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## Disclosure and child exploration of surrogacy origins in gay father families: Fathers' Adult Attachment Interview coherence of mind matters

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### ABSTRACT

**Objective:** The present study aimed at investigating whether gay fathers' coherence of mind within the Adult Attachment Interview (AAI) moderated the influence of parental disclosure on children's exploration of their surrogacy origins during middle childhood and early adolescence.

**Background:** Once children of gay fathers are disclosed to about their surrogacy conception, they may start exploring the meanings and implications of their conception. Very little is known about the factors that may enhance such exploration in gay father families.

**Method:** A home-visit study was conducted with 60 White, cisgender, gay fathers and their 30 children born through gestational surrogacy, all residing in Italy and with medium to high socioeconomic status. At time 1, when children were aged 6–12 years ( $M = 8.31$ ,  $SD = 1.68$ ), fathers were rated for AAI coherence of mind and interviewed about their disclosure of the surrogacy origins to their child. At time 2, approximately 18 months later ( $M = 9.87$ ,  $SD = 1.69$ ), children were interviewed about their exploration of their surrogacy origins.

**Results:** In the context of more information disclosed about the child conception, only children whose fathers showed greater AAI coherence of mind explored their surrogacy origins in more depth.

**Conclusion:** Gay fathers' ability to show an internally consistent, but not emotionally overwrought, state of mind regarding their own attachment experiences impacted the extent to which their children felt safe and legitimated in sharing their curiosity about their conception.

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Gay father family; surrogacy origins; attachment coherence of mind; Adult attachment interview; disclosure

## Introduction

Gay fathers through surrogacy need to explain their path to parenthood to their children. Two previous studies involving gay father families with children born through gestational surrogacy and aged 3–9 years (conducted in the United States and Italy, respectively) indicated that, in addition to explaining the roles played by the surrogate and egg donor,

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gay couples may or may not tell their children which father is genetically related to them (Blake et al., 2016; Carone, Baiocco, et al., 2018). Once the complete or a partial conception story is disclosed, children may start to explore the meanings of their origins. This may be particularly true for school-age children, as, by middle childhood, children begin to grasp the significance of the biological concept of the family and the implications of a lack of biological connection among family members (Brodzinsky, 2011; Williams & Smith, 2010).

Also, in Italy (where the present study was conducted), children typically transition to primary school by the age of 6. At this point, children of gay fathers are likely to be confronted with family types that differ from theirs and to face questions from their peers about the uniqueness of their family composition and their surrogacy origins (Carone et al., 2022). It is possible, therefore, that these events, coupled with the development of social perspective-taking abilities and the gradual acquisition of new coping strategies during middle childhood (Compas et al., 2001), may contribute to the increase in child curiosity about their surrogacy origins (Carone et al., 2021; Carone, Barone, et al., 2020).

In the present study, children's questions about the surrogacy procedure, thoughts expressed towards the surrogate and the egg donor, and self-initiated conversations about the family structure were considered indicative of the degree to which children were exploring their surrogacy origins. To date, only one study has explored factors that enhance the exploration of surrogacy origins in children of gay fathers during middle childhood. In an Italian study, Carone, Barone, et al. (2020) followed-up 30 school-age children born through gestational surrogacy and their 66 gay fathers to explore the separate and combined influences of child attachment security and parental scaffolding during discussions about conception on children's exploration of their surrogacy origins. Within each family, both father – child dyads participated in a 5-minute videotaped conversation regarding an aspect of the child's conception, as well as filled a questionnaire to evaluate their attachment security to their fathers. Approximately 18 months later, children were interviewed about their surrogacy origins. The results showed that fathers who were empathically attuned and supported their children in elaborating upon their questions regarding surrogacy had children who expressed their thoughts and feelings towards the surrogate and the egg donor, and initiated conversations about their genetic origins to a greater extent. However, this was only true when children perceived greater attachment security to their fathers. Building on this research, the present study emphasised the relevance of adopting an attachment perspective for children's experiences of their surrogacy origins (Quintigliano et al., 2022).

Given its focus on the emotion regulation processes underlying childrearing, the attachment theory suggests that further factors may be involved in children's explorations of their surrogacy origins in gay father families. Specifically, parents' attachment state of mind, referring to mental representations of childhood experiences that are organised in a set of rules about attachment-related information that guide their responses to children's signals (Main et al., 1985; van IJzendoorn, 1995), has been shown to be a key component of caregiving (Cassidy & Shaver, 2016; Main et al., 1985). Attachment states of mind can be derived from the Adult Attachment Interview (AAI; George et al., 1985; Main et al., 2002) and classified into four categories: secure-autonomous, insecure-dismissing, insecure-preoccupied, and unresolved (i.e. towards loss or trauma). Previous attachment research has indicated that parents with an insecure (i.e. dismissing, preoccupied) or unresolved attachment state of mind are less open to the

entire range of emotions, and thus less balanced in their responses to children's negative feelings (Cassidy & Shaver, 2016). Furthermore, insecure attachment states of mind have been found to be associated with less adaptive emotion regulation strategies, thereby interfering with problem-solving and reappraisal in potentially demanding situations (Shaver & Mikulincer, 2007).

Along with providing attachment patterns, the AAI is coded in relation to the coherence of the discourse produced during the interview (van IJzendoorn, 1995), which is operationalised in the *coherence of transcript* and *coherence of mind* scales. Coherence of transcript assesses the degree to which an individual's narrative conforms to Grice's (1975) maxims for conversational implicature, specifically, that discourse be truthful/supported by evidence, be informative/detailed, stays on topic, and be well organised, while coherence of mind accounts for the "nature of the subjects' apparent belief systems in comparison to the judge's own assessment of reality" (Main et al., 2002, p. 108) and is reflected by the coherence of transcript. Accordingly, coherence of mind indicates an individual's attachment representation, with coherent respondents describing their early experiences and relationships in an internally consistent, but not emotionally overwrought, autobiographical manner (e.g. Roisman et al., 2001; Waters et al., 2018). Coherence of transcript and coherence of mind scales are viewed theoretically as the single best indicators of security in the AAI and are highly correlated (e.g. George et al., 1985; Main et al., 2002; Roisman et al., 2007; Waters et al., 2018). Therefore, in the present study coherence of mind was preferred over coherence of transcript in line with previous research on caregiving and parent-child relationship (e.g. Roisman et al., 2001; Waters et al., 2018).

Children's challenging questions about their surrogacy origins may activate gay fathers' caregiving system, potentially evoking stances of vulnerability and memories of loss, thereby increasing the risk for stressful feelings (Busch et al., 2008). Although this specific hypothesis has not been tested, qualitative studies with heterosexual and lesbian parents have shown that genetic unrelatedness to one's child can be experienced as coming 'third in line' (Raes et al., 2014, p. 434) in the family, providing an additional challenge to parental equality (e.g. Faccio et al., 2019; Indekeu et al., 2014; Indekeu, 2015; Lingiardi et al., 2016; Raes et al., 2014; Stevens et al., 2003). Such feeling of threat may also affect the genetic parent, who may fear, in fantasy, that the donor or surrogate will take the baby away (Ehrensaft, 2012).

With specific reference to the study sample, from a psychodynamic perspective (Ehrensaft, 2012; Lingiardi & Carone, 2019), it is reasonable that the lack of legal recognition of sexual minority parent families and the ban on domestic surrogacy in Italy may trigger (even unconscious) fears and anxieties in gay fathers through surrogacy, regarding their validity as parents. Such fears and anxieties may be particularly triggered when children show interest in their origins. In this scenario, attachment theory would suggest that fathers who are more coherent in discussing their own childhood experiences may be in a better position to talk openly and elaboratively with their own children about the past (i.e. surrogacy conception) and, thus, to positively shape their children's understanding of events and to securely support them while navigating their experiences (i.e. exploration of origins) (Bowlby, 1988; Reese, 2008; Shlafer et al., 2015).

Based on the research and attachment theory reviewed above, the present study aimed at investigating whether fathers' AAI coherence of mind (at time 1) moderated

the influence of parental disclosure (at time 1) on children's exploration of their surrogacy origins (at time 2). It was hypothesised that, in the context of more information disclosed about the child conception, children whose fathers showed greater AAI coherence of mind would explore their surrogacy origins in more depth.

## Materials and methods

### Participants

The sample comprised 30 children born through gestational surrogacy abroad and their 60 gay fathers, residing in Italy. At time 1 (t1), children were mean aged 8 years and 3 months ( $SD = 1.68$ ; range: 6–12 years), whereas at time 2 (t2; approximately 18 months later), children's mean age was 9 years and 9 months ( $SD = 1.69$ ; range: 7.5–13.5 years). In families with more than one child in the relevant age range, the oldest child was studied. The choice to involve families with children aged 6–12 years at t1 was motivated by what was practical in terms of sample size and what was developmentally appropriate considering that in Italy children enter primary school at 6 years and, thus, are more likely to be exposed to different families from theirs.

At t1, families were recruited in the context of a larger, in-depth study of child adjustment and parenting in gay father surrogacy families (Carone, Baiocco, et al., 2020; Carone, Lingiardi, et al., 2018). Multiple strategies were used to include as diverse a sample as possible, through the main Italian association of sexual minority parents ( $n = 14$ , 46.7%), sexual minority parent Internet groups and forums ( $n = 7$ , 23.3%), events at which sexual minority parents were in attendance ( $n = 3$ , 10.0%), and snowballing ( $n = 6$ , 20.0%). At t1, the inclusion criteria for gay father families were that the couple had lived together since the child's birth, resided in Italy, and had conceived through surrogacy. At t2, parental couples were to still be together. For three families participating at t1 data were not collected at t2 because parents did not consent to involve again their children, without providing any further reason (90.91% retention rate). These three families did not differ from families who were still retained in the study on any of the socio-demographics and study variables collected at t1. Table 1 presents the sociodemographic details of the sample.

### Procedure

Three researchers at t1 and one researcher at t2 visited families at home and interviewed both fathers and the target child between September 2017–April 2018 and March 2019–October 2019, respectively. Each interview was conducted separately with each family member (i.e. the two fathers and the target child) during the same visit, in a different room of the house. Written informed consent was obtained from all fathers, who also gave consent for their children to participate. Children gave verbal consent. All participants were 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 the data collection. Study approval was obtained from the Institution Ethics Committee. The study was carried out according to the Ethical Code of the Italian Association of Psychology (AIP) and the

**Table 1.** Socio-demographic information of participating families (*N* = 60 fathers and their 30 children, nested within 30 families).

	Gay father families
<i>Family variables (N = 30)</i>	<i>N (%)</i>
Child assigned sex at birth (female)	16 (53.33)
Number of siblings	
0	10 (33.33)
1	18 (60.00)
2 or more	2 (6.67)
Family residence	
Northern Italy	14 (46.67)
Central Italy	15 (50.00)
Southern Italy	1 (3.33)
Where surrogacy arrangements have been carried out (including the source of the egg donor)	
California	11 (36.67)
Connecticut	6 (20.00)
Colorado	4 (13.33)
Oregon	2 (6.67)
British Columbia	2 (6.67)
Ontario	2 (6.67)
Maryland	1 (3.33)
Colombia	1 (3.33)
India	1 (3.33)
Egg donors' identity status at t1	
Anonymous	7 (23.33)
Open identity	23 (76.67)
Level of disclosure at t1	
Only the involvement of the surrogate	13 (43.33)
The involvement of the surrogate and the egg donor or the (non-)genetic father's identity	8 (26.67)
The involvement of the surrogate and the egg donor, and the (non-)genetic father's identity	9 (30.00)
	<i>M (SD)</i>
Annual household income (in Euros)	120,433.33 (55,138.66)
Length of couple relationship (in years)	15.37 (5.01)
<i>Individual variables (N = 60)<sup>a</sup></i>	<i>n (%)</i>
Father ethnicity (Caucasian)	
Genetic fathers	58 (96.67)
Non-genetic fathers	27 (46.55)
(Non-)genetic status not disclosed	4 (6.90)
Father education (bachelor's degree or higher)	49 (81.67)
Genetic fathers	25 (51.02)
Non-genetic fathers	22 (44.90)
(Non-)genetic status not disclosed	2 (4.08)
Father occupation (professional/managerial)	50 (83.33)
Genetic fathers	22 (44.00)
Non-genetic fathers	24 (48.00)
(Non-)genetic status not disclosed	4 (8.00)
Father work status (full-time)	60 (100.00)
Genetic fathers	28 (46.67)
Non-genetic fathers	28 (46.67)
(Non-)genetic status not disclosed	4 (6.67)
	<i>M (SD)</i>
Child age at t1 (years)	8.31 (1.68)
Child age at t2 (years)	9.87 (1.69)
Father age (years)	46.55 (6.61)
Genetic fathers	46.43 (6.66)
Non-genetic fathers	46.18 (6.97)
(Non-)genetic status not disclosed	50.00 (2.31)

Note. Where not otherwise specified, all information refers to t2. For descriptive reasons, here the level of disclosure is reported as a frequency. <sup>a</sup>When data are presented for genetic and non-genetic fathers separately, the total *N* is 56 instead of 60, as 4 fathers (from 2 families) did not disclose their (non-)genetic status.

American Psychological Association (APA), and followed the Ethical Principles for Medical Research Involving Human Subjects (Declaration of Helsinki, seventh revision).

## Measures

### Administered at t1

**Surrogacy Disclosure.** In each family, the father who initiated contact with the researcher was asked to describe the disclosure of the surrogacy to their child (e.g. 'Have you spoken about the surrogacy with [child]? In responding, please, consider that we are interested in knowing whether your child received this information, regardless of you or the other father alone, or both of you, initiated the disclosure. If yes: Have you discussed who the surrogate is?'; 'Have you talked about the egg donation with [child]? If yes: Have you discussed who the egg donor is?'; 'Have you discussed whose sperm was used with [child?]. If yes: What did you say to them?'). The answers were coded as follows: 1 = fathers disclosed only the involvement of the surrogate; 2 = fathers disclosed the involvement of the surrogate and the egg donor or the identity of the genetic father; 3 = fathers disclosed the involvement of the surrogate and the egg donor, and the identity of the genetic father. As all children were disclosed about surrogacy, a code for '0 = not disclosed' was excluded. All interviews were coded by a single coder with research expertise in diverse family forms through assisted reproduction. Half of the interviews ( $n = 15$ ) were double-coded by a researcher experienced with qualitative techniques, resulting in an interrater reliability of  $\kappa = .92$  ( $p < .001$ ). Disagreements were solved through consensus meeting. In a previous study the interview demonstrated successful in investigating the disclosure process in gay father families with school-age children born through surrogacy (Carone, Baiocco, et al., 2018).

**Fathers' AAI Coherence of Mind.** In each family, each father was administered individually the Adult Attachment Interview (AAI; George et al., 1985; Main et al., 2002), which is a semi-structured, 20-question protocol used to characterise interviewees' current state of mind with respect to past child – parent attachment experiences (George et al., 1985). Each interview was transcribed verbatim and all identifying information was removed. On average, AAIs lasted 75 minutes. For the aim of this study, all transcripts were coded for the coherence of mind scale by one certified reliable coder, according to Main et al. (2002) criteria. This is a 9-point rating scale (1 = striking absence of coherence of mind; 3 = only slight coherence of mind; 5 = moderate coherence of mind; 7 = marked coherence of mind; 9 = strong coherence of mind), with secure individuals typically receiving a score of 5 or higher (Main et al., 2002). Subsequently, 25% ( $n = 15$ ) of the transcripts were coded by a second certified coder, resulting in an interrater reliability of  $\kappa = .81$  ( $p < .001$ ). Disagreements were solved through consensus meeting. The AAI has been shown to have excellent reliability, discriminant validity, and predictive validity (Bakermans-Kranenburg & van IJzendoorn, 1993; Crowell et al., 1996).

### Administered at t2

**Children's Exploration of their Surrogacy Origins.** Children were asked questions about their surrogacy origins information gap (e.g. 'What more would you like to know about your surrogacy conception?'). Follow-up probes were used to determine the

intensity of children's curiosity about the identified content. This interview format was adapted from the Minnesota/Texas Adoption Project (Grotevant & McRoy, 1997). The extent to which children were curious about their origins (shown, e.g. by questions about the surrogacy procedure or the egg donor's motivation, or particular feelings expressed towards the surrogate) was considered indicative of their degree of exploration of their surrogacy origins. This was coded using a 4-point scale, as follows: 1 = no/minimal exploration; 2 = low exploration; 3 = moderate exploration; 4 = great exploration. A detailed explanation of the codes is available in (Carone, Barone, et al., 2020). On average, child interviews lasted 30 minutes. A second coder, masked to participant data, rated 30% of the interviews ( $n = 9$ ); this resulted in an interrater reliability of  $\kappa = .75$  ( $p < .001$ ). Disagreements were solved through consensus meeting. In a previous study the interview demonstrated successful in investigating the explorations of surrogacy origins in children of gay fathers during middle childhood and early adolescence (Carone, Barone, et al., 2020).

### Data analysis

Means and standard deviations for each study variable were calculated and effects that were significant at  $p < .05$  were interpreted. Bivariate correlations were performed to explore the associations between study variables and sociodemographic factors. An analysis of variance (ANOVA) was run to identify potential gender differences in children's explorations of their surrogacy origins. In the event that significant differences were found, the following analyses were controlled for child gender. Also, the non-parametric Kruskal-Wallis test was conducted to examine whether AAI coherence of mind differed among genetic fathers, non-genetic fathers, and fathers who did not disclose their (non-) genetic status.

To identify the likelihood that the data would detect the factors that best explained children's exploration of their surrogacy origins, given a set of parameters (van de Schoot et al., 2014), several general linear models were computed and compared. Given the nested data structure, the intraclass correlation between fathers' AAI coherence of mind in each parental couple was checked using an unconditional mixed ANOVA with random effects, with only the outcome variable of interest (i.e. fathers' AAI coherence of mind) and no predictors. As the intraclass correlation coefficient from the unconditional model was below the suggested cut-off value of .250 to require linear mixed models (Guo, 2005; Cohen's  $\kappa = .172$ ), general linear models were preferred. All variables were centred in advance, to reduce multicollinearity. To overcome the possible limitations of the small sample size while maintaining predictive accuracy, general linear models were compared using the total coefficient of determination (TCD) and Bayesian information criterion (BIC) (Schwarz, 1978). The model with the highest TCD and lowest BIC was assumed to best fit the data.

To evaluate interactive effects, the Johnson – Neyman technique (Johnson & Neyman, 1936; Preacher et al., 2006) was used to inspect the range of values (i.e. regions of significance) of the moderator for which the independent and dependent variables were significantly associated. All analyses were performed using the statistical software R (R Core Team, 2021), with the *stats* package used for the general linear model to

compute the *p*-values of the main and interaction effects of the best model selected, and the *effects* package used to explore interaction effects.

## Results

### Children’s exploration of surrogacy origins: bivariate associations and gender differences

Table 2 presents the complete associations between the study variables and sociodemographic factors. The ANOVA revealed that girls and boys reported similar levels of exploration of their surrogacy origins,  $F(1,28) = 0.308, p = .583, \eta^2_p = 0.011$  [girls:  $M = 3.06, SD = 1.00$ ; boys:  $M = 2.86, SD = 1.03$ ].

### AAI coherence of mind among genetic fathers, non-genetic fathers, and fathers who did not disclose their (non-)genetic status

The non-parametric Kruskal-Wallis test indicated that genetic fathers ( $M = 5.16, SD = 1.61$ ), non-genetic fathers ( $M = 4.91, SD = 1.77$ ), and fathers who did not disclose their (non-)genetic status ( $M = 5.00, SD = 0.71$ ) did not differ in their AAI coherence of mind,  $\chi^2(2) = 0.443, p = .801, \epsilon^2 = 0.008$ .

### FathErs’ aai coherence of mind as a moderator of the relation between disclosure and children’s exploration of surrogacy origins

Table 3 displays the fit indices and model comparisons. Model 4, containing children’s age at t2 and the main and interactive effects of disclosure at t1 and fathers’ AAI coherence of mind at t1 as predictors, best explained children’s exploration of surrogacy origins at t2, with the highest global variance (i.e. TCD = .214) and the lowest BIC (174.109). Specifically, the interaction between disclosure and fathers’ AAI coherence of mind at t1,  $\beta = .296, p = .013$ , predicted greater exploration in children, whereas both the main effect of fathers’ AAI coherence of mind at t1,  $\beta = .220, p = .065$ , and children’s age at t2,  $\beta = .213, p = .096$ , were not significant. Conversely, disclosure at t1 had no significant effect,  $\beta = .070, p = .557$ . Overall, the model explained 21.4% of the variance.

The Johnson-Neyman technique identified the region of significance on the moderator (i.e. fathers’ AAI coherence of mind at t1) to range from 1.78 (lower bound) to 6.30 (upper

**Table 2.** MeAn scores and associations between disclosure of surrogacy origins and fathers’ aai coherence of mind at t1, and children’s exploration of their surrogacy origins, and socio-demographics at t2.

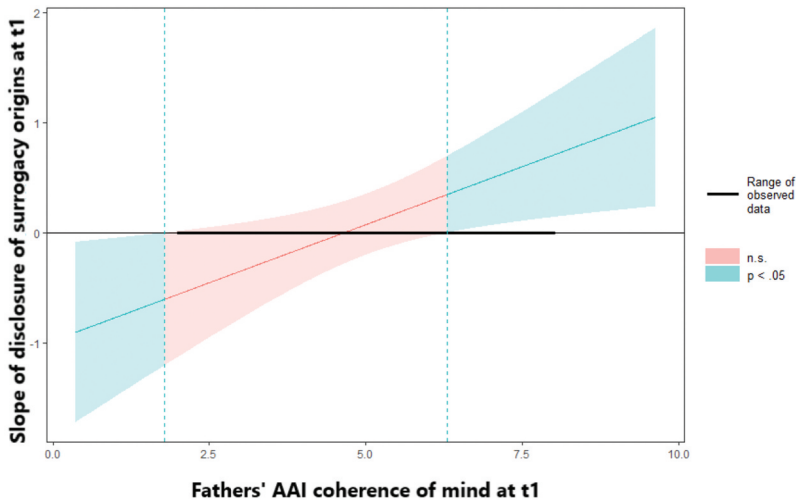
	1.	2.	3.	4.	5.	6.	7.	8.	M	SD
1. Disclosure of surrogacy origins (t1)	1.00								1.87	0.86
2. Fathers’ AAI coherence of mind (t1)	.064	1.00							5.03	1.63
3. Children’s exploration of their surrogacy origins (t2)	.155	.268*	1.00						2.97	1.00
4. Child’s age (t2)	.235	.146	.358	1.00					/	/
5. Father’s age (t2)	-.408**	.040	.207	-.183	1.00				/	/
6. Annual household income (t2)	-.185	-.297*	-.177	-.203	.068	1.00			/	/
7. Number of siblings (t2)	-.142	-.125	-.016	.178	.425***	.220	1.00		/	/
8. Length of couple relationship	-.164	-.204	.071	.388*	.288	.001	.306	1.00	/	/

Note. t1 = time 1; t2 = time 2, approximately 18 months after t1. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 3.** General linear model comparisons and model fit indices predicting children’s exploration of their surrogacy origins.

Outcome: Children’s exploration of their surrogacy origins (t2)	estimate (SE)	CI [25%, 75%]	$\beta$	<i>p</i>	TCD	BIC
Model 0 (null model – intercept only)						176.358
Model 1 Disclosure of surrogacy origins (t1)	0.180 (0.151)	-0.122, 0.482	.155	.237	.007	178.992
Model 2 Fathers’ AAI coherence of mind (t1)	0.162 (0.077)	0.009, 0.316	.268	.039	.056	175.991
Model 3 Child age (t2)	0.015 (0.006)	0.003, 0.028	.310	.017	.136	176.736
Model 4 Disclosure of surrogacy origins (t1)	0.079 (0.145)	-0.210, 0.369	.068	.586		
Fathers’ AAI coherence of mind (t1)	0.132 (0.074)	-0.016, 0.281	.218	.080		
Child age (t2)	0.011 (0.006)	-0.002, 0.023	.213	.096	.214	174.109
Disclosure of surrogacy origins (t1)	0.082 (0.138)	-0.195, -0.358	.070	.557		
Fathers’ AAI coherence of mind (t1)	0.133 (0.071)	-0.009, 0.275	.220	.065		
Disclosure of surrogacy origins * Fathers’ AAI coherence of mind (t1)	0.210 (0.082)	0.045, 0.376	.296	.013		

Note: Estimate = unstandardised beta. CI = confidence interval. Model 4 is the one that best fit the data, with the highest TCD (Total Coefficient of Determination) and the lowest BIC (Bayesian Information Criterion).



**Figure 1.** Johnson-Neyman plot of the interaction disclosure of surrogacy origins at t1 \* fathers' aai coherence of mind at t1 on children's explorations of their surrogacy origins at t2.

bound), indicating that any simple slope outside this range was statistically significant. Given that fathers' AAI coherence of mind scores ranged from 2.00–8.00 and the interactive term was positively associated with the outcome, it may be concluded that, in the context of more information disclosed about the child conception at t1, only children whose fathers showed greater AAI coherence of mind at t1 explored their surrogacy origins in more detail at t2. [Figure 1](#) illustrates this graphically.

## Discussion

The present study identified gay fathers' AAI coherence of mind as a parental factor that might enhance children's exploration of their surrogacy origins during middle childhood and early adolescence, following disclosure of the relevant information (i.e. the involvement of a surrogate and egg donor, the identity of the genetic father). Consistent with the hypothesis, more information disclosed about the child conception at t1 resulted in a more confident exploration of surrogacy origins at t2 only in children whose fathers presented a more coherent and secure autobiographical narrative of their own childhood attachment experiences in the AAI, and who were aware of the effects of these experiences on their present personality and behaviour. This result aligns with attachment research indicating that a parent' attachment state of mind significantly influences their parenting behaviour (e.g. Busch et al., 2008; Shlafer et al., 2015), as well as with a previous study by Carone, Barone, et al. (2020) showing the relevance of adopting an attachment framework for a deeper understanding of the experience of surrogacy origins in children born to gay fathers.

A complementary explanation cannot be excluded. Previous research has shown that AAI coherence of mind is associated with experiences of parental sensitivity during childhood (e.g. Steele et al., 2014). Thus, it is also possible that children who explored their surrogacy origins in more depth experienced sensitive caregiving in their early years. This would have facilitated the development of an internal representation of the self as at

ease with autonomy and legitimised to express their needs, an internal representation of the father as supportive and attentive to their needs, and an internal representation of the child – father attachment relationship as a secure container in which doubts and questions (about, e.g. their surrogacy origins) could be safely expressed and addressed.

The results suggest that gay fathers' coherence of mind promotes what Grossmann et al. (2008) defined as *secure exploration* in children. In the context of the present study, secure exploration can be reformulated as the child's ability to organise their emotions and behaviours open-mindedly and non-defensively when exploring their surrogacy origins, and to do so with interest; as well as the child's confidence in the availability and helpfulness of their fathers during this exploration. In middle childhood and early adolescence, when children begin to balance separation from and connectedness to their parents (Bosmans & Kerns, 2015), this reformulation may be particularly helpful for approaching any thoughts and feelings the child may have towards the surrogate and egg donor, any conversations about their family structure, or any questions regarding the implications of (not) being genetically related to their father.

In more practical terms, this means that fathers with greater coherence of mind likely had a secure attachment state of mind, and were thus more open to addressing and supporting their children's requests, relative to fathers with lower coherence of mind, and thus an insecure or disorganised attachment state of mind. Consistent with previous research linking parents' attachment state of mind to the quality of their responses to children's cues and feelings (e.g. Reese, 2008; van IJzendoorn, 1995), when children sought support from their father during their exploration of their surrogacy origins, they likely experienced their father as sensitively present and attuned to their needs, because he was equipped with adaptive emotion regulation strategies to deal with the potentially stressful situation (Shaver & Mikulincer, 2007).

Several limitations should be considered when interpreting the study results. First, given the sensitive nature of the topic, children's understanding of the questions may have reflected their mood on the day, and they may have also been selective regarding the material they disclosed to the researcher. Should this be the case, future research may include a measure for child mood. Second, given the quite large age range at both times of data collection, it is possible that the different child developmental stages have impacted both fathers' disclosure and children's curiosity of their surrogacy origins. Third, to preserve statistical power, the continuous variable of coherence of mind was preferred over attachment pattern classifications. This approach prevented a verification of whether children's exploration of their surrogacy origins varied as a function of fathers' attachment states of mind, as well as whether – and to what extent – fathers' matching attachment patterns might play a key role, as the additive hypothesis would predict (Dagan & Sagi-Schwartz, 2021). Fourth, in each family only one father was asked to describe their level of disclosure of surrogacy. Although previous research indicates that disclosure of origins to children likely takes the form of a family communication (Blake et al., 2016; Carone, Baiocco, et al., 2018; Van Parys et al., 2016), it cannot be excluded that fathers might have different levels of disclosure. Fifth, it is possible that fathers who volunteered to participate in the study and answer the disclosure questions also had higher AAI coherence of mind. Similarly, given that all children were aware of the use of surrogacy, it is possible that the sample was biased towards fathers who had begun the

disclosure process, particularly when children were younger, and thus the results may not be representative of all Italian gay father families.

As the number of gay father surrogacy families grows, future research should address these questions and focus on more restricted developmental periods given that, according to Erikson's (1968) theory of psychosocial development, children involved in this sample would fall into two different stages (i.e. Industry vs. Inferiority, 6–11 years; and Identity vs. Confusion, 12–18 years) and, therefore, would be grappling with different developmental tasks. Such an approach would be also consistent with previous research into donor-conceived and adoptive families suggesting that children differ in their understanding of biological relatedness and biological curiosity (Brodzinsky, 2011; Golombok, 2015).

Despite these limitations, the study presented several strengths, including the follow-up data collection and the unique population who was recruited despite the ban for intended gay fathers to access domestic surrogacy in Italy. In this vein, the collected data enabled the investigation of the relevance of a key attachment construct (i.e. parental AAI coherence of mind) to processes characterising gay father families through surrogacy during middle childhood and early adolescence (i.e. surrogacy disclosure), from a novel perspective (i.e. secure exploration in the context of surrogacy conception) (Bowlby, 1988; Grossmann et al., 2008; Quintigliano et al., 2022).

In terms of implications, the results inform practitioners in reproductive psychology on the importance of examining children's exploration of their surrogacy origins in relation to their fathers' own attachment experiences. In this vein, the way in which parents accessing assisted reproduction elaborate on their own childhood caregiving experiences may be a further area to explore during the psychosocial consultation, as this aspect may influence their future parenting. As the disclosure of assisted conception is increasingly recommended (e.g. Erikson, 2018) and children's need for information about their origins likely changes as they age (Indekeu et al., 2013; Tallandini et al., 2016), gay fathers' ability to be elaborative and internally consistent, but not emotionally overwrought, when discussing their own early experiences may impact the degree to which their children feel safe and legitimated in sharing their curiosity towards their origins. Therefore, researchers must continue to follow these families as all children enter adolescence to examine further barriers to child's depth of exploration of their origins and the combined effect of fathers' attachment states of mind and children's thoughts and feelings regarding their origins in shaping children's sense of self.

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No potential conflict of interest was reported by the authors.

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## Availability of data and material (data transparency)

Data are available upon reasonable request from the corresponding author.

## Consent to participate

Informed consent was obtained from all individual participants included in the study.

## Author contributions

N.C. conception and design. Data collection was completed by N.C. and D.M. Data coding was conducted by N.C., D.M., and M.M. Analyses of data were conducted by N.C. and D.M. First draft was written by N.C. and D.M. Following drafts were reviewed and revised according to comments by L.B., M.M., A.M.S., R.B., V.L. All authors read and approved the final manuscript.

## Declarations

This study was not preregistered. There was no prior dissemination of the ideas and data appearing in the manuscript.

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