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PII: S1570-677X(16)30049-1
DOI: http://dx.doi.org/doi:10.1016/j.ehb.2016.06.001
Reference: EHB 584

To appear in: *Economics and Human Biology*

Received date: 28-3-2016
Revised date: 24-5-2016
Accepted date: 12-6-2016

Please cite this article as: Whyte, Stephen, Torgler, Benno, Harrison, Keith L., WHAT WOMEN WANT IN THEIR SPERM DONOR: A STUDY OF MORE THAN 1000 WOMEN's SPERM DONOR SELECTIONS.Economics and Human Biology http://dx.doi.org/10.1016/j.ehb.2016.06.001

WHAT WOMEN WANT IN THEIR SPERM DONOR: A STUDY OF MORE THAN 1000 WOMEN'S SPERM DONOR SELECTIONS

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JEL Classification: J13, D10, Z00

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A. Highlights

- Our results show women choose younger and more highly educated sperm donors faster
- That education is a possible proxy for future resources even in the absence of paternal investment from donors is
- The sperm donor market is a relevant and high stakes domain for behavioural research
- Behavioural research in reproductive medical settings is in its infancy and it's economic relevance will burgeon with time

B. Highlights

- Women choose younger and more highly educated sperm donors faster
- Education maybe a proxy for resources even in the absence of paternal investment
- Behavioural research in reproductive medical settings is in its infancy
- The sperm donor market is a relevant and high stakes domain for behavioural research

Abstract:
Reproductive medicine and commercial sperm banking have facilitated an evolutionary shift in how women are able to choose who fathers their offspring, by notionally expanding women's opportunity set beyond former constraints. This study analyses 1546 individual reservations of semen by women from a private Australian assisted reproductive health facility across a ten year period from 2006 to 2015. Using the time that each sample was available at the facility until reservation, we explore women's preference for particular male characteristics. We find that younger donors, and those who hold a higher formal education compared to those with no academic qualifications are more quickly selected for reservation by women. Both age and education as proxies for resources are at the centre of Parental Investment theory, and our findings further build on this standard evolutionary construct in relation to female mate preferences. Reproductive medicine not only provides women the opportunity to become a parent, where previously they would not have been able to, it also reveals that female preference for resources of their potential mate (sperm donor) remain, even when the notion of paternal investment becomes redundant. These findings build on behavioural science's understanding of large-scale decisions and human behaviour in reproductive medical settings.

Keywords: Sperm donor market; characteristics & preferences; large scale decision making; mate choice; evolutionary psychology; reproductive medicine

1. Introduction

Human females (like most mammals) bear a heavier burden in reproduction than their male counterparts. Women's considerable physical investment of internal fertilization, months of gestation and possibly years of ongoing lactation all come at a substantial physical and resource cost. Because of this significant reproductive constraint of parental investment

(Trivers 1972), women have evolved preferences for males with the ability and willingness to provide resources. This may be to partly offset, or compensate, for the opportunity cost of their heavy maternal burden. As such, women's capacity to identify men with both the ability and willingness to provide resources to them and their offspring is of critical importance (Buss & Schmitt 1993). A growing global market place for human gametes has facilitated a change in how women are able to identify and choose who fathers their offspring. Firstly, women no longer need to pursue and secure possible mates themselves; they are readily available as cryogenically frozen gamete samples at their nearest invitro fertilization (IVF) facility. Consequently, women no longer need a mate's consent to pursue pregnancy, as male donors relinquish dissemination control of their sperm at the time of their donation. Women are also no longer bound by the constraints of proximity, social class, culture, or race when choosing a male to mate with. A woman's choice is therefore no longer limited by the availability of certain genetic and environmental factors such as aesthetics, education, and income, in potential or available mates. The willingness of a male to provide resources or to paternally invest has also become redundant. Women can choose a male to father their children based purely on the suitability of his genetic fitness.

In most developed countries women (and men) with fertility problems, single women, and lesbians are all now able to freely access sperm from sperm banks and reproductive health facilities for the purpose of insemination. They are able to reserve sperm close to where they live, and the facilities they seek treatment from are able to source sperm from all over the world. This market place for life has been significantly driven by the commercialisation of the sperm donation industry in countries where it is illegal. Private companies such as Xytex Cryo International[4] and European Sperm Bank USA[5] supply a

[4] Xytex Cryo International Ltd. 1100 Emmett Street Augusta, Georgia 30904-5826 USA.
[5] European Sperm Banks USA: Sperm Bank & Cryobank. 4915 25th Ave NE #204, Seattle, WA 98105, United States

global market of reproductive health facilities and institutions. The commercialisation of the sperm donation industry and advances in (IVF) technology has notionally expanded women's opportunity set for mating, far beyond previous historical and evolutionary constraints. Behavioural exploration of how this market for human gametes operates is important, not only for the future of reproductive medicine and the psychology of its patients, but also wider behavioural and evolutionary science.

Exploring the characteristics of women's preferences in this market place, and how they notionally and quantitatively differ from more traditional mating settings like our social circles, speed dating, and in online dating (Buss 1989, Fisman et al. 2006, Lee & Niederle 2015, Lykken & Tellegen 1993) is currently an under-researched field. Research into the characteristics of preferred sperm donors and the women that participate in these markets is relatively new (Riggs & Russell 2010, Ripper 2008, Whyte & Torgler 2015). By utilizing data on donor gamete reservations from an Australian private practice fertility firm, we are able to explore the factors and characteristics preferred by women when choosing a sperm donor. The innovative element of our study is that we use the speed at which certain donor's samples are reserved as our dependent variable to analyse women's actual consumption decision of a mate. This provides a far more robust analysis, as the reservations are actual decisions, rather than a more commonly used instrument in behavioural sciences which records participants' stated preference (Leiblum et al. 1995, Scheib 1994). Using the difference between date of gamete arrival at the firm and date of reservation by the recipient, we are able to create an elapsed time variable to explore women's preference for specific donor characteristics.

While resources (as a signal of parental investment) has been a core theoretical construct in understanding how women decide with whom to mate (Trivers 1972), this setting allows us to explore the decision making process free of such constraint. Key genetic and

environmental factors such as a male's age, aesthetic features (eye colour, hair colour, height and weight), occupation and education level, can be analysed and distinguished from any correlation with paternity. The exclusion of proxies for resources allows us to explore women's true preference for certain genetic factors: the genetic factors that women know will be passed on to their future offspring.

Another interesting feature of the gamete market is that it is non-sequential in supply. Traditional mate choice decisions usually entail humans making a "yes or no" decision about a possible partner at a single point in time, never knowing if another more suitable (or any) other option may materialise in the future. The sperm donor market is non-sequential, in that women have multiple options to choose from in real time, and the ability to attempt to maximise their preference set in a particular group of (mate) options (Whyte & Torgler 2015).

Like many mate choice studies, this quantitative research seeks to ascertain the relevance and importance of the specific characteristics of males in the donation process. We question the key determinants or properties of donors, and whether certain traits increase reproductive success (i.e. do women prefer certain characteristics in men for reproduction when more formal constraints are relaxed). Our research aims to understand and demonstrate a tangible measurement of the female choice mechanism in a (notionally unbounded) non-sequential mating market. By exploring the timing of reservation of gametes from a commercial IVF facility, we aim to ascertain the factors at play in this large scale human mating decision.

Non-sequential multiple demographic factor evaluation of potential mates (sperm donor profile selection) deviates from how women and men historically have gathered information on and chosen who to mate with. Technological and human capital advancement

in reproductive medicine (and to a lesser extent the conduit of the internet) is facilitating a fundamental shift in how the human species can make decisions about who to reproduce with. The unique setting explored in this study allows the researchers to observe how people actually make decisions (choose) in a domain where they have little or no prior training or expertise, and furthermore in a domain with extremely high (economic, psychological and biological) stakes. To the best of the author's knowledge this is the first ever economic analysis of actual female choice (not just preference) in a reproductive medical setting. While the inimitability of the data set used in this research means the findings presented are somewhat limited in scope, the researchers believe they represent a valuable contribution to what is sure to become a topic of burgeoning interest across a wide range of scientific disciplines.

2. Method

2.1 Data

This empirical research was conducted in conjunction with Queensland Fertility Group[6] (QFG). The data for this project were collated between December 2014 and June 2015. The donor information was generated from pre-existing non-identifiable data collected from individual donor profiles, readily available on a myriad of internet sperm bank websites (for example Xytex & European Sperm Bank USA). Donor profile data generally includes (at a minimum) the donor's date of birth, his marital status, occupation, ethnicity, blood type, physical attributes, and educational attainments.

The empirical data consists of the date of arrival for the donor's semen sample and the date of reservation by the recipient at the QFG facility. As the sale of human tissue is illegal

[6] Queensland Fertility Group, 55 Little Edward St Level 2 Boundary Court Spring Hill, Queensland 4000, Australia

in Australia, women do not purchase gamete samples, rather they "reserve" the donation for use. To create a unique dependent variable of the elapsed time before reservation, the more recent date (the reservation date) was subtracted from date of arrival to give an "elapsed number of days" for each individual reservation. Only the first reservation by each different woman was included in the sample, as subsequent reservations are naturally correlated with the initial decision, and are often linked to reproductive medical procedures or ongoing semen storage decisions. As reservation numbers differ between donors (minimum one to maximum ten), each reservation in our sample represents a recipient's[7] unique choice of donor. The primary sample consisted of 1546 individual recipient reservations of semen across the time period 16th October 2006 to 22nd January 2015. Not all of these observations were able to be used in our analysis, as some profiles have missing values for some variables. This can be due to the fact that donor profiles are not globally standardised and differ by sperm bank. In addition, donors do not necessarily answer or provide information for all demographic factors.

QFG patients navigate the decision process in a standardized method across all facilities state-wide. Once a woman becomes a registered patient of the organisation they are given online access to QFG's database of all currently available semen donor stock. Women are then free to look through the database for as long as they wish, and as many times as they wish, without constraint. Available stock (on average) numbers approximately 10-20 different donors at any one time. The order available donor stock is shown to recipients in the database is from longest to shortest time of storage at the organisation (date of sample arrival at QFG). Elapsed time of storage, from either the point of donation or at the QFG facility has

[7] No female patient of QFG was identified at any point in this research by the QUT researchers. No demographics or identifying data was viewed or collated by the QUT researchers at any time. All female observations in this research were anonymous and consisted only of the date of reservation by the female, and the date of arrival of the sample at the facility.

zero bearing on the quality of the semen sample itself. And women are informed of this. The cryopreservation process of semen donation ensures that samples are frozen at a temperature of -196°C within approximately one hour of the donation being made. In fact, cryopreserved semen remains viable and has been successfully used well past several decades of storage, with no reduction in sperm quality (Cancer Council 2014).

The individual number of unique male donors totalled 169 men. Donors' ages ranged from 19 to 41 years with a mean of 26 years. Men who identified as married made up 5.76% of the sample, and 13.08% of these stated they currently have at least one child. 35.51% listed that they were currently a tertiary student of some kind, and 23.16% had stated that they had already attained some level of tertiary (education) accreditation.

Figure 1 and 2 show the frequency of reservation of gamete donations based on number of elapsed days available at the QFG facilities before reservation. Figure 1 excludes outliers that exceed 1000 days before reservation (90.82% of sample: N =1404). As such, more than nine out of every ten samples reserved by recipients are done so in less than five months from the date received. It is clear that there is strong demand for particular donor's gametes as approximately one in every two samples is reserved in under a month (Figure 2 – 49.48% of sample).

Figure 3 and 4 represent the average elapsed time between consecutive reservations of a donor's sample. Figure 3 is the complete sample (N = 1546) and shows a somewhat consistent average range of 10-18 days (9.60 days to 17.62 days) between reservations number one to number eight. And the elapsed reservation time average between the eighth and ninth, and ninth and tenth jumping significantly to 27.96 and 21.34, respectively.

As the supply in this market clears so quickly, we also look at those donors whose samples are reserved the fastest. In Figure 4 we present approximately half the sample (49.48%: $N = 765$) which consists of all of the donors whose maximum available 10 samples were reserved in less than 32 days (one month). The average time for first reservation and first to second reservation are more than twice as fast as the full sample comparison in Figure 3. There also appears to be a consistent average trend between reservations from second to third, all the way to ninth to tenth, of approximately 3 days (2.71 days to 3.65 days).

3. Results

Ordinary least squares (OLS) regression was used to analyse the preferred determinants of choice for women when selecting a sperm donor using the number of days until reservation as a dependent variable (Table 1). We also report beta (standardized) coefficients so that all coefficients are in the same metric (standard deviation units), and thus can be compared across variables. In all specifications we add dummies for the reservation order (e.g., whether it was the first reservation of person *i*, the second one of person *i*, etc.).

In specification (1) we start with four independent variables: the donor's age, and their educational qualification using three dummy variables, namely tertiary degree, tertiary qualification but still studying, and still studying. All the rest of the donors are in the reference group. We observe that women have a preference for donors who are young. A sperm sample of a person age 20 is reserved on average 30 days sooner than one of a man age 30. Women also prefer men with a tertiary qualification. Having such a degree reduces the reservation time by more than 20 days. In particular those who have a degree and who are still studying are in high demand although it should be noted that the sample of such individuals is quite small. The number of observations of samples reserved where donor had both a tertiary qualification and was still studying was $N = 35$ (2.26% of sample).

Next we control for the total number of reservations (1 to 10) as a proxy for attractiveness (see specification (2)) as not all semen donors realised the maximum 10 samples reserved by women. The effect size of both age and education remain, as does the statistical significance. The results indicate that the more popular the donor, the faster they reach the maximum reservation of ten samples. In specification three (3), we further restrict the data set to only those donors who had achieved their maximum of ten reservations. Thus, the sample size decreases to 950 observations. This variation mainly affects the group of people who have a degree and are still studying, which is possibly due to the low number of observations. In the next two specification we take better advantage of the available variables in our data set (see specifications (4) and (5)). This allows us to further investigate the robustness of our two key variables, age and education. First, we add donors' height and weight, and number of children. We also now use dummies to control for further individual characteristics such as skin and hair colour and blood type. We do not report the coefficients of these variables, but rather note the F-tests for the joint significance of each group of variables. The F-tests indicate the usefulness of including eye colour, hair colour, and blood type in our specification. In specification (5) we include marital status. For some donors there is no information about their marital status, thus we build a dummy variable "No information" to avoid further reducing the number of observations.

Finally, in specification five (5), we include a marital status classification for those donors who are married, divorced, or chose to provide no information on their donor profile. In this context we find that donors who are married are chosen for reservation faster than donors who state that they are single. Both marital status and number of children are used as

possible proxies for signals of fertility and attractiveness. The number of children[8] is positively correlated with a faster pick but the coefficient is not statistically significant. On the other hand, being married rather than single (reference group) reduced the reservation time by 39 days (coefficient statistically significant at the 1% level). Height and weight are included as signals of genetic fitness of the donor, as research has shown that women exhibit a preference for taller men (Lynn & Shurgot 1984).

Weight[9] has the expected positive relationship but the coefficient is negative. Surprisingly, height also shows a positive correlation but the coefficient is only statistically significant in one specification (and only at the 10% level).

Looking at the standardised coefficient in specification (5) we observe that age has the strongest influence on the reservation speed. This result motivated us to look more closely at age. In Table 2 we present specification six (6) and seven (7), which further explores the interaction effect between donor age and reservation order on the speed of donor semen reservation. This interaction analysis explores whether the order of the reservation is influenced by the age of the donor. In both regressions younger donors are increasingly more attractive in later reservations.

To get a better idea of the underlying relationship, we represent age by reservation order interaction, demonstrating the way that the age slope changes as a function of the reservation order (see Figure 5). Furthermore, we estimated the age slope at each level of

[8] We also ran additional specifications (that have not been included in the tables) that included a dummy independent variable for having a child. As with the number of children variable, these results were also significant at a 1% level.

[9] We also ran additional specifications (that have not been included in the tables) that included a dummy independent variable for BMI. This is weight, divided by height squared, however this independent variable was not statistically significant in any specification.

reservation. This shows that the age slope increases as a function of reservation order. In fact, the slope was even negative for reservation 1 and 2. The graph visually depicts the age slope increasing linearly as a function of reservation order. We have also included the confidence interval with respect to each age slope, illustrating that the age slope is statistically significant in later reservations (reservation five to 10).

4. Discussion

Our multivariate analysis demonstrates women's preference for younger and tertiary educated men, particularly for those continuing with further study. Education is certainly a proxy for resources and paternal investment, but as previously discussed, sperm donation is not a setting in which parental investment is possible. Even before Trivers (1972) identified "parental investment" as the driving force behind women's preferences, science had researched and identified women's penchant for resources (not all of which are economic or material) as a reproductive strategy. In fact, the "cumulative weight of scientific evidence supports the hypothesis that human females have evolved species-typical psychological mate preferences for males who display cues to resources and resource acquisition" (Buss 1991, p.406). Favoured proxies for resource acquisition such as education (Regan 1998, Townsend & Wasserman, 1998) can also be signals of a male's genetic fitness. Therefore, women's preference for tertiary educated sperm donors is more likely to represent a decision based on the genetic payoff. Bearing children with higher intelligence or children who are more willing to learn naturally reduces maternal investment and cost for the mother involved in the short run. And in the long run possibly the realisation of resource gains from more productive offspring. Education has previously been shown to be deemed "very important" for recipients when choosing a donor (Leiblum et al. 1995, pg.11). Sperm donation profiles do not carry information regarding a donor's income, but they definitely allude to resource acquisition or

potential future earnings. Without information on the recipient it is impossible to establish if females' preference for tertiary educated sperm donors is driven by assortative homophily (Skopek et al. 2010) or possibly even hypergamy on the part of the recipient (Whyte and Torgler 2014). As women seeking IVF are often in, or post, peak fertility (late 20's to early 30's, or older), it would not be unreasonable to expect female preference for assortative and aspirational mating based on their own educational attainment. Women in their late twenties and early thirties are more likely to have accrued a significantly higher level of education, than their younger (donor) male counterparts.

In a market where supply rapidly clears, younger male donors do not necessarily realise a fitness bonus in their earlier reservation, but in later reservation of semen, older men are definitely not preferred to younger males. This interaction effect between donor age and the speed at which his remaining gametes are reserved again significantly favours the younger donor. The age of the donor, while not relatively important in the preliminary reservation, becomes a highly significant factor between the fifth and tenth (final reservation). Our research poses an interesting question: when the issue of "actual" paternal investment by males becomes redundant thanks to reproductive medicine, why is *age* of the preferred mate (donor) the only significant change in women's preferences. One hypothesis may be that in a reproductive setting, women are choosing younger men on the assumption that they will have more viable sperm (Kidd et al. 2001) than their older counterparts, even though a male's sperm counts and motility or probability of reproductive success is unlikely to significantly vary in the current study's observed donor population *age* range (19-41 years). This cognitive bias towards youth is further accentuated based on the knowledge that current semen cryopreservation techniques ensure no reduction in semen quality or viability across decades of storage.

5. Limitations

The authors acknowledge several limitations of the study. Firstly, while the donor semen market does offer a greater diversity of choice in a non-sequential setting, it could be argued that it is a quasi-unbounded market, as available donors are not infinite. Availability of supply (Van den Broeck et al. 2013, Yee 2009) is at times compromised for a range of social, medical, financial, legal, or even logistical reasons. We are also unable to collect information on participants' (both donor and recipient) personality or preference for personality, which has previously been shown to impact sperm donor choice (Whyte & Torgler 2015).

Not all donor profiles used in this study had completely homogenous demographic variables. It is of little surprise that donor profiles are incorporating increasing amounts demographic data, as women seek additional information (Porter & Bhattacharya 2008, Wingert et al 2005) to assist their choice, and to forecast their potential for reproductive success. US research indicates that the number of donor insemination (DI) programs offering open-identity sperm donors is also increasing (Scheib & Cushing, 2007). It is still unclear whether this is indicative of women wanting ongoing contact with their donor, or just increased information to assist in the child's development. However, it is clear that women are requesting and are being provided with more information in their choice of donor than ever before.

Healthcare professionals also influence a recipient's preferences and decisions, either deliberately or unknowingly (Almeling 2006). Both the recipient's specific medical requirements and the type of IVF procedure chosen also impact women's decision making. The recipient's age and fertility affects the probability of reproductive success, and thus naturally influences the speed and desire to select a donor. Women's fertility is cyclical and

as such not linear like our time dependent variable. Furthermore, pre-existing family arrangements (e.g. siblings), or social pressures may also guide preference and choice, and influence timing of reservation.

This study does also not delineate sexuality on the part of the recipient, and whether this has an influence on the decision making process. The literature acknowledges that less attention has been paid to the specific dynamics inherent in lesbian donor conception, and how lesbian couples navigate these processes (Nordqvist 2010, 2012). However, with respect to sperm donation decisions and sexual preference, research has shown that the only major difference being "that heterosexual women begin DI attempts on average at an older age" (Leiblum et al. 1995 pg 11). Both groups are also alike in their information requests, "about the donor, principally health variables and medical history" (Jacob et al. 1999, pg. 203).

The question also arises as to whether women in the process of IVF and DI are disproportionally risk-seeking in their attitudes, or at least non-reflective of the broader community base in relation to their perception of risk. A study by Reading (1989) found that although none of the women in his study reported being given a success rate greater than 50%, they each believed their own chances to be higher, and did not consider the actual probability of success. One in every two women stated that "the decision to undergo treatment was not affected by probability estimates" (Reading 1989, p.107). The fact that there may be "misconceptions in the community about the effect of age on natural fecundity and the outcome of fertility treatment" (Maheshwari et al. 2008, p. 1041) may actually mean that women participating in IVF and DI procedures are more representative than first thought.

While there exists a body of scientific literature on how men advertise in traditional mating settings like personal ads and dating websites (Waynforth & Dunbar 1995, Pawlowski & Dunbar 1999, Pawloski & Koziel 2002), exploration of how men advertise via sperm

donation profiles (Riggs & Russell 2010) is limited. It is also unclear if males are cognitively aware of developing female preferences in this new and unique setting when they compile their donation profiles.

It is also uncertain what impact sexuality has on the way men present and provide information in their donor profiles, and the effect this has on information asymmetry. Studies have shown marked differences "between heterosexual and gay/bisexual donors with the latter being significantly more likely to desire contact with children born of their donations" (Ripper 2008, pg. 313). It is also unclear how this influences the flow of information and formation of donor profiles when sexuality is not a requested or stated preference.

Finally, and most importantly, the authors would like to acknowledge that not all donation reservations that occurred at QFG during the time frame stated were included in the sample. Our sample did not include some international and domestic donors that were excluded because: 1) for whatever reason their samples were of a standard that meant they were restricted by the treatment procedure that they could be used for, 2) there was a lack of the necessary demographic characteristics to conduct an adequate analysis for the purpose of this study, and 3) the donor had been specifically ordered for one recipient only and were not available for wider general usage (selection).

6. Conclusion

Research exploring the decision making process of women in reproductive medical settings is in its infancy. Our study provides important insight into the characteristics preferred by women when choosing a sperm donor in a formal medical setting. We suggest that future studies explore the role of personality in choice, and aesthetic symmetry in selection (assortative mating), two areas that have been widely explored in a range of other human mating settings. It is important to understand the role and influence of behavioural

tendencies shaped in previous or redundant environments, and its impact on this particular mate selection (reproductive medicine) scenario (Simpson & Gangestad 1992).

While on the surface it would be easy to assume females show a preference for particular (alpha) male(s). But our research shows that women do not necessarily gravitate towards a specific male, rather groups of genetic and phenotypic traits signalling genetic fitness in males. Male quality (their dna) is well defined in this setting, and it would appear that unlike in real life supply is highly elastic, meaning choices (to an extent) are not necessarily constrained by rationing or pricing ie there is reduced switching costs for women in non-sequential decision settings. But the reality is that while price is (somewhat) homogenous across the industry, supply is significantly constrained globally. And in most reproductive medical settings a particular donor's semen is only available for a maximum number of women. At QFG this maximum ten (10) reservations is realised by 79.56% percent of all donors. Because the majority of unique donors realise the maximum ten reservations, the use of elapsed time becomes the most apt dependent variable for the analysis of female decision making in this research study. Time is arguably the most valuable commodity for women with finite reproductive viability, who are wishing to maximise their choice of male donor characteristics.

There is no doubt that "human mating defies simple characterization" (Buss 2000, p.47). This is primarily due to the fact that decisions in one particular mating scenario or event "may not necessarily reflect choices on subsequent occasions or opportunities" (Roberts & Little 2008, p. 309). However, whether in traditional human mating settings or in regard to sperm donation decisions, women in the aggregate consistently exhibit preferences for signals of paternal investment and the future provision of resources (i.e. educational attainment).

The social sciences have been able to build an understanding of the importance of particular factors (and humans preferences for them) in the decision making process. That female mate choice preference for age is reversed in a reproductive medical setting is an important finding for behavioural science, and particularly for reproductive medicine and psychology. As mate choice is one of the largest economic decisions humans can make, the study of IVF and DI choices by women provides unique insight into the female choice mechanism, and the developing impact that reproductive technology is having on sex difference in mate preference. As advances in assisted reproductive medicine gather pace, along with demands for these processes from both men and women, ongoing and increased behavioural research is warranted in this field.

Acknowledgements

We acknowledge financial support from the Australian Research Council (ARC) Future Fellowship (FT110100463). This research was conducted in accordance with the Queensland University of Technology (QUT) Human Research Ethics guidelines (QUT Ethics approval number 1200000106). The authors declare that they have no conflict of interest. The authors would like to thank the editor Joerg Baten, two anonymous referees and Barnaby J. Dixson for their help full comments and suggestions.

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Figure 1: Frequency of sperm sample reservation (90.82% of sample)

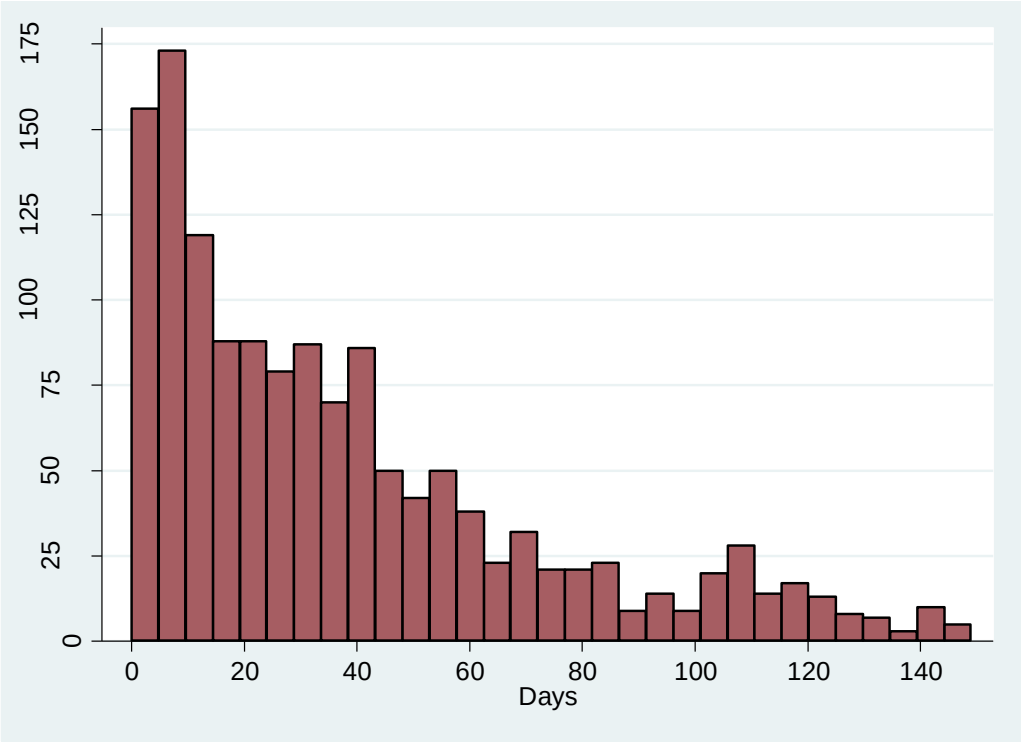

Figure 2: Frequency of sperm sample reservation (49.48% of sample)

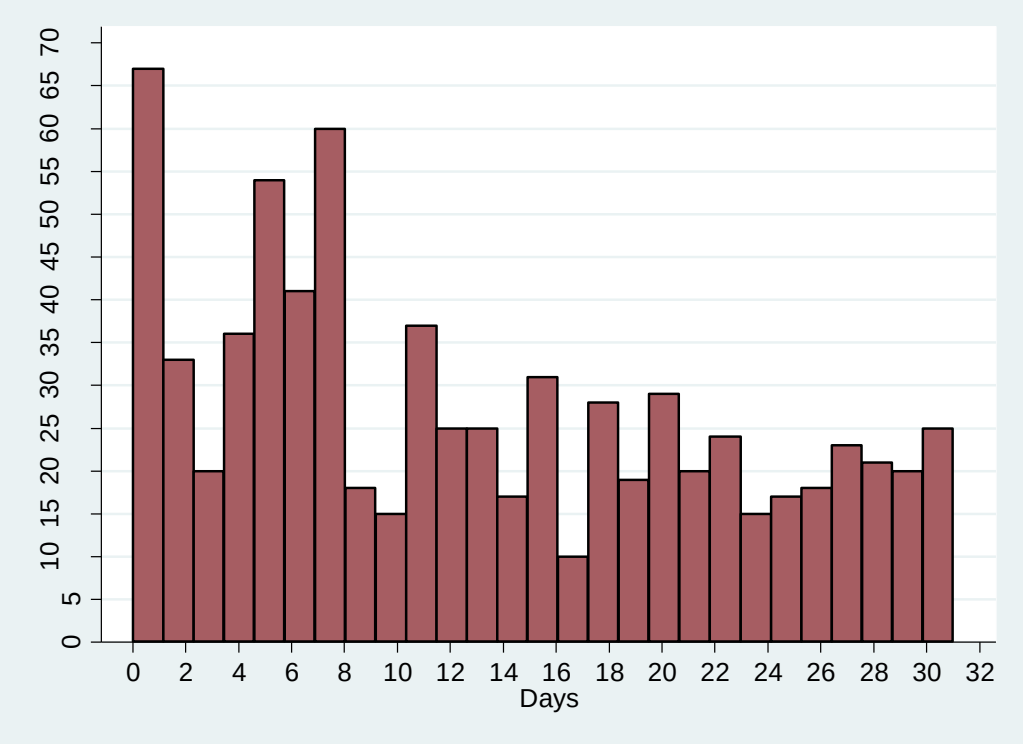

Figure 3: Average days elapsed between reservations (*N* = 1546)

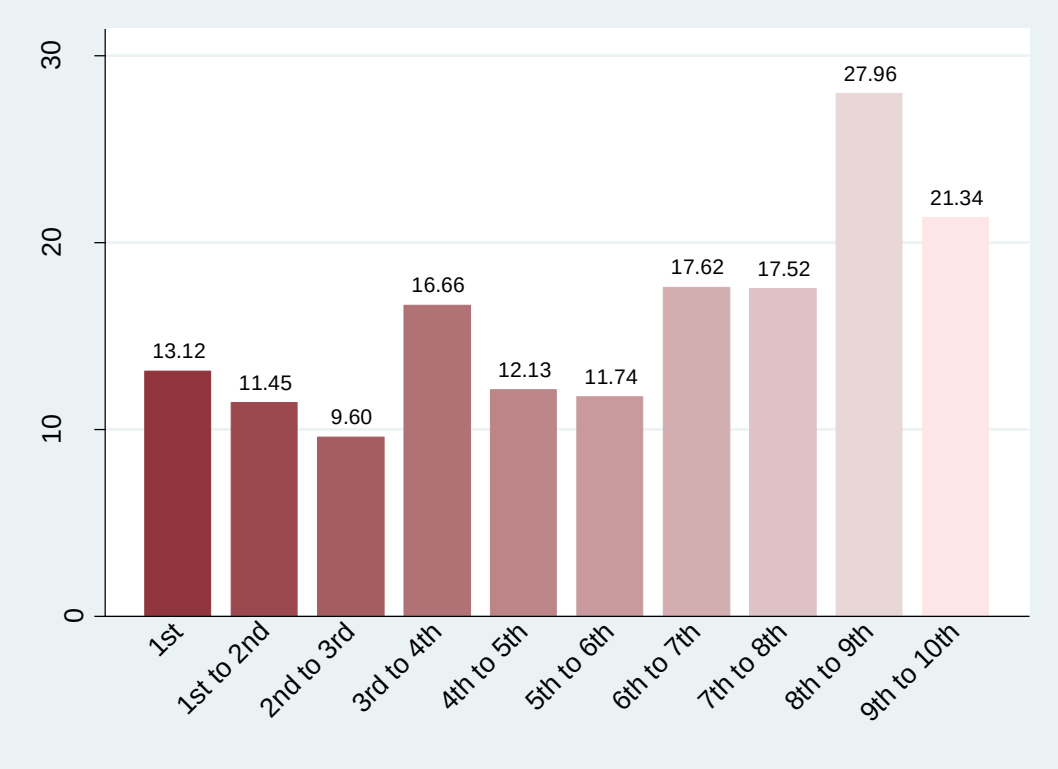

Figure 4: Average days elapsed between reservations (49.48% of sample)

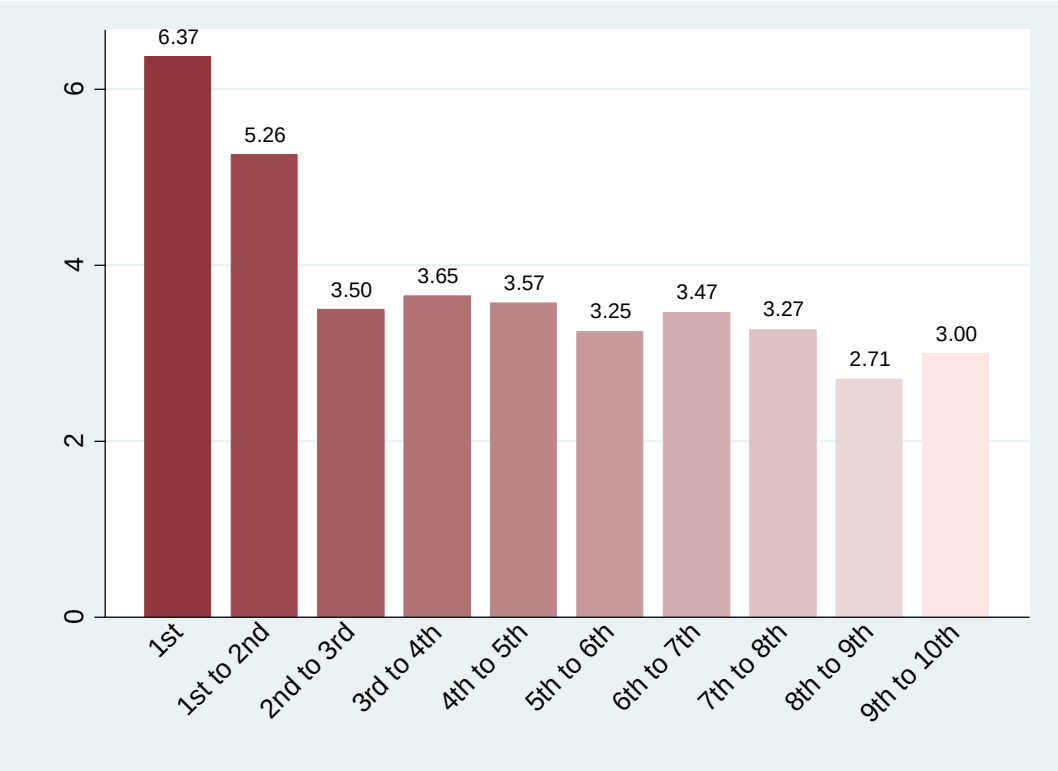

Figure 5: Average marginal effects: age and reservation order

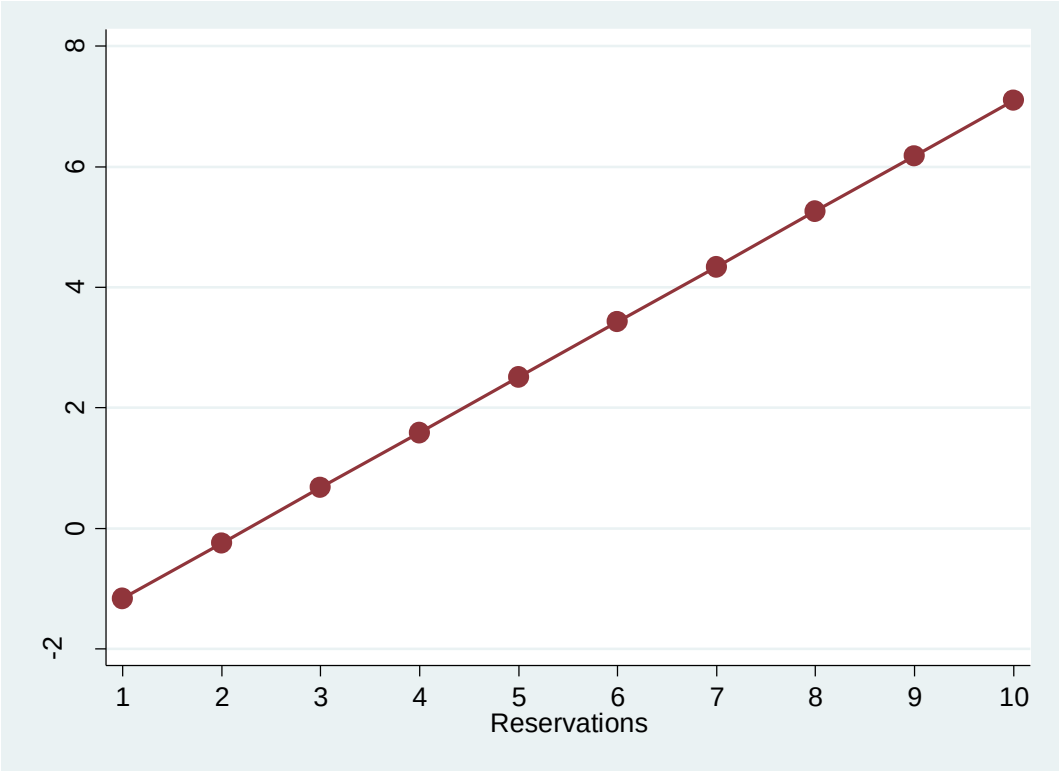

Table 1: Factors influencing number of days until reservation

Dep Variable: ***N* days until reservation**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Age	2.951***	2.587***	2.990***	2.667**	2.948**
	0.708	*0.683*	*0.927*	*1.305*	*1.328*
	(0.135)	(0.118)	(0.129)	(0.124)	(0.137)
Degree	-26.094***	-25.869***	-23.450***	-21.570***	-23.706***
	6.981	*6.950*	*8.124*	*7.258*	*7.741*
	(-0.951)	(-0.094)	(-0.863)	(-0.080)	(-0.088)
Degree & still studying	-45.947***	-53.684***	-25.236**	-47.223**	-45.569**
	9.342	*10.614*	*10.319*	*20.213*	*22.793*
	(-0.666)	(-0.778)	(-0.032)	(-0.057)	(-0.055)
Student	-2.627	-3.919	-5.435	-11.112	-10.056
	7.835	*7.564*	*7.563*	*8.603*	*9.298*
	(-0.010)	(0.015)	(-0.021)	(-0.464)	(-0.043)
Total Reserved		-13.248***		-11.136***	-9.998***
		2.738		*3.418*	*3.481*
		(-0.147)		(-0.129)	(-0.117)
Height				1.814*	1.603
				1.053	*1.095*
				(0.085)	(0.075)
Weight				0.108	0.095
				0.305	*0.313*
				(0.010)	(0.008)
Number of Children				-8.485	-6.901
				10.691	*11.404*
				(-0.042)	(-0.037)
Marital Status: Married					-39.181**
					17.548
					(-0.077)
Marital Status: Divorced					25.919
					21.740
					(0.037)
Marital Status: No information					4.531
					12.134
					(0.019)
Reservation Order Dummies	Yes	Yes	Yes	Yes	Yes
Skin Colour Dummies	No	No	No	Yes	Yes
Eye Colour Dummies	No	No	No	Yes	Yes
Hair Colour Dummies	No	No	No	Yes	Yes
Blood Type Dummies	No	No	No	Yes	Yes
N	1189	1189	950	992	992
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000
R-Squared	0.1436	0.1639	0.1677	0.2479	0.2531

Notes: Robust std. err. are presented in italics, beta coefficient presented in parentheses. *, ** and *** represent statistical significance at 10, 5 and 1% levels, respectively. Reference group variables include: Hair colour: Auburn, black, blonde, blonde dark, blonde light, blonde medium, blonde strawberry, brown, brown dark, brown light and brown medium. Eye colour: Black, blue, blue green, blue hazel, brown, brown dark, brown light, brown medium, green, green brown and hazel green. Blood type consists of all ABO and Rh blood types. Skin Colour: Brown, dark, fair, medium and olive.

Table 2: Interaction effects: Donor Age and reservation order

Dep Variable:		
***N* days until reservation**	**(6)**	**(7)**
Age	-2.335*	-2.078*
	1.144	*1.096*
	(-0.102)	(-0.096)
Reservation Order (1 to 10)	-8.527	-9.289
	7.745	*7.721*
	(-0.201)	(-0.239)
Age x Reservation Order (1 to 10)	0.949***	0.917***
	0.314	*0.320*
	(0.630)	(0.661)
Degree	-24.370***	-22.451***
	7.309	*7.226*
	(-0.085)	(-0.083)
Degree & still studying	-53.328***	-46.104**
	15.137	*20.971*
	(-0.066)	(-0.056)
Student	-3.637	-10.704
	7.772	*8.508*
	(-0.014)	*(-0.045)*
Number of Children	-4.403	-8.319
	9.349	*10.401*
	(-0.019)	(-0.041)
Height	-0.043	1.927*
	0.607	*1.054*
	(-0.002)	(0.089)
Weight	0.035	0.055
	0.269	*0.304*
	(-0.002)	(0.005)
Total Reserved	Yes	Yes
Skin Colour Dummies	No	Yes
Eye Colour Dummies	No	Yes
Hair Colour Dummies	No	Yes
Blood Type Dummies	No	Yes
N	1088	992
Prob > F	0.0000	0.0000
R-Squared	0.2590	0.2590

Notes: Robust std. err. are presented in italics, Beta Coefficient presented in parentheses. *, ** and *** represent statistical significance at 10, 5 and 1% levels, respectively. Reference group variables are: Hair colour: Auburn, black, blonde, blonde dark, blonde light, blonde medium, blonde strawberry, brown, brown dark, brown light and brown medium. Eye colour: Black, blue, blue green, blue hazel, brown, brown dark, brown light, brown medium, green, green brown and hazel green. Blood type consists of all ABO and Rh blood types. Skin Colour: Brown, dark, fair, medium and olive.

Table 3: Average Marginal Effects: age and purchase order

Age & reservation order	dy/dx	Std. Err.	[95% Conf.	Interval]
1st	-1.161	0.927	-2.979	0.658
2nd	-0.243	0.849	-1.909	1.422
3rd	0.674	0.887	-1.067	2.415
4th	1.592	1.029	-0.428	3.611
5th	2.509**	1.239	0.077	4.941
6th	3.426**	1.489	0.504	6.349
7th	4.344**	1.762	0.886	7.802
8th	5.261***	2.049	1.241	9.282
9th	6.179***	2.344	1.579	10.779
10th	7.096***	2.645	1.905	12.287

Note: . *, ** and *** represent statistical significance at 10, 5 and 1% levels, respectively. N = 992