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Child attachment security in gay father surrogacy families: Parents as safe havens and secure bases during middle childhood

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ABSTRACT

Child attachment security and utilization of parents as safe havens and secure bases were compared in 33 surrogacy children with gay fathers and 37 donor-conceived children with lesbian mothers during middle childhood. Assessments included data coded from parent–child interactions, interviews, and questionnaires administered to children and both parents. Findings indicated that children of gay fathers perceived high attachment security and their scores did not differ from those of children with lesbian mothers or from normative scores of children with heterosexual parents. Children's greater attachment security was associated with higher levels of parental warmth, responsiveness, and willingness to serve as an attachment figure; lower levels of parental negative control and rejection; and the child's younger age. Finally, children used the primary attachment figure more as a safe haven and the secondary attachment more as a secure base, though they reported high levels of both types of support from both parents.

ARTICLE HISTORY

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KEYWORDS

Attachment security; Security Scale; middle childhood; gay father; surrogacy

The formation of secure attachments to parents has been documented as a key influence on children's developing competence and mental health (Brumariu & Kerns, 2010; Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Groh, Fearon, van IJzendoorn, Bakermans-Kranenburg, & Roisman, 2017). Although Bowlby's (1951, 1958) early work gave mothers considerably more attention than fathers, from the perspective of attachment theory (Bowlby, 1969/1982), children are held to be capable of developing an attachment to any caregiver who interacts with them regularly – be this a mother, a father, or a (non-)genetic/biological parent (Bowlby, 1969/1982). Additionally, infants form attachments to both fathers and mothers at about the same age (Lamb, 1976, 1977a, 1977b; Schaffer & Emerson, 1964), and research has documented the importance of the father–child attachment relationship for child adjustment, beginning in infancy (Boldt, Kochanska, Grekin, & Brock, 2016; Boldt, Kochanska, Yoon, & Nordling; 2014; Bretherton, 2010; Cohn, Cowan, Cowan, & Pearson, 1992; Cowan, Cohn, Cowan, & Pearson, 1996; Kochanska & Kim, 2013). However, to date, research on fathers has focused exclusively on fathers in heterosexual two-parent families. The rise in the number of gay father families formed through surrogacy (Blake et al., 2017) offers a unique context in which to explore children's perceived attachment security to their fathers in this family type. Specifically, these fathers demonstrate three significant characteristics, simultaneously: non-heterosexual orientation, male gender, and conception via surrogacy. It is particularly appropriate to study the perceived security of children born to gay fathers through surrogacy during middle childhood, because it is around this age that children show an awareness of biological inheritance and begin to grasp the meaning of their surrogacy origins (Carone et al., 2018). To our knowledge, the only study of father–child attachment in surrogacy families was conducted with heterosexual parents and their 1-year-old infants. Findings showed greater father–child attachment quality in this family form than in those of families who conceived spontaneously (Golombok, Murray, Jadva, MacCallum, & Lycett, 2004), suggesting that fathers through surrogacy are capable of forming secure attachment relationships with their children.

In the same vein, the influence of parents' non-heterosexual orientation and conception through assisted reproduction has only been studied in lesbian mother families created through donor insemination. A longitudinal UK study compared children born to lesbian mothers following donor insemination with children raised by a single heterosexual mother and children raised by two heterosexual parents at ages 6 years (Golombok, Tasker, & MacCallum, 1997) and 19 years (Golombok & Badger, 2010). At age 6, children in lesbian mother and heterosexual single mother families showed greater attachment security (as measured by the Separation Anxiety Test) than their counterparts in two-parent heterosexual families (Golombok et al., 1997). At 19 years, there was no difference between the three family types in total attachment score (as measured by the Inventory of Peer and Parent Attachment; Golombok & Badger, 2010). The only two studies that included gay fathers found high levels of child attachment security to parents, but participants were adoptive families (Erich, Kanenberg, Case, Allen, & Bogdanos, 2009; Feugé, Cyr, Cossette, & Julien, 2018).

The first aim of the present study was to investigate how family type is related to children's perception of attachment security in middle childhood. Our study is the first to include a sample born to gay fathers through surrogacy, and to compare children in this family type to children in lesbian mother or heterosexual parent families. To date, no study has investigated whether children in this family form are more or less likely to form secure attachment relationships with their attachment figures. Findings from studies with lesbian mother families cannot necessarily be extended to gay father families, because the circumstances in which children of gay fathers are born and develop are somewhat different from those of children of lesbian mothers (Golombok, 2015). Specifically, in this family form children are raised by two fathers and no mother, and surrogacy is a more complex path to parenthood than donor insemination as it usually involves the participation of two different women (the donor and the surrogate) (Blake et al., 2017). Nevertheless, because children are just as able to form secure attachment to fathers as to mothers in heterosexual two-parent families (Bowlby, 1969/1982; Lamb, 1976, 1977a, 1977b; Schaffer & Emerson, 1964), and evidence does not suggest that either sexual orientation or the use of reproductive technology is linked to greater likelihood of insecure attachment (Golombok & Badger, 2010; Golombok et al., 2004, 1997), we expected that children born to gay fathers through surrogacy would

feel equally securely attached to their parents as would children born to lesbian mothers or to heterosexual parents.

A key tenet of attachment theory is that the likelihood that a child will form secure attachment relationships to his or her parents (i.e. whether the child will have confidence in his or her parents' responsiveness and availability) increases or decreases depending on the quality of particular parenting behaviors (Bowlby, 1973, 1979). Parental sensitivity is conceptualized as the most important aspect of parenting for attachment (Bretherton, 2013; De Wolff & van IJzendoorn, 1997), though it is more strongly associated with secure attachment for mothers than for fathers (De Wolff & van IJzendoorn, 1997; Koehn & Kerns, 2018; Lucassen et al., 2011). Other aspects of parenting may also foster secure attachment, especially in older children. For example, it has been proposed that parents of securely attached children may promote their children's autonomy and use less harsh parenting methods (Koehn & Kerns, 2018). In this regard, a recent meta-analysis (Koehn & Kerns, 2018) of parenting behaviors associated with parent-child attachment in middle childhood and adolescence found that children with more secure attachment had parents who were more responsive and more supportive of their autonomy, and who used more behavioral control strategies and fewer harsh control strategies. As all of the studies included in the meta-analyses included heterosexual parents, research has yet to explore which parenting behaviors are related to secure attachment in children of gay fathers who were conceived through surrogacy. The second aim of this study was to extend earlier research by testing how parenting is associated with secure attachment in gay and lesbian parent families.

Mothers and fathers as safe havens and secure bases

It is well established that all children have an innate tendency to use their parents as both *safe havens* when they are distressed and seeking comfort and *secure bases* from which to explore when there are no immediate environmental threats (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969/1982). Both of these uses are interrelated components of the "secure base" phenomenon: the more the parent–child dyad is able to coordinate and balance needs for care with needs for exploration, the more the child is likely to develop a secure attachment relationship (Bowlby, 1988; for a distinction between secure base and secure exploration, see; Grossman, Grossman, & Zimmerman, 1999). Nonetheless, more remains to be learned about the respective roles played by mothers and fathers in providing a safe haven and supporting secure exploration, particularly in middle childhood (Kerns & Brumariu, 2016; Kerns, Mathews, Koehn, Williams, & Siener-Ciesla, 2015), a period in which attachment is understudied (Bosmans & Kerns, 2015; Kerns & Brumariu, 2016).

It is worth noting that the few existing studies on the utilization of parents as safe havens and secure bases have been limited to samples of heterosexual two-parent families. Findings from these studies show that both preschoolers (Bretherton, 2010) and children in middle childhood and early adolescence (Grossmann et al., 2002; Kerns et al., 2015; Seibert & Kerns, 2009) report both types of support from both parents, though they rely on their parents differently: mothers are used more for safe haven needs and fathers are used more for secure exploration. It has been hypothesized that these differences likely depend on the different and complementary roles adopted by mothers and fathers with their children (Grossmann et al., 2002; Kerns et al., 2015). Specifically, mothers' sensitive responding to their child's emotional expressions of distress likely increases children's opportunities to turn to fathers for secure support during exploration and challenging tasks (Bowlby, 1979; Grossmann, Grossmann, Kindler, & Zimmermann, 2008). In Grossmann et al.'s (2002) view, this finding echoes Bowlby's (1979) idea that "psychological adaptation depends on emotional security with others in times of distress as well as during challenges" (p. 325).

One key question that arises from previous research (Bretherton, 2010; Grossmann et al., 2002; Kerns et al., 2015; Seibert & Kerns, 2009) is whether and to what extent children's preference for using mothers as safe havens and fathers as secure bases is due to conflation between parental roles and parental gender in heterosexual two-parent families. In these families, mothers tend to be the primary/principal attachment figure and fathers tend to act as the secondary/subsidiary attachment figure, and children may expect different roles for mothers and fathers due to socialization practices (Fagan, Day, Lamb, & Cabrera, 2014). It remains the case that mothers and fathers generally show different behaviors when engaging with their children: the mother-child attachment relationship typically involves caregiving sensitivity, whereas the father-child attachment relationship is typically characterized by more sensitive play and exploration (Bretherton, 2010; Grossmann et al., 2008). Kerns et al. (2015) suggested that further studies with gay father and lesbian mother families could clarify the dynamics at play in children's preference for mothers as safe havens and fathers as secure bases, because if parents in these families also "adopt complementary roles, then it might be that parents adopt more specialized roles as a way to differentiate family relationships." (p. 348).

The third aim of this study was thus to explore how children born to gay fathers through surrogacy use their parents to fulfill safe haven and secure base needs in middle childhood, in comparison with a group of children born to lesbian mothers through donor insemination. In both of these family types, parents are of the same gender, only one parent is the genetic/biological parent, and the caregiving roles are more likely to be shared equally, relative to heterosexual parent families (Golombok, 2015).

Present study

The present investigation involved a multi-method (questionnaires, interviews, and observational measures) and multi-informant (parents and children) design to test the following hypotheses:

- (1) Family type will not be related to attachment security. That is, in gay father families children's perception of attachment security towards primary and secondary attachment figures will not differ from children's perception of attachment security towards primary and secondary attachment figures in lesbian mothers families. Furthermore, total scores of attachment security obtained by children of gay fathers and lesbian mothers will not differ from the normative scores (Calvo, 2008) of attachment security obtained by children raised in heterosexual two-parent families.
- (2) Parenting behaviors such as responsiveness, warmth, positive control, negative control, rejection, and parental willingness to serve as an attachment figure will

be more strongly associated with children's perceived attachment security than will family type (gay father family vs. lesbian mother family).

(3) In both gay father and lesbian mother families, children's perceived reliance on parents will be distributed according to the parental care role (i.e. primary attachment figure vs. secondary attachment figure), with children preferentially using primary attachment figures as safe havens and secondary attachment figures as secure bases.

Materials and methods

Participants

The sample was comprised of 33 Italian children born through gestational surrogacy and their 66 gay fathers, and a comparison group of 37 Italian children born through donor insemination and their 74 lesbian mothers, giving a total of 70 children aged between 6 and 12 years and 140 parents. Both surrogacy and donor insemination were undertaken abroad. Twenty-four gay father families and 27 lesbian mother families were recruited in the context of a larger, in-depth study of child adjustment and parenting in gay father surrogacy families (Carone, Lingiardi, Chirumbolo, & Baiocco, 2018). To increase the sample size, a further 9 gay father families and 10 lesbian mother families with children in the same age range were recruited. Multiple strategies were used to include as diverse a sample as possible, through the main Italian association of same-sex parents (n = 25, 35.7%), same-sex parent web groups and forums (n = 22, 31.4%), events at which same-sex parents were in attendance (n = 9, 12.9%), and snowballing (n = 14, 20%). The inclusion criteria for both gay father and lesbian mother families were that the couple had lived together since the child's birth, resided in Italy, and had conceived through surrogacy and donor insemination, respectively.

Sociodemographic information for each group is presented in Table 1. The two groups of families were matched for children's demographic variables. With respect to the comparative normative scores of attachment security, we used data collected from 317 Italian children (n = 168 boys, 53%) born through spontaneous conception and raised in heterosexual two-parent families (Calvo, 2008). All children of the normative group were aged between 8 and 11.8 years (M = 10.20 years, SD = 0.76) and attended elementary school (23 were third graders, 130 were fourth graders, and 164 were fifth graders); they resided in northern Italy and their parents' socioeconomic status was middle to high. As only total mean scores of attachment security were available for the normative group, children of heterosexual parents could not be included in our tests of hypotheses 2 and 3.

Procedure

Families were assessed at home by three researchers trained in the study techniques. Study approval was obtained from the Ethics Committee of the Department of Developmental and Social Psychology, Sapienza University or Rome, and written informed consent was obtained from all adult participants. Parents gave consent for their children to participate. Where possible, children gave written consent to take part; failing this, verbal assent was gained. Each participant was reminded that his or her

274 🛞 N. CARONE ET AL.

	Gay father families $(n = 33)$	Lesbian mother families $(n = 37)$			
	n (%)	n (%)	<i>X</i> ² (df)		р
Child's gender			0.06(1)		.80
Boy	15 (45.6)	19 (51.3)			
Girl	18 (54.5)	18 (48.7)			
Number of siblings			0.14(1)		.93
0	13 (39.4)	15 (40.5)			
1	18 (54.5)	19 (51.3)			
2 or more	2 (6.1)	3 (8.2)			
Parents' ethnicity (Caucasian)	60 (90.9)	69 (93.2)	0.04(1)		.84
Parents' residence			1.23(2)		.54
Northern Italy	14 (42.4)	11 (29.7)			
Central Italy	16 (48.5)	22 (59.5)			
Southern Italy	3 (9.1)	4 (10.8)			
Parents' educational level (bachelor's	51 (77.2)	52 (70.3)	0.56(1)		.46
degree or higher)					
Parents' occupation (professional/ managerial)	55 (83.3)	49 (66.2)	4.49(1)		.03
Parents' work status (full-time)	66 (100)	59 (79.7)	12.94(1)		.003
Length of couple's relationship	. ,		0.66(2)		.72
<10 years	9 (27.3)	10 (27.1)			
11–15 years	8 (24.2)	12 (32.4)			
>15 years	16 (48.5)	15 (40.5)			
Marital status			0.77(2)		.68
Civil partnership in Italy	18 (54.5)	22 (59.5)			
Only married/civil partnership	9 (27.3)	11 (29.7)			
abroad					
Unmarried/no civil partnership	6 (18.2)	4 (10.8)			
Genetic parenthood			7.92(2)		.02
Primary attachment figure	15 (44.5)	26 (70.3)			
Secondary attachment figure	13 (39.4)	11 (29.7)			
Not disclosed/unknown	5 (15.1)	0			
	M (SD)	M (SD)	F(df)	р	η_p^2
Child's age at visit (in months)	99.39 (20.85)	99.27 (18.49)	<0.01(1.68)	.98	<.01
Parent's age (in years)	47.05 (6.14)	41.68 (4.74)	10.50(1.68)	.002	.20
Household income (€) 12	23,681.82 (67,014.90)	70,540.54 (28,541.73)	19.36(1,68)	<.001	.22

Table 1. Sociodemographic info	mation by family type $(n = 70)$.
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Data are presented as average scores for both parents in each family. For the individual parent variables of ethnicity, educational level, occupation, work status, and age, the *n* for gay father and lesbian mother families is 66 and 74 rather than 33 and 37, respectively. Chi-square test was reported with the Yates' correction for continuity.

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 ageappropriate manner, both prior to and during participation.

Measures

Children's identification of primary/secondary attachment figures

To determine children's primary and secondary attachment figures, the Important People Interview (IPI; Kobak & Rosenthal, 2003; Kobak, Rosenthal, & Serwik, 2005) was administered to children. This measure asks respondents to nominate the four most important people in their life. They are then asked to rank these four people, in order of preference, for each of nine situations intended to measure one of three attachment constructs: attachment bond (closeness, separation distress, and emergency situations), support seeking (comfort or support in daily contexts), and affiliative

proximity seeking (enjoyable social contact). Referring to a randomly ordered list of their four important people (as well as a "nobody" option), respondents choose which nominee they would go to first in each situation, and who they would go to next if that person was unavailable. This question is repeated until the preferences for going to all of the important people are rank ordered in each context. Because our aim was to identify children's primary and secondary attachment figures between parents, in this paper we do not report other important nominated people (e.g. peers, relatives, siblings). We considered the primary attachment figure the parent who received the highest average ranking across the nine attachment situations, and the secondary attachment figure the parent who received a lower average ranking compared to his or her partner.

Children's perceptions of security

Children completed a 21-item modified version of the SS guestionnaire (Kerns et al., 2015; for the original Italian validation, see Calvo, 2008; Marci et al., 2018) to assess their perceived attachment security to each parent, using Harter's (1982) "Some kids... Other kids..." format. On this measure, 14 items constitute a safe haven subscale (e.g. "Some kids feel their mom really understands them BUT Other kids feel like their mom really does not understand them"), whereas the remaining 7 items refer to a secure base support subscale (e.g. "Some kids think their mom encourages them to be themselves BUT Other kids do not think their mom encourages them to be themselves"). For each question, respondents indicate which statement is more characteristic of them and indicate whether the statement is really true (1) or sort of true (4) for them. In addition to generating two item scores (i.e. a safe haven score and a secure base score) for each parent, the scale also generates a total score of attachment security for each parent by averaging the item scores. Higher scores indicate higher levels of children's perceived attachment security. In the present study, in order to ensure that the youngest children (aged 6-7 years) understood the questions, each item was read aloud to them.

The reliability and validity of the SS have been assessed in both child and adolescent samples, showing moderate stability over time (Brumariu, Madigan, Giuseppone, Movahed Abtahi, & Kerns, 2018) and convergence with observations of children's interactions with their parents (Kerns, Klepac, & Cole, 1996). In the present study, safe haven and secure base scores, as well as a total attachment security score, were produced for each parent. Cronbach's alphas were .85, .71, and .80 for safe haven support, secure base support, and total attachment security, respectively. To avoid order effects in testing, half of the sample was asked to answer questions referring to the secondary attachment figure before answering questions referring to the primary attachment figure; the other half of the sample followed the opposite pattern.

Parents' willingness to serve as an attachment figure

Both parents in each family separately completed the 91-item Block (1965) Childrearing Practices Q-set (CRP), which measures childrearing practices and beliefs. In this measure, each parent reads and sorts cards into 7 piles of 13 cards each, ranging from "most character-istic" (Pile 7) to "least characteristic" (Pile 1) of their childrearing practices and beliefs. Items are scored according to the piles in which they are placed. Kerns et al. (1996, 2001) identified 10

276 🛞 N. CARONE ET AL.

CRP items that are face-valid indices of parental willingness to serve as an attachment figure for their child. Sample items in this cluster include: "I respect my child's opinions and encourage him/her to express them"; "I feel a child should be given comfort and understanding when she/he is scared or upset"; and "I make sure my child knows that I appreciate what she/he tries to accomplish." In the present study, a parent's score for this variable was an average of his or her scores across the 10 items, after the appropriate items were reverse scored. Cronbach's alphas were .72 and .71 for mothers and fathers, respectively.

Observed parenting behaviors

Within each family, each parent-child dyad participated in a videotaped assessment of their interaction in "real time." In order to avoid practice effects, the primary attachment figure engaged in the Etch-A-Sketch task (Stevenson-Hinde & Shouldice, 1995) and the secondary attachment figure participated in the Co-Construction task (Steele et al., 2007). The Etch-A-Sketch is a drawing tool with two dials on the front of the frame that allow users to draw vertical and horizontal lines, respectively. In the Etch-A-Sketch task, each dyad was asked to reproduce a picture of a house, with clear instructions that the child was to use one dial and the parent the other dial, without overlapping activity. In the Co-Construction task, child and parent were given a set of wooden building blocks and instructed to build something together using as many blocks as possible. They were given 5 minutes to complete the task, with the researcher out of the room. The Etch-A-Sketch and Co-Construction sessions were videotaped and coded using the Parent-Child Interaction System (PARCHISY; Deater-Deckard, 2000; Deater-Deckard, Pylas, & Petrill, 1997), which assesses multiple facets of parent-child interaction with children aged 3 to 12 years. The PARCHISY has been widely used with children with typical behavior as well as those with behavioral and/or emotional problems. It also has been shown to achieve high inter-rater reliability (ICC = >.80 for each single variable) and to link with child outcomes (Funamoto & Rinaldi, 2015).

The following parenting behaviors were rated on a 7-point scale ranging from 1 (*no instances*) to 7 (*constant, throughout interaction*): (a) *positive control* assessed the extent to which the parent used praise, explanation, and open-ended questions with the child; (b) *negative control* assessed the extent to which the parent used criticism and physical control of the dials or the child's hand/arm/body; (c) *warmth* assessed the extent to which the parent used smiles, laughter, and a warm tone of voice; (d) *rejection* assessed the extent to which the parent used smiles, laughter, and a cold/harsh voice; and (e) *parent's responsiveness to child* assessed the extent to which the parent responded immediately and contingently to the child's comments, questions, and behavior. To establish interrater reliability, half of the video recordings (n = 70) were randomly selected and coded by a second rater. The intraclass correlations (ICC, single measure) for positive control, negative control, warmth, rejection, and parent's responsiveness to child were .84, .79, .81, .72, and .86, respectively.

Data analysis

Power analyses

Given the small and hard-to-reach study population, we aimed to have enough power to detect at least medium effect sizes with an alpha of .05 in the analyses of principal

interest. Following Cohen's recommendations (1988), we conducted a priori power analyses with f^2 levels set to .10, .30, and .50, respectively, for bivariate correlations; .10, .25, and .40, respectively, for mixed ANCOVAs; and .20, .50, and .80, respectively, for one sample t-tests. Findings showed that our sample (i.e. 70 children and 140 parents) was sufficiently large to detect medium (e.g. d = .50) and large (e.g. d = .80) effects, but not small effects (e.g. d = .20).

Data analytic plan

SPSS version 24 was used to conduct all analyses. To investigate whether children's perceived attachment security differed according to family type, we performed a mixed ANCOVA 2 (family type: gay father family vs. lesbian mother family) \times 2 (attachment figure type: primary vs. secondary) using SS total mean scores and child's age as a covariate. Furthermore, we ran two one-way t-tests to compare Italian SS normative scores with the SS scores reported by children of gay fathers and lesbian mothers, respectively.

To test the hypothesis that parental willingness to serve as an attachment figure and parenting behaviors would better predict children's security of attachment than family type (Hypothesis 2), we performed hierarchical linear modeling analyses (Smith, Sayer, & Goldberg, 2013) to account for the nested data structure. For these analyses, there were 140 parents and 70 children nested within 70 families. Dichotomous variables were effects coded (family type: gay father family = -1, lesbian mother family = 1; child gender: boy = -1, girl = 1), so that estimates for other predictors would cross categories. All continuous variables were grand mean centered to reduce collinearity. Effects that were significant at p < .05 were interpreted. First, we performed unconditional mixed ANOVAs with random effects with the outcome variables of interest and no predictors. The intraclass correlation coefficient (Cohen's kappa, p < .001) from the unconditional model was .33 (range = .08–.72), meaning that 33% of the variation in outcome variable scores was between families. This exceeded the suggested cutoff value of 25% to require HLM (Guo, 2005).

Finally, to assess the way in which children used their parents as safe havens and secure bases (Hypothesis 3), we performed one mixed ANCOVA 2 (family type: gay father family vs. lesbian mother family) \times 2 (attachment figure type: primary vs. secondary) \times 2 (attachment dimension: safe haven vs. secure base), with child's age as a covariate. Where significant interactions were found, simple effects analyses were run to explore the nature of the interaction by examining the difference between groups within one level of one of the independent variables.

Results

Preliminary analysis

We examined score distributions for normalcy, which was confirmed for all variables of interest. Following this, we conducted preliminary analyses to determine whether children's and parents' demographics (i.e. child's age and gender, number of siblings, parents' age, parent's education, parents' occupation) were related to attachment security, parent–child interaction variables, and parental willingness to serve as an attachment figure. Results indicated that only child's age was related to parental will-ingness to serve as an attachment figure, r = .36, p < .01. However, given that the sample

had a large age range and studies have reported declines in the frequency and intensity of attachment behavior as children age (e.g. Ainsworth, 1989; Bosmans & Kerns, 2015; Bowlby, 1979), it was more appropriate to control for children's ages in all the analyses of principal interest. Partial correlations between SS-rated attachment security, parenting behaviors during parent–child interaction, and parental willingness to serve as an attachment figure by family and attachment figure type are shown in Table 2.

Children's perceived attachment security to both caregivers as a function of family type

After controlling for child's age, neither the main effect for family type, F(1,67) = 2.03, p = .16, $\eta_p^2 = .03$; d = .29, nor the main effect for attachment figure type, F(1,67) = 0.62, p = .44, $\eta_p^2 = .01$, d = .12, was significant for children's perceived attachment security. However, the interaction between family type and attachment figure type trended towards significance, F(1,67) = 3.58, p = .06, $\eta_p^2 = .05$, d = .46, with children in lesbian mother families perceiving higher attachment security towards the secondary attachment figure compared to children in gay father families, F(1,135) = 4.66, p < .05, $\eta_p^2 = .07$, d = .57.

In both family types, comparisons with normative scores of children raised in heterosexual two-parent families were also computed using averaged scores of perceived attachment security towards both parents. Two one-sample t-tests showed that neither children of gay fathers, t(32) = -1.08, p = .29, nor children of lesbian mothers, t(36) = 0.79, p = .44, differed from children of heterosexual parents in their perceived attachment security. Mean scores were 3.12, 3.27, and 3.27 for children of gay fathers, lesbian mothers, and heterosexual parents, respectively.

Factors associated with children's perceived attachment security

HLM analyses indicated that the predictors of attachment security were: higher parental willingness to serve as an attachment figure, b = 0.19, t(127) = 4.97, p < .001; higher parental warmth, b = 0.09, t(99) = 4.69, p < .001; higher parental responsiveness, b = 0.10, t(130) = 4.43, p < .001; lower parental negative control, b = -0.08, t (106) = -2.80, p < .01; lower parental rejection, b = -0.10, t(122) = -3.18, p < .01; and child's younger age, b = < 0.01, t(71) = -2.41, p < .05. These effects could not have arisen due to multicollinearity, because most predictors were not significantly related (see Table 2); for the few that were significantly related, tolerance and VIF values of collinearity were within acceptable levels (Tabachnick & Fidell, 2012). Parental positive control was marginally significant in predicting child's attachment security, b = 0.04, t (117) = 1.96, p = .053, while family type did not yield significant effects, b = 0.03, t (66) = 0.74, p = .46 (see Table 3).

Utilization of parents as safe havens and secure bases

Means and standard deviations of children's utilization of parents as safe havens and secure bases, as well as their perceived security, are shown in Table 4. No order effect of testing was found. After child's age was controlled for, neither family type, *F*

Table 2. Partial correlations l	between 5	S dimer	nsions and	d predicto	ors of chil	d's attach	ment secu	urity by fa	mily type,	after con	trolling fc	or child's	age.	
Variable	1	2	3	4	5	6	7	8	6	10	11	12	13	14
1. Attachment security-P	-	.42*	.37*	.45**	48**	57***	.53**	.66***	.34*	.44**	.34*	16	.02	.40*
2. Parental positive control-P	.34 [†]	-	.43**	.30 [†]	12	04	.34*	90.	.05	.05	.03	.11	.39*	.14
3. Parental warmth-P	.44*	.47*	-	.18	18	03	.23	.22	.29	.16	.18	.05	.41*	.15
4. Parental responsiveness-P	.63***	.16	.37*	-	04	21	.25	.29 [†]	.17	.38*	.52**	60.	11	.30 [†]
5. Parental negative control-P	52*	10	09	18	-	.47**	.39*	37*	–.31 [†]	–.29 [†]	06	.28 [†]	.11	34*
6. Parental rejection-P	38*	02	15	02	.62***	-	34*	42*	072	–.31 [†]	20	.14	.16	19
7. Willingness to serve AF-P	.37*	.13	09	.27	10	13	-	.37*	.16	.46**	.37*	11	05	.70***
8. Attachment security-S	.35*	.32†	03	.17	.02	.01	.41*	-	.59***	.71***	.58***	41*	34*	.56***
9. Parental positive control-S	.05	.35 [†]	.14	.07	05	.02	.17	.45*	-	.36*	.50**	14	35*	.29 [†]
10. Parental warmth-S	.02	.25	03	21	.01	.12	.17	.69***	.37*	-	.55**	40*	–.32 [†]	.56***
11. Parental responsiveness-S	.37*	90.	.07	.44	13	06	.32 [†]	.53**	.36*	.38*	-	23	22	.42*
12. Parental negative control-S	14	.07	10	19	15	06	03	23**	.24	28	10	-	.40*	20
13. Parental rejection-S	17	.10	.25	.03	12	.19	17	51**	04	–.30 [†]	17	.27	-	09
14. Willingness to serve AF-S	.10	.27	03	60.	.04	11	.71***	.54**	.45*	.33 [†]	.22	06	28	-
P = Primary attachment figure. S :	= Secondary	r attachm	ent figure.	AF = Attac	hment Figu	ıre.								

P = Primary attachment figure. S = Secondary attachment figure. AF = Attachment Figure. Correlations for lesbian mother families are displayed above the diagonal, whereas correlations for gay father families are displayed below the diagonal. † <.10. *p < .05. **p < .01. ***p < .001.

	Full sample $(n = 70)$	Gay father families $(n = 33)$	Lesbian mother families $(n = 37)$
Safe Haven			
Primary attachment figure	3.31 (0.53)	3.28 (0.52)	3.34 (0.55)
Secondary attachment figure	3.07 (0.63)	2.98 (0.56)	3.15 (0.69)
Total	3.19 (0.60)	3.13 (0.56)	3.25 (0.63)
Secure Base			
Primary attachment figure	3.09 (0.65)	3.08 (0.69)	3.10 (0.63)
Secondary attachment figure	3.31 (0.69)	3.10 (0.59)	3.50 (0.52)
Total	3.20 (0.63)	3.09 (0.64)	3.29 (0.61)
Total Perception of Security			
Primary attachment figure	3.20 (0.53)	3.18 (0.56)	3.22 (0.54)
Secondary attachment figure	3.19 (0.55)	3.04 (0.51)	3.32 (0.53)
Total	3.20 (0.54)	3.11 (0.55)	3.27 (0.52)

Table 3. Means and standard deviations by family type and attachment figure type on safe haven, secure base, and total perception of security scores.

Table 4. Changes in children's security of attachment predicted by family type, parental willingness to serve as an attachment figure, and parenting behaviors following the bootstrapping procedure.

		Child's attachment security								
	Original sample $(n = 140 \text{ parents and } 70 \text{ children})$ Bootstrapping $(n = 1,000 \text{ parents})$							00 parents n)		
Fixed effects	Coeff	SE	t(df)	р	Lower Cl	Upper Cl	SE	р	Lower Cl	Upper Cl
Intercept	<0.01	.03	-0.01(63)	.99	-0.07	0.07	<.01	.99	-0.05	0.04
Family type	0.03	.04	0.74(66)	.46	-0.04	0.10	.03	.20	-0.02	0.07
Child age	<0.01	<.01	-2.41(71)	.02	-0.01	<0.01	<.01	<.01	-0.01	<0.01
Willingness to serve as AF	0.19	.04	4.97(127)	<.001	0.11	0.26	.19	<.01		
Parental positive control	0.04	.02	1.96(117)	.05	<0.01	0.09	.04	.21	-0.01	0.08
Parental negative control	-0.08	.03	-2.80(106)	.01	-0.14	-0.02	08	.06	0.16	0.01
Parental warmth	0.09	.02	4.69(99)	<.001	0.05	0.13	.09	.03	0.03	0.16
Parental responsiveness	0.10	.02	4.43(130)	<.001	0.06	0.14	.10	.01	-0.04	0.15
Parental rejection	-0.10	.03	-3.18(122)	.01	-0.16	-0.04	10	.07	-0.20	0.03
Random effects	σ^2	SE	Ζ	р	Lower Cl	Upper Cl	SE	р	Lower Cl	Upper Cl
Residual	.05	.01	5.58	<.001	0.03	0.07	.05	.82		
Intercept	.06	.02	3.73	<.001	0.04	0.10	.06	.001		

Family type was coded as "gay father family" = -1, "lesbian mother family" = 1. AF = Attachment Figure. CI = 95% Confidence Interval. Coeff = unstandardized coefficients.

(1,135) = 3.07, p = .08, $\eta_p^2 = .02$, d = .41, nor attachment figure type, F(1,135) = 0.50, p = .82, $\eta_p^2 = < .01$, d = .06, nor the interaction between family type and attachment figure type, F(1,135) = 1.77, p = .19, $\eta_p^2 = .01$, d = .26, showed any significant effect for these variables.

The analysis did yield a significant two-way interaction between attachment figure type and attachment dimensions, F(1,135) = 23.92, p < .001, $\eta_p^2 = .15$, d = 1.00. A simple effect analysis showed that the primary attachment figure served more as a safe haven than a secure base, with a significant mean difference, F(1,135) = 11.47, p < .01, $\eta_p^2 = .08$, d = .92; and the secondary attachment figure served more as a secure base than a safe haven, with a significant mean difference, F(1,135) = 21.46, p < .01, $\eta_p^2 = .09$, d = .94. Furthermore, the primary attachment figure was used more as a safe haven, relative to the secondary attachment figure, with a significant mean difference, F(1,135) = 6.24, p < .05, $\eta_p^2 = .04$, d = .70; and the secondary attachment figure was used more as a secure base, relative to the primary attachment figure, with the mean difference again significant, F(1,135) = 4.06, p < .05, $\eta_p^2 = .03$, d = .52. These patterns did not differ between gay father and lesbian mother families, as the interaction between family type, attachment figure type, and attachment dimensions was not significant, F(1,135) = 2.04, p = .16, $\eta_p^2 = .02$, d = .30.

Bootstrapping simulation

Because our sample (n = 140 parents and 70 children in 70 families) was not sufficiently large to detect small effects and the HLM power analyses could not be performed prior to data collection because the covariance structure was not known, we used bootstrapping to understand the stability of our results within a larger simulated sample (n = 1,000parents and 500 children in 500 families). The results showed that repeated samples of n = 1,000 would be unlikely to detect different statistically significant effects from those detected by our sample. The only exceptions to this related to the effects of parental rejection and negative control on children's perceived attachment security, which were found likely to become marginally significant with a larger sample (see Table 4).

Discussion

The present study extended work on family type and attachment security as it is the first to explore the perceived attachment security of children conceived by surrogacy in gay father families. In a middle childhood sample, we found that perceptions of parental attachment security for children born to gay fathers through surrogacy did not differ from those of children born to lesbian mothers through donor insemination or a normative group of children with heterosexual parents. Although the findings are preliminary and need to be replicated in a more diverse and larger sample of families, the results suggest that concerns voiced about the potential negative impact of being born through surrogacy and being raised by gay men on child attachment security (Golombok, 2015) are unfounded. The findings thus align with those of previous studies of lesbian mothers through donor insemination (Golombok & Badger, 2010; Golombok et al., 1997) and heterosexual surrogacy fathers (Golombok et al., 2004), which have shown that neither parents' sexual orientation nor their conception via assisted reproduction are associated with lower levels of children's attachment security.

Although children's perceptions of security were not related to family type, they were related to observers' and parents' reports of parenting. Consistent with the attachment framework (Ainsworth, 1989; Bowlby, 1969/1982), the meta-analytic results of Koehn and Kerns (2018), and our second hypothesis, the present study found that children's perceived attachment security in middle childhood was related to parenting behaviors characterized by greater responsiveness, warmth, and parental willingness to serve as an attachment figure and with less negative control and rejection. The quality of parenting is proposed to be a key factor in the development of attachment, and the findings in this study are important in confirming that parenting is related to individual differences in attachment security across family types.

In line with our third hypothesis, the primary caregiver was used more as a safe haven and the secondary caregiver was used more as a secure base from which to explore. It may be that the safe haven function of attachment figures is more "primary" than the secure base function and thus is more dominant with the primary attachment figure. This idea requires further exploration, especially as children reported high levels of both types of support from both parents and the effect sizes of all significant differences were fairly small. The results of the present study suggest that a child's attachment needs in a same-sex parent family cannot be obviously addressed on the basis of parental gender, but instead depend on attachment figure role (primary vs. secondary). It may be that the provision of complementary attachment support develops when two parents are available and in regular contact with their children, whereas in a single parent family children might rely on their parent for safe haven and secure base support equally, because "in the absence of a second attachment figure a parent (mother or father) would make active efforts to provide both types of support" (Kerns et al., 2015, p. 348). Investigation of children's perception and use of their parent in a single parent family would help clarify our result.

This result provides some support for the model of the "independent organization" of multiple attachment figures (Howes & Spieker, 2016; Kobak et al., 2005; van IJzendoorn, Sagi, & Lambermon, 1992), which posits that a child may develop different attachment relationships with each parent (Kobak et al., 2005; Steele & Steele, 2005). In heterosexual two-parent families, the mother is usually the primary attachment figure and the father is usually the second attachment figure (Bretherthon, 2010; Grossmann et al., 2002; Kerns et al., 2015; Seibert & Kerns, 2009). Our finding that parents in same-sex families also differentiate these roles to some degree suggests that the development of a somewhat unique and differentiated attachment relationship with each parent is more likely to stem from the complementary roles adopted by parents and not from their gender, per se.

Our results also suggest that each parent remains a fundamental attachment figure who transmits his or her internal model of relationships to the child, independent of the other parent's actions (Fonagy, Steele, Steele, Higgitt, & Target, 1994; Steele, Steele, & Fonagy, 1996). Through this mechanism, the child develops and maintains distinguishable mental representations of the expected relationship with each caregiver, and these representations might be combined into an integrated view of attachment relationships as the child matures (Fonagy et al., 1994). As the "independent organization" model also implies that each attachment figure might only influence the area "in which the child and a specific caretaker have been interacting over a long period of time" (van Uzendoorn et al., 1992, p. 10), in future studies it will be important to investigate this assumption also in same-sex parent families.

The present study was not free from limitations. Our sample primarily involved families who were Caucasian, well educated, and of a medium to high socioeconomic status, which limits the generalizability of the results. Furthermore, as the findings were based on correlational data, our ability to draw causal conclusions is restricted. Although we hypothesized that child attachment security would be predicted by parental will-ingness to serve as an attachment figure and parenting behaviors during parent–child interactions, the shift towards greater coregulation in the parent–child attachment relationship in middle childhood (Bosmans & Kerns, 2015) may have led children who were securely attached to their parents to favor more positive and child-oriented parental behavior, resulting in secure child–parent relationships (Kerns & Brumariu, 2016). The bidirectionality of this effect should be explored through future longitudinal studies. Furthermore, due to the specific legal policies and sociocultural beliefs on same-

sex parenting in Italy (loverno et al., 2018; Lingiardi & Carone, 2016a, 2016b), this study should be replicated in different sociocultural contexts, possibly with a more diverse sample, to account for the potential influence of the wider social world on parent–child attachment relationships and children's views on the respective roles of mothers and fathers. In this vein, a direct comparison with a matched group of children with heterosexual parents would be of certain value and would represent a line for future research.

Further limitations include the use of a single measure to evaluate children's perceived attachment security and their utilization of parents as safe havens and secure bases. Future studies should pair the SS with other measures of child-parent attachment (e.g. interview measures or story stems), for several reasons. First, similar to all self-report measures of attachment, the SS limits the ability to consciously access internal working models and it therefore heightens the risks of response bias and social desirability (Bosmans & Kerns, 2015). Second, to the extent that attachment measures differ in their ability to tap into strategic (conscious) or automatic (unconscious) processes (for a wider discussion of the "dual process theory" as applied to attachment research, see Bosmans & Kerns, 2015), the inclusion of a variety of measures would enable researchers to assess different components of the attachment construct, whilst simultaneously comparing their overlap. This would be particularly valuable, as studies employing both the SS and other measurement approaches have found small to modest convergence across measures (e.g. Borelli et al., 2016; Brenning, Soenens, Braet, & Bosmans, 2011; Brumariu et al., 2018; Kerns, Brumariu, & Seibert, 2011; Kerns et al., 2015; Psouni & Apetroaia, 2014; Venta, Smueli-Goetz, & Sharp, 2014). Third, the SS cannot differentiate between types of insecurity (i.e. "preoccupied" vs. "dismissing"). This raises concerns as there is some evidence that, similar to dismissing adults, dismissing children evaluate their parents as significantly warmer and more caring than secure children, irrespective of the measurement approach (i.e. self-report or interview; Borelli, David, Crowley, Snavely, & Mayes, 2013; Borelli et al., 2016; although other studies have not found these effects; Kerns et al., 2011; Kerns, Tomich, Aspelmeier, & Contreras, 2000). Finally, it should be noted that the SS was originally developed for children aged 8 years and older. Although in our study the scale showed satisfactory internal consistency (with Cronbach's alphas similar to those found by Kerns et al., 2015) and no children aged 6-7 years showed specific difficulties in understanding the questions [e.g. they did not ask the researcher to explain the questions more frequently than did older children]), it is possible that older children had greater capacity for self-reporting their emotions – and greater accuracy in doing so – due to their greater cognitive sophistication and emotional awareness.

Despite its limitations, this study also presented a number of strengths. Compared to most prior studies, which have typically involved only mother–child dyads (Howes & Spieker, 2016), the present study included both caregivers in families of gay fathers and lesbian mothers. This approach, sustained by the HLM analysis – which considered data within families non-independent – enabled us to account for the influence of both caregivers' parenting behaviors and children's perceived attachment security with caregivers when exploring the uniqueness of each attachment relationship. Furthermore, the SS questionnaire has the advantage (over other measures) of providing separate scores of attachment security for each caregiver. The observational measure of parent–child interaction and the questionnaire used to evaluate parental willingness to serve as an attachment figure possibly reduced the influence of shared method variance. Although the study relied on 70 children with same-sex parents, power analyses revealed that our

sample size was sufficiently large to detect medium and large effect sizes. In addition, the bootstrapping simulation revealed that, even if we had used a sample size large enough to detect small effects, it would have been unlikely to lead to different results relating to child attachment security as a function of family type.

In conclusion, the findings of this study are unique in that no previous empirical analyses of family type and attachment security have examined children born to gay fathers through surrogacy. This family type is unique in its constellation of parents' non-heterosexual orientation, male gender, and conception via surrogacy, and these three differentiating characteristics distinguished our target sample from the comparison sample of lesbian mothers and from the samples of heterosexual parents predominantly used in prior research. We found that parenting, but not family type, was related to children's perceptions of attachment security. The findings also provide initial evidence that same-sex parents serve as safe havens and secure bases for exploration based on whether their child views them as a primary or secondary attachment figure. A related research question that arises from our study is whether primary and secondary attachment figures contribute differently to the development of children's attachment security – a long-debated question that has only been researched with heterosexual two-parent families (Dagan & Sagi-Schwartz, 2018). If differences exist, it would be useful to test whether they apply to both gay and lesbian parent families, or only to a particular family configuration.

It will be very important to follow these children longitudinally as they enter adolescence, a period in which they will have to negotiate intense developmental challenges. The impact of children's more sophisticated understanding of their surrogacy origins, as well as their incrementally growing need for autonomy and individuation from their parents, may influence their adolescent attachment relationships. In addition, as the concept of the "secure base" (Bowlby, 1988) would predict, a co-occurring sense of connectedness to and an increasing sense of independence from parents in adolescents with secure attachments may facilitate the exploration of their surrogacy identity formation (Carone, Lingiardi, & Baiocco, 2018), because they may have confidence that their "secure base" will be available should a threat arise.. Findings from studies with adopted (e.g. Grotevant & Cooper, 1985; Wrobel et al., 2013) and donor-conceived adolescents (Slutsky et al., 2016) indicate that this may be the case. Furthermore, as our results provide preliminary evidence that gay fathers can promote secure attachment, but their internalization as a safe haven or secure base varies according to their attachment figure role, future studies can investigate whether safe haven and secure base support differentially influence children's appraisal of their surrogacy conception.

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- 286 👄 N. CARONE ET AL.
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- 288 🛞 N. CARONE ET AL.
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