay and heterosexual fathers. ^d From Cassibba et al. (2013). National normative fathers were compared with gay and heterosexual fathers. NA = Not available. Percentages may not equal 100 due to rounding.

used interview-based attachment measures (i.e. Attachment Interview for Childhood and Adolescence, Ammaniti et al., 2000; Child Attachment Interview; Bizzi et al., 2021) showed no significant differences. For descriptive reasons, Tables 5 also displays the three-way FFI distribution. The four-way FFI distribution was not presented since no child in any family type was classified as disoriented/disorganized.

Intergenerational transmission of attachment: mediating role of parents' AAI-RF

Three mediational models—one per family type – were run with confidence intervals computed using the bootstrap percentiles method and 5,000 resamples. In all family types, the results showed a significant indirect effect of parents' AAI coherence of mind on children's attachment security, through parents' RF. As shown in Table 6, parents with greater AAI coherence of mind showed higher levels of AAI-RF, which, in turn, was associated with greater children's FFI attachment security. The Monte Carlo power analysis for indirect effects showed a moderate to large power of 64% (lesbian mother families), 81% (gay father families), and 57% (heterosexual parent families), based on a 95% CI. However, the direct effect was also significant, indicating that parents' coherence of mind directly influenced children's attachment security. Overall, the three models explained 25% (lesbian mother families), 38% (gay father families), and 41% (heterosexual parent families) of the variance. Table 6 presents the full statistics. When the analyses were repeated controlling for children's age, similar significant results were found. Also, the three mixed models—one for each family type—indicated no differences in the attachment security scores based on children's age (see Supplemental Material).

Discussion

The present study represents the first investigation of the attachment pattern distributions and intergenerational transmission of attachment via AAI-RF in lesbian, gay, and heterosexual parent families through assisted reproduction. Furthermore, the study explored potential differences in FFI child attachment security by family type, and parents' AAI coherence of mind and AAI-RF by gender and sexual orientation.

On average, children in all family types showed similar high levels of FFI attachment security, regardless of their age; also, no differences in AAI coherence of mind (used as an index of parents' attachment mental state) emerged according to parent gender and sexual orientation. However, lesbian and gay parents demonstrated higher AAI-RF than heterosexual parents. Differences in AAI-RF were also found based on parent gender by sexual orientation, with gay fathers showing higher AAI-RF than heterosexual fathers. Several aspects may help explain these differences.

First, and in relation to both lesbian and gay parents, their parental desire is not routinely encouraged or supported (Armesto, 2002; Biblarz & Stacey, 2010). Insofar as an individual's life is shaped by their historical moment and location (Elder, 1998), many people with minoritized sexual identities – such as the lesbian women and the gay men in the present sample, who were mainly in their mid-40s and had begun to “come out” during the 1980s – have been exposed to discourses that equate heterosexuality with parenthood and homosexuality with childlessness (Mallon, 2004). In the 1980s, “assuming

Table 5. FFI two- and three-way distributions by family type, and comparisons with international and national data from middle childhood samples.

FFI	Lesbian mother families (n = 30)		Gay father families (n = 25)		Heterosexual parent families (n = 21)		National data from AICA (10 years) ^a (n = 31)		National data from CAI (attachment to mother) ^b (n = 100)		National data from CAI (attachment to father) ^b (n = 100)	
	X ² (df)	p	X ² (df)	p	X ² (df)	p	X ² (df)	p	X ² (df)	p	X ² (df)	p
two-way	0.34(2) .843											
Secure	16 (53.33%)	15 (60.00%)	11 (52.38%)	20 (64.52%)	Comparison with LMF: 0.79(1) .375		Comparison with LMF: 0.07(1) 0.07(1)		Comparison with LMF: 0.13(1) 0.13(1)		Comparison with GFF: 0.718	
	14 (46.67%)	10 (40.00%)	10 (47.62%)	11 (35.48%)	Comparison with GFF: 0.12(1) .729		Comparison with GFF: 0.09(1) 0.09(1)		Comparison with LMF: .797		Comparison with HPF: 0.09(1) .761	
Insecure	2 (6.67%)	2 (8.00%)	2 (9.52%)	2 (6.45%)	Comparison with HPF: 0.77(1) .382		Comparison with HPF: 0.761		Comparison with HPF: 0.09(1) .761		Comparison with HPF: 0.09(1) .761	
	16 (53.33%)	15 (60.00%)	11 (52.38%)	20 (64.52%)	Comparison with LMF: 0.79(1) .375		Comparison with LMF: 0.07(1) 0.07(1)		Comparison with LMF: 0.13(1) 0.13(1)		Comparison with GFF: 0.718	
Ds	12 (40.00%)	8 (32.00%)	8 (38.10%)	9 (29.03%)	Comparison with GFF: 0.12(1) .729		Comparison with GFF: 0.09(1) 0.09(1)		Comparison with LMF: .797		Comparison with HPF: 0.09(1) .761	
	2 (6.67%)	2 (8.00%)	2 (9.52%)	2 (6.45%)	Comparison with HPF: 0.77(1) .382		Comparison with HPF: 0.761		Comparison with HPF: 0.09(1) .761		Comparison with HPF: 0.09(1) .761	
E	16 (53.33%)	15 (60.00%)	11 (52.38%)	20 (64.52%)	Comparison with LMF: 0.79(1) .375		Comparison with LMF: 0.07(1) 0.07(1)		Comparison with LMF: 0.13(1) 0.13(1)		Comparison with GFF: 0.718	
	12 (40.00%)	8 (32.00%)	8 (38.10%)	9 (29.03%)	Comparison with GFF: 0.12(1) .729		Comparison with GFF: 0.09(1) 0.09(1)		Comparison with LMF: .797		Comparison with HPF: 0.09(1) .761	
F	2 (6.67%)	2 (8.00%)	2 (9.52%)	2 (6.45%)	Comparison with HPF: 0.77(1) .382		Comparison with HPF: 0.761		Comparison with HPF: 0.09(1) .761		Comparison with HPF: 0.09(1) .761	
	16 (53.33%)	15 (60.00%)	11 (52.38%)	20 (64.52%)	Comparison with LMF: 0.79(1) .375		Comparison with LMF: 0.07(1) 0.07(1)		Comparison with LMF: 0.13(1) 0.13(1)		Comparison with GFF: 0.718	
D _s	12 (40.00%)	8 (32.00%)	8 (38.10%)	9 (29.03%)	Comparison with GFF: 0.12(1) .729		Comparison with GFF: 0.09(1) 0.09(1)		Comparison with LMF: .797		Comparison with HPF: 0.09(1) .761	
	2 (6.67%)	2 (8.00%)	2 (9.52%)	2 (6.45%)	Comparison with HPF: 0.77(1) .382		Comparison with HPF: 0.761		Comparison with HPF: 0.09(1) .761		Comparison with HPF: 0.09(1) .761	
E	16 (53.33%)	15 (60.00%)	11 (52.38%)	20 (64.52%)	Comparison with LMF: 0.79(1) .375		Comparison with LMF: 0.07(1) 0.07(1)		Comparison with LMF: 0.13(1) 0.13(1)		Comparison with GFF: 0.718	
	12 (40.00%)	8 (32.00%)	8 (38.10%)	9 (29.03%)	Comparison with GFF: 0.12(1) .729		Comparison with GFF: 0.09(1) 0.09(1)		Comparison with LMF: .797		Comparison with HPF: 0.09(1) .761	
F	2 (6.67%)	2 (8.00%)	2 (9.52%)	2 (6.45%)	Comparison with HPF: 0.77(1) .382		Comparison with HPF: 0.761		Comparison with HPF: 0.09(1) .761		Comparison with HPF: 0.09(1) .761	
	16 (53.33%)	15 (60.00%)	11 (52.38%)	20 (64.52%)	Comparison with LMF: 0.79(1) .375		Comparison with LMF: 0.07(1) 0.07(1)		Comparison with LMF: 0.13(1) 0.13(1)		Comparison with GFF: 0.718	

Note: LMF = lesbian mother families. GFF = gay father families. HPF = heterosexual parent families. ^aAmmaniti et al. (2000); only data from AICA 10 (p. 335) were considered, given similarities to the child mean age in the present sample. National normative data from AICA were compared with all three family types. ^bBizzi et al. (2021). National normative data from CAI-mothers were compared with lesbian and heterosexual parent families, while data from CAI-fathers were compared with gay and heterosexual parent families. FFI four-way distributions were not compared with international data as no children in the present sample were coded as “disorganized.” Percentages may not equal 100 due to rounding.

Table 6. Intergenerational transmission of attachment through parents' AAI-RF, by family type ($N = 152$ parents and 76 children nested within 76 families).

Type	Effect	Estimate	SE	Lower	Upper	β	p
Family type: Lesbian mother families (n = 60 mothers and 30 children)						95% CI	
Indirect	AAI coherence of mind \Rightarrow AAI-RF \Rightarrow FFI attachment security	0.05	0.02	0.02	0.09	.14	.008
Component	AAI coherence of mind \Rightarrow AAI-RF	0.45	0.10	0.25	0.65	.47	<.001
	AAI-RF \Rightarrow FFI attachment security	0.11	0.04	0.03	0.18	.31	.005
Direct	AAI coherence of mind \Rightarrow FFI attachment security	0.10	0.05	< 0.01	0.19	.27	.046
Total	AAI coherence of mind \Rightarrow FFI attachment security	0.15	0.04	0.07	0.23	.42	<.001
Family type: Gay father families (n = 50 fathers and 25 children)						95% CI	
Indirect	AAI coherence of mind \Rightarrow AAI-RF \Rightarrow FFI attachment security	0.08	0.04	0.02	0.16	.18	.025
Component	AAI coherence of mind \Rightarrow AAI-RF	0.41	0.12	0.18	0.64	.43	<.001
	AAI-RF \Rightarrow FFI attachment security	0.20	0.05	0.10	0.29	.43	<.001
Direct	AAI coherence of mind \Rightarrow FFI attachment security	0.13	0.05	0.02	0.23	.29	.012
Total	AAI coherence of mind \Rightarrow FFI attachment security	0.21	0.06	0.10	0.32	.48	<.001
Family type: Heterosexual parent families (n = 42 parents and 21 children)						95% CI	
Indirect	AAI coherence of mind \Rightarrow AAI-RF \Rightarrow FFI attachment security	0.10	0.05	0.01	0.20	.21	.045
Component	AAI coherence of mind \Rightarrow AAI-RF	0.63	0.11	0.41	0.85	.63	<.001
	AAI-RF \Rightarrow FFI attachment security	0.15	0.07	0.02	0.29	.34	.028
Direct	AAI coherence of mind \Rightarrow FFI attachment security	0.16	0.07	0.03	0.29	.37	.017
Total	AAI coherence of mind \Rightarrow FFI attachment security	0.26	0.06	0.15	0.37	.58	<.001

Note: AAI = Adult Attachment Interview. AAI-RF = Reflective functioning, coded on the AAI. FFI = Friends and Family Interview. Estimate = unstandardized betas. Betas are completely standardized effect sizes. CI = confidence interval. SE = standardized error. Confidence intervals were computed using the bootstrap percentiles method. FFI attachment security was residualized from children's WISC-IV Verbal Comprehension Index scores. Each child had two FFI attachment security scores—one in relation to each parent.

a gay identity seemed to automatically entail losing [one's] prospective parent identity" (DeBoehr, 2009, p. 329). Thus, to become a parent, the lesbian and gay participants in our sample who had been exposed to this master narrative must have rejected it in order to envision an alternative reality (Goldberg et al., 2012). This task may have triggered their reflection on their own family experiences during childhood, fostering higher AAI-RF.

Secondly, and specifically in relation to gay fathers over heterosexual fathers, the process of surrogacy involves a radical confrontation with psychological, ethical, and social issues, especially considering that surrogacy is illegal in Italy. Moreover, it entails building a relationship with the surrogate and her family, who reside in a foreign country, along with significant financial expenses. Finally, the practice faces opposition from various quarters, both within and outside the LGBTQIA+ community (Blake et al., 2017; Ioverno et al., 2018). These unique challenges prompt gay fathers to examine and reflect on their desire for parenthood continually and deeply. In doing so, they may have also reflected on how and why their own parents behaved as they did.

Thirdly, caregiving task-sharing is more equal between gay couples compared to heterosexual couples (Carone et al., 2022). As a result, it is possible that gay fathers were more directly involved in caregiving their children than heterosexual fathers. Consequently, this daily experience might have engaged them more in mentalizing about their own past experiences and their children's behavior in terms of mental states. Finally, it cannot be excluded that the gay fathers' higher RF (compared to heterosexual fathers) could have been influenced by their elevated socioeconomic status. This factor

has been demonstrated to play a significant role in influencing RF (e.g. Buttitta et al., 2019; Stuhmann et al., 2022).

Regarding the three-way AAI distributions, approximately 59% of lesbian mothers, 65% of heterosexual mothers, 51% of gay fathers, and 45% of heterosexual fathers were classified as secure-autonomous; these figures showed only slight decline in the four-way distribution (i.e. 50%, 52%, 46%, and 33%, respectively). Relatedly, parents' AAI two-way (secure versus insecure) distributions did not differ between lesbian mothers, gay fathers, heterosexual mothers, and heterosexual fathers, or in comparison to normative international (Bakermans-Kranenburg & van IJzendoorn, 2009a) and national (Cassibba et al., 2013) data. The lack of gender differences aligns with previous meta-analytic results (Bakermans-Kranenburg & van IJzendoorn, 2009a) and supports evidence that secure attachment is adaptive and even normative, at least in Western contexts (van IJzendoorn, 1995; Verhage et al., 2016).

Similar to the results for parents, for children, no differences in FFI (secure versus insecure) attachment pattern distributions were found between family types or in comparison to international and national data referring to middle childhood samples (Ammaniti et al., 2000; Bakermans-Kranenburg & van IJzendoorn, 2009b; Bizzi et al., 2021). Looking more closely at the three-way FFI distribution, approximately 53%, 60%, and 52% of children of lesbian, gay, and heterosexual parents, respectively, showed a secure-autonomous attachment pattern. Of note, no child in any family type was classified as disoriented-disorganized. These results echo the findings of the few prior studies on attachment quality of children of lesbian and gay parents through assisted reproduction (Carone et al., 2020a) and adoption (Feugé et al., 2020; McConnachie et al., 2020), as well as the wider literature on diverse family forms (Golombok, 2015; Imrie & Golombok, 2020; Patterson, 2017; Zanchettin et al., 2022), showing that neither parents' sexual orientation nor conception via assisted reproduction is necessarily detrimental to healthy child development. As a side note, it should be mentioned that the lack of disoriented-disorganized children may also be linked to the low rates of disorganization found in studies using autobiographical attachment interviews in middle childhood compared to other ages and other measures (Gastelle & Kerns, 2022).

Overall, the normative rates of attachment security found in the present sample of children may be attributed to parents' characteristics, children's characteristics, or a combination of both. Considering that the large majority of parents accessed assisted reproduction through clinics, which typically require intended parents to undergo psychological counselling, it stands to reason that parents who completed the conception process were more likely to be better-adjusted, with evident benefits for the child – parent attachment relationship. Also, in light of parents' AAI attachment patterns, it is perhaps unsurprising that most children were rated as secure, given evidence of attachment continuity between parents and children (Fonagy et al., 1991; van IJzendoorn & Bakermans-Kranenburg, 1997; Verhage et al., 2016). This also aligns with our hypothesis about the significant direct effect of parent attachment security on child attachment security, with parents who showed greater AAI coherence of mind having children reporting greater FFI attachment security in the three family types.

In line with our second hypothesis of the intergenerational transmission of attachment (van IJzendoorn & Bakermans-Kranenburg, 1997), parents' AAI-RF was found to mediate the association between parents' AAI coherence of mind and children's FFI attachment

security. This effect was significant and similar across all family types, suggesting that the original idea of Fonagy et al. (1991)—that a mother’s capacity to make sense of her child’s behavior in light of internal, affective experience is linked to her child’s feeling of safety and security in that relationship – extends to lesbian, gay, and heterosexual parents through assisted reproduction. More specifically, greater parental coherence of mind was associated with higher AAI-RF, which, in turn, was associated with greater child attachment security. That is, parents’ ability to reflect on their own experiences as children (in terms of mental states) and convey a coherent state of mind that was not overwhelmed by those experiences, represented a resource for children, enabling them to rely on their parents when coping with the challenges of middle childhood.

The confirmation of the intergenerational transmission of attachment hypothesis in the three family types is particularly meaningful, given the characteristics of the sample and children’s developmental phase. In middle childhood, identity formation is a key task (Erikson, 1968) that may coincide with parents’ disclosure of ART conception and deepening conversations about family diversity in families with same-gender parents and/or families through assisted reproduction. In the present sample, all children had been informed of their ART origins (however, we did not collect data on the specific information they received). Considering that middle childhood is associated with children’s deepening understanding of the meaning and implications of biological inheritance (Blake et al., 2010), children in the present sample may have been grappling with questions about their family structure, origins, and alignment with societal norms and expectations. Also, beginning in middle childhood, children of lesbian, gay, and heterosexual parents through assisted reproduction are more likely to experience a wide set of emotions related to their family structure, such as curiosity, pride, confusion, and even concern over societal acceptance (Carone et al., 2018a; Zadeh et al., 2018).

The present results indicate that lesbian, gay, and heterosexual parents who maintain a consistent attachment state of mind without becoming emotionally overwhelmed are able to establish meaningful connections between their past emotional experiences as children and their present role as parents, and to transmit this connection to their children in a regulated fashion. A secure attachment state of mind may also provide parents with effective strategies for managing emotions during potentially stressful parenting situations (George & Solomon, 2008), such as when their children confront them with questions about their conception. Additionally, as children’s FFI attachment security considered both safe haven and secure base scores, the significant mediating role of AAI-RF suggests that parents served as safe havens for their children, helping them to navigate the unique challenges associated with their family structure. This may have allowed children to confidently rely on their parents for clarification and emotional support, and to use them as secure bases for exploring and understanding their ART origins.

Limitations, strengths, and future directions

The present study has several limitations. First, the sample primarily involved parents who were White, well educated, and of a medium to high socioeconomic status, and who had disclosed their use of assisted reproduction to their children. While this limits the generalizability of the results, it primarily affects the generalization to heterosexual parents

through gamete donation, who present varying rates of disclosure (Tallandini et al., 2016) and sociodemographic characteristics, and are the only population allowed to access third-party assisted reproduction in Italy. Conversely, across studies, the demographic composition of lesbian mothers through donor insemination and gay fathers through surrogacy has been relatively homogeneous (Golombok, 2015; Patterson, 2017). In addition, although we examined the intergenerational transmission of attachment, the results were based on correlational data; therefore, our ability to draw causal conclusions was restricted. Future longitudinal research is needed to confirm the accuracy of the identified mediation path.

As a further limitation, the FFI was designed for use with children older than 8 years, though some previous studies have used it to interview younger children (e.g. Abrines et al., 2012; Pace, 2014; Psouni et al., 2020; Zadeh et al., 2017). Irrespective of family type, dismissing children seemed overrepresented in the present study, relative to national and international data (though not to a significant degree). Of note, several children classified as “dismissing” answered vaguely or shiftily (e.g. “I don’t know,” “I don’t remember”) when asked to produce specific examples to support their answers. It is unclear whether this pattern may have been influenced by the limited narrative coherence of the younger children in the sample, or whether it might otherwise reflect avoidant affect regulation strategies in the older children (potentially adapted to minimize dependency on parents) (Ammaniti et al., 2000). As a side note, it cannot be excluded that, despite all of the precautions taken to create a defined and confidential setting, the online interviews via Zoom may not have been conducive to child focus, and they may have exacerbated children’s emotional distance, biasing their scores towards avoidance. This is not entirely unfounded, given that the categorical FFI scores were based on continuous scores in each attachment dimension, with the dimension that achieved a score of 3 or higher considered the predominant attachment pattern.

Finally, the relatively small sample size forced us to group together heterosexual parents through egg donation and heterosexual parents through sperm donation, and prevented us from examining the role of “ecological constraints” as a moderator of intergenerational transmission. Considering the characteristics of the present sample, future research should aim at testing the ecological model of the intergenerational transmission of attachment (van IJzendoorn & Bakermans-Kranenburg, 1997), taking into account, for example, families’ social context (e.g. experiences of stigmatization, social policies, attitudes towards access to assisted reproduction) as a moderator of the relationship between parents’ IWM and AAI-RF, as well as individual or family characteristics (e.g. biological link to the child, caregiving role) in the relationship between parents’ AAI-RF and child attachment.

Future studies with larger samples are also required, given the growing emphasis on children’s attachment networks of relationships (Dagan & Sagi-Schwartz, 2021). In this vein, although we collected AAI data from both parents and considered children’s FFI safe haven and secure base scores in relation to each parent, we lacked the statistical power to determine whether the intergenerational transmission of attachment was also influenced by discrepancies in parents’ AAI classifications, AAI-RF low/high scores, and/or children’s FFI secure/insecure pattern matching with each parent. Similarly, future research could examine and compare the strength of the intergenerational transmission of attachment in families with parents diverse in their sexual orientations, in light of previous evidence that

the intergenerational transmission of secure-autonomous attachment is stronger from mothers than from fathers in heterosexual biological parent families (e.g. Steele et al., 1996; van IJzendoorn, 1995). We could not address this issue due to the quite limited sample size of heterosexual parents through gamete donation and the family approach (i.e. considering the child and both their parents simultaneously) we adopted in this study.

Notwithstanding these limitations, the present study demonstrates unique strengths, insofar as it extends one of the core hypotheses of attachment theory (i.e. the intergenerational transmission of attachment) to diverse family forms that were not originally considered by Bowlby when he developed his theory. Another strength is that we examined the contribution of parents' attachment states of mind to children's attachment security through AAI-RF using gold standard measures of attachment; in contrast, the few available studies using similar instruments have focused on children in adoptive lesbian, gay, and heterosexual parent families (Feugé et al., 2020; McConnachie et al., 2020) or lesbian and single parent families through donor insemination (Slutsky et al., 2016; Zadeh et al., 2017). Also, given the stigma surrounding families headed by parents with minoritized sexual identities and ART families in Italy (Carone et al., 2018b; Lingiardi & Carone, 2016), the use of both the AAI and the FFI over self-report questionnaires of attachment allowed us to tap into automatic (unconscious) attachment processes, while preventing both parents and children, respectively, to influence outcomes.

Study implications

While parenting during middle childhood requires parents to understand the motivations underlying their children's behavior as they become increasingly independent and develop their own identities (Kerns & Brumariu, 2016), lesbian, gay, and heterosexual parents through assisted reproduction may face additional challenges. All parents in this study had disclosed their ART conception and family structure (e.g. two mothers, two fathers) to their children. It is therefore reasonable that, at the time of the data collection, children had begun to elaborate on their conception and gain an understanding of the nature of their family relationships and the roles played by the gamete donor and surrogate in their family formation. Also, in all families, only one parent was biologically related to the child. Thus, the lack of resemblance between the child and the non-biological parent may have represented a further topic of discussion, with regard to family structure (Becker et al., 2005). This might have potentially distressed the non-biological parent, with ripple effects on the entire family system.

Under these circumstances, it is reasonable to speculate that a secure attachment state of mind may have helped parents freely explore the topic of biological relatedness and recognize whether – and to what extent – this influenced their relationships with their children (Carone et al., 2023). In parallel, securely attached parents may have been more likely to significantly contribute to their children's capacities to organize defenses, regulate affects, and revise their representations of themselves and their parents, based on new information. Furthermore, the present results indicate that secure parents were more likely to reflect on their own memories of childhood relationships in mentalistic terms, and this may have facilitated their understanding of their children's behaviors as expressions of

intentional mental states (e.g. feelings, desires, needs). This may have allowed parents to better support their children's questioning of their family structure and ART origins.

The disclosure of assisted conception is increasingly recommended (Erikson et al., 2018), and children's questions about their origins and family structure are likely to change as they age (Tallandini et al., 2016). Based on the present results, it is recommended that family and clinical psychologists interacting with ART families situate these discussions within the child – parent attachment relationship. Practitioners should also support parents in examining – and eventually elaborating upon – their own attachment mental states, as their ability to do so may impact their provision of emotional support to their children. Similarly, there is evidence that RF has a dynamic, rather than a static, nature (Fonagy & Target, 1997), and that increasing parents' RF may improve the quality of both their parenting behaviors and children's attachment security (Camoirano, 2017; Katznelson, 2014; Zeegers et al., 2017), particularly in middle childhood (Lo & Wong, 2022). In this vein, the present results encourage practitioners working with parents of diverse sexual orientations and pathways to parenthood to design interventions that integrate the specific characteristics of lesbian, gay, and heterosexual parent families, in order to better reflect and validate the experiences of parents and their school-aged children through assisted reproduction, from an attachment perspective.

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Data sharing statement

The data that support the findings of this study are not publicly available. However, further information about this study is available from the corresponding author upon reasonable request.

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