

1 RUNNING TITLE: Experiences of donor offspring

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3 The experiences of adolescents and adults conceived by sperm donation:

4 Comparisons by age of disclosure and family type

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17

1 **Abstract**

2 **BACKGROUND:** This study presents findings from a large sample of donor offspring who are
3 aware of the nature of their conception. Importantly, this is one of the first studies to compare the
4 views of offspring told of their origins during childhood to those who found out during
5 adulthood.

6 **METHODS:** On-line questionnaires were completed anonymously by donor offspring who were
7 members of the Donor Sibling Registry (DSR): a US-based worldwide registry that helps donor
8 conceived individuals search for and contact their donor and donor siblings (i.e. half siblings).
9 Data were obtained on offspring's feelings about being donor conceived and their feelings
10 towards their parents.

11 **RESULTS:** Offspring of single and lesbian couples learnt of their donor origins earlier than
12 offspring of heterosexual couple parents. Those told later in life reported more negative feelings
13 regarding their donor conception than those told earlier. Offsprings' feelings towards their
14 parents were less clear with some of those told later reporting more positive feelings and others
15 reporting more negative feelings. Offspring from heterosexual couple families were more likely
16 to feel angry at being lied to by their mothers than by their fathers. The most common feeling
17 towards fathers was 'sympathetic'.

18 **CONCLUSION:** Age of disclosure is important in determining donor offsprings' feelings about
19 their donor conception. It appears it is less detrimental for children to be told about their donor
20 conception at an early age.

21

22 **Key Words:** Donor conception, donor offspring, disclosure

1 **Introduction**

2 Donor conception is a common reproductive technique used to enable infertile heterosexual
3 couple couples, lesbian couples, and single women to have children. Despite the prevalence of
4 donor conception across the world, relatively little is known about the offspring who result from
5 this method of assisted conception. Studying donor conceived offspring has been limited due
6 largely to the shroud of secrecy that, in the past, was imposed by parents and encouraged by
7 clinics. However, more recently there has been a move towards greater openness. This has meant
8 that it is now possible for researchers to gain first hand accounts of what donor conception means
9 to those created by this method of assisted conception.

10 Despite growing opinion that offspring should be informed of their donor conception, few
11 parents disclose the nature of conception to their donor conceived children (Golombok *et al.*
12 2002; Gottlieb *et al.*, 2000). A study of 111 families with a child conceived through donor
13 insemination living in Spain, Italy, The Netherlands and the UK, found that none of the parents
14 had told their 4- to 8-year old child about their donor origins (Golombok *et al.*, 1996). A follow-
15 up of this sample, when the children were aged 12, found that only 8.6% of parents had told their
16 child about their donor conception (Golombok *et al.*, 2002). A more recent UK sample of 50
17 heterosexual couple parents of 1 year-old children conceived by donor insemination found that
18 46% intended to be open with their child about their donor conception (Golombok *et al.*, 2004).
19 However, intention to disclose does not always lead to disclosure. When these families were re-
20 visited when the child was aged 3, only 5% had told their child (Golombok *et al.*, 2006), and
21 preliminary data at age 7 showed that only 29% had done so (Casey *et al.*, 2008).

22 Reasons given by parents for non disclosure include wanting to protect the child from the
23 distress of not being able to gain any information about their donor. Other concerns include the

1 impact that disclosure may have on family relationships, in particular with the father, and
2 wanting to protect the father from either potential rejection by the child or the social stigma
3 associated with male infertility. Parents can also be unsure about how to tell their child (see Cook
4 *et al.*, 1995; Nachtigall *et al.*, 1998; Lindblad *et al.*, 2000). The decision to disclose has also been
5 found to differ between family types, with lesbian and single mothers more likely to disclose
6 compared to heterosexual couple parents (Brewaeys, 2001). This is not surprising given that
7 lesbian and single mothers have to explain the absence of a father to their child. Those parents
8 who do decide to tell their child tend to do so because they want to be honest and open with their
9 child (Rumball and Adair, 1999; Golombok *et al.*, 2004 and 2006). For heterosexual couples,
10 reaching a decision on whether they will tell their child or not can be complex (Shehab, *et al.*,
11 2008). Parents who do decide to tell may use strategies defined as either ‘seed planting’ used by
12 parents who believe that a child should be told from as early as possible, or ‘right time’ used by
13 parents who believe that disclosure should occur when children are of an age where they can
14 understand the information (Mac Dougall *et al.*, 2007).

15 Studies that have examined the views of donor conceived offspring have shown that some
16 adult donor offspring experience negative feelings about being donor conceived. Such feelings
17 can include anger about being lied to or frustration about not having access to medical or genetic
18 information (e.g. Turner and Coyle, 2000; Kirkman, 2004). However, a more recent study
19 reported better experiences for adolescent offspring. Scheib *et al.*, (2005) studied 29 adolescents
20 and found that the large majority were comfortable about the way they were conceived. The
21 adolescents in the study had found out about their conception at a young age (all had found out
22 before age 10), which may well explain their more positive response. Furthermore, they all had
23 open-identity donors which may have alleviated the feelings of anger and frustration reported by

1 offspring unable to find out the identity of their donor (Scheib *et al.*, 2005). Some parents,
2 particularly single mothers, of offspring born using open-identity release donors, have shown
3 interest in contacting other families conceived using the same donor. These parents report
4 wanting to create a sense of family for their child, and when such contact has been made it has
5 generally led to positive relationships (Scheib and Ruby, 2008). Similar positive relationships
6 have been reported by parents who used anonymous sperm donation to have their child, but later
7 searched for and contacted parents of their child's half-siblings (Freeman *et al.*, 2009).

8 Age of disclosure could thus be a critical factor in determining donor offsprings' feelings
9 about their donor conception. Telling children from a young age enables the information to be
10 incorporated into the child's sense of identity (Rumball and Adair, 1999). Those told during late
11 adolescence or adulthood often report being shocked and sometimes feel that their life has been a
12 lie (Turner and Coyle, 2000). Family secrets may be detected by children. A study of donor
13 offsprings' recollections revealed that parents, particularly fathers, avoided discussing issues
14 relating to resemblances, traits, genealogy and medical history (Paul and Berger, 2007).

15 Furthermore, if parents have discussed the child's conception with other family members
16 or friends, there is always a possibility that offspring will find out about their conception by
17 accident which could be far more detrimental (McWhinnie, 1995). Studies have found that
18 around half of DI Parents tell either a friend or a family member about their child's donor
19 conception (Golombok *et al.*, 1999; Gottlieb *et al.*, 2000), and thus disclosure by someone other
20 than parents is a real concern. Finally, with improvements in genetic technology and genetic
21 understanding, there is an increasing possibility that offspring may discover their donor
22 conception on their own (McGee *et al.*, 2001).

1 Little research has been conducted with families who disclose and who do not disclose,
2 therefore it is not known if disclosure is beneficial. In a comparison between families who had
3 told their child about their donor origins and those who had not, Lycett *et al.*, (2005) found more
4 positive parent-child relationships in disclosing families. Interim results from a study of families
5 with a 7 year-old child, found that assisted conception children (born using egg donation, sperm
6 donation or surrogacy), who had been told of their origins were rated by teachers as showing
7 fewer emotional problems than those who had not (Casey *et al.*, 2008). However, it is not known
8 whether this finding is due to telling *per se* or to other factors such as more open communication
9 by these parents generally.

10 Whilst in the past, only anonymous sperm donors had been available to prospective
11 parents, it is now possible for parents to access identity release donors (i.e. donors whose identity
12 is available to donor offspring when the child reaches a specific age) in some countries including
13 the US, Sweden, Austria, Switzerland, the Australian State of Victoria, the Netherlands, New
14 Zealand, and the UK (Daniels and Lewis, 1996; Pennings, 1997; Scheib *et al.*, 2003; Lycett *et al.*,
15 2005; Janssens *et al.*, 2006; Lalos *et al.*, 2007). However, whilst open identity donors are now an
16 option (or in some countries, the only option) available to parents wishing to use donated sperm
17 to start a family, it is important to bear in mind that it is only those offspring who are aware of
18 their conception who can request the identity of their donor; whilst parents can be encouraged to
19 tell their child about their conception, many parents still choose not to do so. Although it is
20 thought that using identity release donors will increase disclosure amongst parents, it is not yet
21 known what the impact will be. It is possible that knowing that the child will be able to contact
22 and meet their donor may actually make parents less likely to disclose. However, Greenfeld and
23 Klock (2004) failed to find any differences regarding disclosure when they compared the views

1 of women who had conceived a child using an anonymous egg donor with those who had used a
2 known donor.

3 ***The present study***

4 This present study explores the views and experiences of a large number of individuals who are
5 aware of their conception by sperm donation and is the first investigation to include adult as well
6 as adolescent offspring. The participants were recruited via the Donor Sibling Registry (DSR), a
7 worldwide internet registry that enables donor offspring to search for and contact their donor
8 and/or their donor siblings (see Freeman *et al.*, 2009 for further details). Whilst the study may not
9 be representative of all donor conceived individuals, the large sample size allows for meaningful
10 comparisons to be carried out between offspring of different ages and from different family types.

11

12 **Materials and methods**

13 All participants were either members of the DSR or children of parents who were members of the
14 DSR. Emails were sent to all members of the DSR, inviting them to take part in an on-line
15 survey. For parents of donor conceived offspring the email asked if they were willing to allow
16 their 13-17 year old child to take part. The survey was also advertised on the front page of the
17 DSR website. Ethical approval for this study was obtained from the Cambridge University
18 Psychology Research Ethics committee. Appropriate procedures were put in place to ensure that
19 children were unable to participate without their parents' consent.

20 Data for the current study were obtained over two phases. The first phase was open to
21 offspring aged 18 and over and was on-line for 11 weeks between April-June 2007. The second
22 phase was open to offspring aged 13 and over and was online for 11 weeks between December–

1 February 2008. Sixty-three offspring took part in the first phase and 102 offspring took part in the
2 second phase.

3 The response rate for the first phase was calculated using the total number of offspring
4 who were active members at the beginning of the study. There were 336 adult donor offspring
5 members thus yielding a response rate of 19%. For the second phase, 456 e-mails were
6 successfully sent to parents of 13-17 year old donor children and to adult donor offspring who
7 had not already taken part giving a response rate of 22%. Whilst the response rates are relatively
8 low, they are consistent with studies that use on-line survey methods (Couper, 2000; Wright,
9 2005; Freeman *et al.*, 2009). These low response rates need to be considered alongside the
10 advantages of carrying out on-line surveys such as the ability to target large or difficult to reach
11 samples (Couper, 2000; Wright, 2005; Freeman *et al.*, 2009).

12

13 ***Measures***

14 The questionnaire had two main sections. The first asked offspring about their experiences of
15 donor conception and the second asked them about searching for their donor and donor siblings.
16 This paper reports findings from this first section only. The findings on searching are presented
17 elsewhere (Jadva *et al.*, 2008).

18 The questions included multiple choice and open-ended items. For the multiple choice
19 questions, respondents had to tick boxes with different response options including an option for
20 'other, please specify'. Respondents were also given an opportunity to elaborate on their answers.
21 The questionnaire design, including the questions and response options, were based on interview
22 questions from research carried out with donor conception families (e.g. Casey *et al.*, 2008;
23 Lycett *et al.*, 2004, 2005). The questionnaire was piloted with DSR members to ensure that

1 questions were clear and had face and content validity. Quantitative data were analysed using Chi
2 Square tests and qualitative data were used to illustrate findings from the quantitative analysis.

3 The questions were analysed quantitatively. Two key areas were examined:

- 4 **1. Feelings about being donor conceived** Offspring were asked about i) the age at which
5 they had found out about their conception, ii) how they had found out about their
6 conception, iii) how they felt at the time they had found out, and iv) how they feel now (at
7 the time of completing the questionnaire). In order to gain more insight into offsprings'
8 feelings of being donor conceived, qualitative data analysis was carried out to identify any
9 additional themes.
- 10 **2. Feelings towards parents** Information was obtained on vi) how offspring felt towards
11 their mother, and vii) father (for heterosexual couple families only), at the time they found
12 out. Again, qualitative data analysis was carried out to uncover any additional themes
13 about offsprings' relationships with their parents.

14 *Participants*

15 A total of 165 offspring conceived by sperm donation completed the survey. They were aged
16 from 13–61 years (mean = 22 years, SD = 10). Approximately half (82) were aged between 13
17 and 17 and the other half (81) were aged 18 or over. Seventy-five percent (123) were female and
18 25% (42) were male. Fifty-eight percent, (96) of the offspring reported their parents to be a
19 heterosexual couple, 23% (38) a single mother and 15% (25) a lesbian couple. The majority
20 (89%, 148) of respondents were currently living in the US with the remainder living in Canada
21 (4%, 7), the UK (2%, 4), Australia (2, 1%) and South Korea (.5%, 1). With regard to ethnicity,
22 the vast majority (95%, 157) classified themselves as 'White', 4% (5) as mixed race, 1 (.6) as
23 'American Indian/Alaska Native', and 1 (.6) did not say.

1 Thirty-one percent (51) had yet to complete high school education, 21% (35) had been, or
2 were currently being, educated to community college level, 8% (14) to undergraduate level and
3 17% (28) had a postgraduate (Masters or PhD) degree. Twenty-two percent (37) did not specify
4 their educational background. Twenty-five percent (42) of the offspring currently had a partner
5 and 12% (19) had children of their own.

6

7 **RESULTS**

8 It should be noted that not all offspring answered every question; therefore the numbers do not
9 always add up to 100 percent. Also, for some of the questions, respondents could tick multiple
10 responses.

11

12 **1. Feelings about being donor conceived**

13

14 *Age of disclosure*

15 Thirty percent (50) of offspring had found out about their conception before the age of 3 years,
16 and 19% (32) had found out after the age of 18 (see Table I). When asked to state their exact age
17 at finding out, the mean age was 14 years ($SD = 9.5$), reaching a maximum of 50 years. However,
18 over one third of offspring (38%, 62) did not give an exact age largely because they were too
19 young to recall (80% of offspring told before age 3 and 40% of offspring told between ages 4-11
20 did not give an exact age). Taking this into account, the mean age of disclosure would be much
21 lower.

22 Comparisons were carried out to determine whether age of disclosure differed between
23 family types. As can be seen in Table I, only 9% (9) of offspring from heterosexual couple

1 families were told about their conception before the age of 3, compared with 63% and 56% of
2 offspring from single mother and lesbian families respectively. Thirty-three percent of offspring
3 from heterosexual couple families were told of their conception after the age of 18, compared to
4 none of the offspring from the other two family types.

5

6 ***Who told offspring about their conception?***

7 Twenty-four percent (40) of offspring stated that they had always known about their conception,
8 55% (90) had been told by their mother, 1% (2) by their father, 14% (23) by both parents, and 4%
9 (7) by someone else. Looking at the breakdown by family type (see Table 1), it can be seen that
10 almost half the offspring in single mother families (45%, 17) and over half (56%, 14) in lesbian
11 families reported always knowing about their conception.

12 Of the offspring who had been told by someone else, one had been told by her step-father
13 and one had found out by overhearing a conversation between her parents. One (from a single
14 mother family) was told by her sister when aged 1. Four reported being told by a family friend or
15 a member of their extended family.

16 Although information was not collected on the manner in which people were told, the
17 large majority had been told intentionally by someone. However, in a few exceptions, offspring
18 had found out unintentionally e.g. during an argument with their parents or during a genetics
19 class at school.

20

21 ***Response to disclosure***

22 Those offspring who had found out about their conception before the age of 3 were not included
23 in this analysis as they were considered too young to recall their feelings. Thus the final data

1 analysed were from 87 offspring of heterosexual couple families, 14 offspring of single mothers
2 and 11 offspring of lesbian couples. When asked to select their feelings at the time of finding out
3 from a list of different emotions, the most common feeling reported was curiosity (72%, 82). Chi-
4 square Tests were computed to determine if there were any relationships between feelings at the
5 time of finding out and offspring having been told during childhood (aged 4-11), adolescence
6 (aged 12-18) and adulthood (aged over 18). A number of significant associations were found
7 according to age of disclosure, with those told during adulthood more likely to report feeling
8 confused ($\chi^2 (2, N=114) = 7.846, p = <.05$) shocked ($\chi^2 (2, N=114) = 719.15, p = <.001$), upset
9 ($\chi^2 (2, N=114) = 8.348, p = <.05$), relieved ($\chi^2 (2, N=114) = 13.043, p = <.01$), numb ($\chi^2 (2,$
10 $N=114) = 13.043, p = <.01$) and angry ($\chi^2 (2, N=114) = 9.48, p = <.01$) (see Table II). Offspring
11 were also given the opportunity to elaborate further on their experiences of finding out that they
12 were donor conceived. Examples taken from these open-ended responses are shown in Table II to
13 illustrate the feelings expressed.

14

15 ***Current feelings about being donor conceived***

16 All offspring (96 from heterosexual families, 25 from lesbian couple families and 38 from single
17 mother families) were asked how they feel currently (at the time of completing the questionnaire)
18 about their conception. Again, they were asked to select their feelings from a list of possible
19 emotions. The most common response was curiosity, reported by 113 (69%) offspring. Fisher's
20 Exact Tests were conducted to compare the feelings of those told before the age of 18 and those
21 told after the age of 18. Significant associations were found between age of disclosure and feeling
22 angry (Fisher's Exact, $p = .017$), relieved (Fisher's Exact, $p = .018$) and shocked (Fisher's Exact,
23 $p = .005$), with those told after the age of 18 more likely to report these feelings (see Table III). A

1 non significant trend was found for feeling ashamed, with those told after the age of 18 more
2 likely to feel this way (Fisher's Exact, $p = .051$). Again, offspring were given the opportunity to
3 elaborate further on how they currently feel about being donor conceived and, in Table III,
4 examples taken from these open-ended responses illustrate some of the feelings expressed.

5

6 ***Definitions of donor***

7 Offsprings' qualitative responses were examined to determine the terminology used when talking
8 about their donor. Table IV shows the terminology used, and also shows the breakdown by
9 family type.

10 The frequencies shown in Table IV suggest that offspring from single mother families
11 were more likely than offspring from two parent families (heterosexual couple parents and
12 lesbian couples) to use terminology referring to 'dad' or 'father'. However, a Fisher's Exact Test
13 did not find this difference to be significant.

14 The open-ended responses shed further light on terminology relating to parentage. As one
15 offspring from a single mother family stated "*I dislike the word donor. He is my father. I have*
16 *no other man as father*" (17 year-old male, found out during childhood, with single mother).

17 Other offspring referred to their donor as their dad or father, even though they did not
18 want to form a relationship with him.

19 "*It is completely unnatural, my Father was likely to be a 20 ish year old Med Student, My Mother*
20 *was a 36 year old Woman very unlikely to have met this type of person. It makes me feel like*
21 *some kind of Hybrid or Cuckoo!*"

22 32 year-old female, found out during adulthood, with heterosexual parents

1 *“He IS my father in the most basic sense, but I don't expect a 'familial' relationship with him,*
2 *except in the 'long lost relatives' sense.”*

3 37 year-old female, found out during adulthood, with heterosexual couple parents

4 *“I'd like to know my dad, but since I've grown up without him, it's really no biggie.”*

5 16 year-old male, found out during childhood, with single mother

6

7 **2. Feelings towards parents**

8

9 *Feelings towards mother at time of disclosure*

10 Offspring were asked how they felt towards their mother at the time of finding out and responded
11 by selecting their feelings from a list of possible emotions. Overall, 40% said they felt no
12 different towards their mother and 30% said they appreciated their mother's honesty. Chi-Square
13 Tests were computed to determine whether age of disclosure was related to offsprings' feelings
14 towards their mother at the time of finding out. Significant associations were found between age
15 of disclosure and offspring feeling angry about being lied to ($\chi^2 (2, N=114) = 12.66, p = <.01$)
16 and feeling a sense of betrayal ($\chi^2 (2, N=114) = 6.11, p = <.05$), with offspring told during
17 childhood less likely to report these feelings. Offspring told during adolescence and adulthood
18 also reported feeling sympathetic towards their mother ($\chi^2 (2, N=114) = 15.68, p = <.001$) and
19 were more likely to state that they appreciated their mother's honesty ($\chi^2 (2, N=114) = 6.57, p =$
20 $<.05$). Those told as children were more likely to state that it made no difference to how they felt
21 towards their mother compared to those told later in life ($\chi^2 (2, N=114) = 6.57, p = <.05$) (see
22 Table V).

23

1 *Feelings towards mother and father (for heterosexual families) at time of disclosure*

2 For offspring from heterosexual couple families, Chi Square Tests were carried out to examine
3 the relationship between age of disclosure and offsprings' feelings towards their mother and
4 father separately (see Table VI). The most common feeling reported by offspring towards their
5 mother was 'angry at being lied to' whereas the most common feeling towards their father was
6 'sympathetic'. Offspring told during childhood were more likely to report feeling that disclosure
7 made no difference to how they felt towards their mother ($\chi^2 (2, N=87) = 8.949, p = <.05$).
8 Offspring told during adolescence and adulthood were more likely to report feeling sympathetic
9 towards their mother compared to those told during childhood ($\chi^2 (2, N=87) = 8.973, p = <.05$).
10 No association was found between feelings towards father and age of disclosure, although
11 offspring who were older at the time of disclosure showed a non significant trend towards feeling
12 betrayed ($\chi^2 (2, N=87) = 5.847, p = .054$).

13 Looking at how all offspring (irrespective of age of disclosure) felt towards their parents
14 at the time of disclosure (Table VI) it can be seen that 34% (30) felt 'angry at being lied to' by
15 their mother in comparison to only one offspring reporting this feeling towards their father. The
16 most common feeling towards fathers at the time of disclosure was sympathetic (37%, 32).

17 An additional theme that was highlighted by offspring of heterosexual parents was how
18 their conception was kept a secret because their father did not wish them to know. Often these
19 offspring were only told once their parents had separated or following their father's death.

20
21 *"My father had made my mother promise to never tell me about this, and still does not know that*
22 *I know about my biological origins. So my parents are the only people who ever knew. I have*
23 *not told my father that I know, and have not told anyone else."*

1 18 year-old female, found out during adolescence, with heterosexual couple parents
2 *“Although generally I do not agree with telling children something like this so late, my mother*
3 *was keeping a secret that she promised my father she would keep and also following the specific*
4 *recommendation of the doctor who did the insemination.”*

5 39 year-old female, found out during adulthood, with heterosexual couple parents
6 *“It was a secret my mother had wished to reveal for a long time but felt compelled to be silent by*
7 *her infertile husband.”*

8 24 year-old male, found out during adulthood, with heterosexual couple parents

9
10 Others commented that they had a good relationship with their father, but they were concerned
11 about upsetting him.

12 *“My father has never said anything negative -I just think it makes him feel a bit uncomfortable.”*

13 13 year-old male, found out during childhood, with heterosexual couple parents

14
15 *“For a long time it was something the family just didn't talk about, now we're a little more open*
16 *with it, but I still have never really discussed it with my Dad, I feel like it might hurt him*
17 *somehow, especially if he knew that I was interested in finding info on the donor.”*

18 32 year-old female, found out during adolescence, with heterosexual couple parents

19 **DISCUSSION**

20 This study has for the first time been able to compare the views of offspring told about
21 their donor conception during childhood, adolescence and adulthood, and has shown that age of
22 disclosure is important in determining offsprings' responses to their donor conception. Offspring
23 told about their donor conception during adulthood reported more negative experiences than

1 those told during childhood or adolescence. This finding from a large sample categorised by age
2 of disclosure, supports previous studies which have shown that adults told later in life have
3 negative experiences (Turner and Coyle, 2000), and that adolescents told during childhood have
4 more positive experiences about their donor conception (Scheib *et al.*, 2005). At the time of
5 finding out about their donor conception the offspring who had found out later in life were more
6 likely to recall having negative or neutral feelings e.g. confused, shocked, upset, relieved numb
7 and angry. At the time of completing the survey, those told later were still more likely to report
8 feeling angry, relieved and shocked. No significant relationships were found between the more
9 positive emotions and age of disclosure.

10 This finding is also in line with research on adoption which shows that adopted
11 individuals benefit from early disclosure about their origins. Some have argued that it may be
12 possible to draw analogies between donor offspring and individuals who have been adopted
13 (Feast, 2003; Crawshaw, 2002). Similarities have been found between adopted people and donor
14 conceived individuals in their feelings of curiosity about their origins, their need for more
15 information about their genetic or medical background, and their desire to obtain a clearer sense
16 of identity (Howe and Feast, 2000; Feast, 2003). The adoption literature has shown that it is
17 psychologically beneficial for children to learn about their origins in an accurate and truthful
18 manner (Triseliotis, 2000; Feast, 2003). Whilst the findings from this study suggest that
19 individuals conceived by donor would benefit from being told of their origins as early as
20 possible, some have argued that young children are not able to reflect on the implications of what
21 it means to be donor conceived (Solomon *et al.*, 1996). Others believe that it is important for
22 children to learn of their origins early so that this knowledge can be incorporated into their sense
23 of identity (Rumball and Adair, 1999).

1 Important differences were found between offspring from the different family types.
2 Those from single and lesbian couple families were more likely to have been told about their
3 conception from a young age. This is not surprising, given that children in these two family types
4 would be curious and would ask questions about not having a father. In contrast, individuals from
5 families headed by heterosexual couple parents were more likely to have been told later. In this
6 study, all offspring who had found out about their conception after the age of 18 were from
7 families headed by heterosexual couple parents. Furthermore, offspring from heterosexual couple
8 families were more likely than those from single mother or lesbian couple families to have found
9 out about their conception through someone other than their parents. Thus, findings from this
10 study show how telling others can lead to accidental disclosure and perhaps more importantly,
11 how it is possible for individuals to work it out for themselves (as one child did during her
12 genetics class at school). It is important that parents are made aware that even though they
13 decide not to disclose, there is a possibility that their child may come to learn of their donor
14 origins through other means.

15 There has been much debate recently over the terminology parents should adopt when
16 discussing their child's conception with their child. In order to create a distinction between the
17 donor and social father, Daniels & Thorn (2001) suggested that the former should be referred to
18 as 'the man who gave his semen', and the latter is referred to as 'father'. They also believe that
19 using the term 'father' for the donor who is 'not present physically, nor involved in loving and
20 nurturing, is to create a situation which has the potential to cause confusion for the child'
21 (Daniels and Thorn, 2001, p 1794). The present study found that whilst the majority of offspring
22 who talked about their donor in the open-ended responses referred to him as 'donor', almost one
23 third used a term that included father or dad (father, biological father, donor father, and dad). In

1 contrast, Mahlstedt *et al.*, (2008) found that the majority of adult offspring in their study viewed
2 their donor as their ‘biological father’. Offspring in our study were not specifically asked how
3 they referred to their donor, and it is conceivable that asking offspring directly would have led to
4 different findings. In terms of family type, it appears that offspring of single mother families are
5 more likely than those from two parent families to use terminology relating to father or dad; a
6 finding which is similar to other studies (Scheib *et al.*, 2003; Scheib *et al.*, 2005). Some offspring
7 from heterosexual couple families were using terms relating to father despite having a parent
8 whom they could refer to as father or dad. In Scheib *et al.*’s (2003) study which asked parents of
9 children conceived by donor from heterosexual, mother-only and same-sex families how they
10 defined their donor, none of the 10 parents of heterosexual couple families said that they referred
11 to the donor as ‘father/dad’. The adolescent offspring of these parents were later studied and
12 asked what they called their donor. Only 1 of the 6 offspring of heterosexual couple parents
13 referred to the donor as ‘donor’ with the remainder using terms that included ‘father’ or ‘dad’
14 (Scheib *et al.*, 2005). Little is known about how the terminology used by offspring reflects how
15 they view their relationship with their donor. From this study it is of interest that offspring who
16 used terms such as dad or father did not necessarily want to develop a father-child relationship
17 with their donor.

18 A number of relationships were found between age of disclosure and offsprings’ feelings
19 towards their mother at the time of finding out about their conception. Specifically, those told
20 later were more likely to feel angry at being lied to and betrayed compared to those told earlier.
21 However, they were also more likely to report positive feelings such as appreciating their
22 mother’s honesty and feeling sympathetic towards her. Offspring who had found out about their
23 conception during childhood were more likely to report that it made no difference to how they

1 felt towards their mother. This study also examined how offspring in heterosexual couple
2 families responded to their parents at the time of disclosure and found that they felt differently
3 towards each parent. Perhaps the most striking finding is the comparison between the number of
4 offspring who felt angry at being lied to by their mother and the number who felt angry at being
5 lied to by their father. The most common feeling offspring of heterosexual couple parents felt
6 towards their mother was 'angry at being lied to' compared to just one offspring feeling this
7 towards their father. In comparison the most common feeling towards their father was
8 'sympathetic'. It is unclear from the present data why offspring display greater levels of anger to
9 their mother than their father at the time of disclosure. One possible explanation is that mothers
10 had lied to conceal the truth or had missed opportunities to reveal their child's donor conception.
11 Also, children are more likely to talk about relationship issues with their mothers than their
12 fathers.

13 The open-ended responses provided greater insight into issues affecting offspring in
14 heterosexual couple families. For example, some reported that donor conception was kept secret
15 because their mother had promised their father that they would never disclose. This ties in with
16 findings from studies of parents' reasons for non-disclosure, which have shown parents to be
17 concerned about the impact that disclosure may have on the father-child relationship (Cook *et al.*,
18 1995).

19 *Limitations of the study*

20 One major limitation of this study was sample bias. Participants were members of a website that
21 facilitates contact between individuals conceived by donor and their half-siblings or donor. Thus
22 the sample was not representative of all donor conceived offspring, specifically those who are not
23 aware of their donor conception or who are not curious about their donor relations. Nevertheless,

1 by recruiting the sample through the DSR we have been able to access large numbers of donor
2 conceived individuals who are aware of their donor origins, the focus of interest in the present
3 study. To date, very little research has been conducted on individuals who know about their
4 donor conception, and thus the study provides valuable insight into the outcomes of donor
5 conception from the perspective of offspring themselves.

6 A further limitation relates to the methodology of the study. Whilst an on-line survey
7 enables researchers to access large numbers of participants, they also have relatively low
8 response rates. In addition to this, survey methodology, in comparison to face to face interviews,
9 does not allow for the researcher to explore emerging themes in the participant's narrative. This
10 survey gave rise to a wealth of issues, which we did not ask offspring about directly. Future
11 studies would benefit from using in-depth interviews to gain more insight to many of the issues
12 that are so pertinent to offspring created using donor sperm. However it is important to bear in
13 mind that on-line surveys may offer a sense of privacy not possible during face-to-face
14 interviews, which could lead to more honest and open responses.

15 In the current study, age of disclosure was confounded with family type and current age.
16 Offspring from single mother and lesbian couple families were more likely to have been told of
17 their conception at an early age compared to offspring from heterosexual couple families. Age of
18 the offspring at the time of taking part in the study was also highly associated with age of
19 disclosure, so that older people in the sample were more likely to report negative feelings about
20 their donor conception compared to younger individuals.

21 Future studies would benefit from the use of psychological measures to assess the
22 psychological impact on individuals aware of being donor conceived. Whilst this study showed
23 that age of disclosure was related to offsprings' feelings about being donor conceived, examining

1 whether age of disclosure is related to offsprings' psychological well-being was beyond the scope
2 of the investigation. Assessing the psychological consequences of donor conception is of
3 paramount importance for ensuring the wellbeing of individuals conceived in this way.

4

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9

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12

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Table I. Age of disclosure and who told offspring about their conception by family type

Age of disclosure	Heterosexual couple parents		Single mother		Lesbian mothers	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age of disclosure						
0-3	9	9	24	63	14	56
4-7	15	16	9	24	8	32
8-11	14	15	3	8	1	4
12-15	18	19	2	5	2	8
16-18	8	8	0	0	0	0
Over 18	32	33	0	0	0	0
Total	96	100	38	100	25	100
Who told offspring about their conception						
Always known	8	8	17	45	14	56
Mother	61	64	19	50	6	24
Father/co-parent	2	2	n/a	n/a	0	0
Both parents	18	19	n/a	n/a	5	20
Someone else	6	6	1	3	0	0
Total	95	99	37	97	25	100

Table II. Feelings at time of finding out by age of disclosure

Feelings	Age of Disclosure								p	Example (taken from open-ended responses)
	Childhood		Adolescence		Adulthood		All offspring			
	n	%	n	%	n	%	n	%		
Curious	36	71	20	65	26	81	8	72	n.s.	<i>"I was so young I don't remember feeling much more than interested and curious."</i> 13 year old female, found out during childhood
Confused	19	37	16	52	22	69	5	50	<.05	<i>"At first when told I did not really understand..."</i> 17 year old male, found out during childhood
Shocked	14	27	18	58	24	75	5	49	<.001	<i>"It was a big shock when my parents first told me"</i> 25 year old female, found out during adolescence
Accepting	16	31	11	35	6	19	3	29	n.s.	<i>"I've always been accepting to it because I never knew any different."</i> 15 year old female, found out during childhood
Upset	8	16	7	23	14	44	2	25	<.05	<i>"Either tell your kid from the beginning or don't tell them at all, it was one of the most shocking and upsetting moments of my life."</i> 19 year old female, found out during adolescence
Isolated	6	12	9	29	10	31	2	22	n.s.	<i>"I felt alone."</i> 19 year old female, found out during adolescence
Excited	10	20	8	26	6	19	2	21	n.s.	<i>"I also felt excited, because it meant I might have a living 'father' (my social father died when I was quite young), and half-siblings as well."</i> 36 year old female, found out during adulthood
Relieved	3	6	8	26	12	38	2	20	<.01	<i>"I was relieved that the man my mom was married to was not my biological father."</i> 30 year old female, found out during childhood

Numb	3	6	8	26	12	38	2	20	<.01	<i>“strange and numb”</i> 13 year old female, found out during adolescence
Angry	6	12	4	13	12	38	2	19	<.01	<i>“I am angry because I asked about being 'adopted' several times throughout my childhood and adolescence and told that I was being foolish. I knew.”</i> 52 year old female, found out during adulthood
Happy	7	14	8	26	5	16	2	18	n.s.	<i>“When I found out, I was not heartbroken or devastated (unlike the popular belief), but I was more curious than anything else. 10 minutes after I found out, a dozen questions flowed out of my mouth in less than a minute. This was the best day of my life.”</i> 13 year old male, found out during adolescence
Indifferent	6	12	4	13	3	9	1	11	n.s.	<i>“I am no different then any other person. How we are born, doesn't make us who we are. I do not define myself by that trait. It is more of just how I came to be.”</i> 17 year old female, found out during childhood
Ashamed	6	12	2	6	5	16	1	11	n.s.	
Content	5	10	6	19	0	0	1	10	-	
Wish hadn't found out	2	4	1	3	1	3	4	4	-	
Other	5	10	3	10	3	9	1	10	-	<i>“Annoyed to have to deal with it.”</i> 31 year old female, found out during adulthood

Table III. Current feelings by age of disclosure

Feelings	Under 18		Over 18		All offspring		p	Example (taken from open-ended responses)
	n	%	n	%	n	%		
Curious	89	67	24	75	113	69	n.s.	<i>"I'm curious about the half of me that is blank."</i> 19 year old female, found out during childhood
Accepting	60	46	14	44	74	45	n.s.	<i>"I've always been accepting to it because I never knew any different."</i> 15 year old female, found out during childhood
Content	36	27	4	13	40	24	n.s.	<i>"Though I am content with my life, I would still love to meet the rest of my family."</i> 13 year old female, found out during childhood
Happy	30	23	6	19	36	22	n.s.	<i>"I am very happy with being donor conceived. I have no problems at all."</i> 14 year old female, found out during childhood
Indifferent	31	24	3	9	34	21	n.s.	
Confused	19	14	7	22	26	16	n.s.	<i>"Trying to grasp my situation completely is impossible and I often get confused, frustrated, or stoic."</i> 19 year old female, found out during childhood
Excited	18	14	5	16	23	14	n.s.	
Angry	13	10	9	28	22	13	.017	<i>"It makes me feel physically sick to think that I have a Father/ Gandparents/ Half Siblings out there that I can never ever meet!"</i> 32 year old female, found out at during adulthood.
Upset	12	9	7	22	19	12	n.s.	<i>"The fact that my mother wanted a genetic connection with a child but didn't mind that she was denying me my connection to my father makes me very upset."</i>

								17 year old male, found out during childhood
Isolated	13	10	5	16	18	11	n.s.	
Relieved	9	7	7	22	16	10	.018	<i>"Relieved and happy now..."</i>
								17 year old female, found out during adolescence
Shocked	1	1	4	13	5	3	.005	
Ashamed	2	2	3	9	5	3	.051	
Numb	2	2	2	6	4	2	n.s.	
Wish hadn't found out	1	1	1	3	2	1	n.s.	
Other	13	10	5	16	18	11	-	<i>"like half of my heritage and identity are missing"</i> .
								37 year old female, found out during adulthood

Table IV. Terminology used to describe donor

	Heterosexual		Single mother		Lesbian		All offspring	
	couple parents				mothers			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Definitions of donor</i>								
donor	39	41	10	26	10	40	60	36
father	6	6	5	13	0	0	13	8
biological father	6	6	2	5	0	0	8	5
dad	1	1	1	3	2	8	4	2
donor father	2	2	0	0	0	0	2	1
none used	42	44	20	53	13	52	78	47
Total	96	100	38	100	25	100	165	100

Table V. Offsprings' feelings to their mother at time of disclosure by age of disclosure

	4-11		12-18		Over 18		All		
	n=51		n=31		n=32		n=114		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%			
<i>Feelings to mother</i>									
No different	28	55	13	42	5	16	46	40	<.01
Appreciated honesty	9	18	12	24	13	41	34	30	<.05
Angry at being lied to	6	12	9	29	15	47	30	26	<.01
Betrayal	6	12	7	23	11	34	24	21	<.05
Sympathetic	1	2	10	32	9	28	20	18	<.001
Loved them more	5	10	8	26	4	13	17	15	n.s.
Estranged	6	12	4	13	6	19	16	14	n.s.

Table VI. Offsprings' feelings to their mother and father (heterosexual couple parents) at time of disclosure by age of disclosure

	4-11		12-18		Over 18		All		
	n=29		n=26		n=32		n=87		P
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	offspring		
<i>Feelings to mother</i>									
Angry at being lied to	6	21	9	35	15	47	30	34	n.s.
No difference	15	52	9	35	5	16	29	33	<.05
Appreciated honesty	5	17	10	38	13	41	28	32	n.s.
Betrayal	4	14	7	27	11	34	22	25	n.s.
Sympathetic	1	3	9	35	9	28	19	22	<.05
Estranged	5	17	4	15	6	19	15	17	-
Loved them more	2	7	7	27	4	13	13	15	n.s.
<i>Feelings to father</i>									
Angry at being lied to	0	0	0	0	1	3	1	1	-
No difference	6	21	7	27	8	25	21	24	n.s.
Appreciated honesty	0	0	2	7	3	9	5	6	-
Betrayal	2	7	7	27	10	31	19	22	.054
Sympathetic	12	41	9	35	11	34	32	37	n.s.
Estranged	3	10	8	31	7	22	18	21	n.s.
Loved them more	5	17	4	15	9	28	18	21	n.s.