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Selection Criteria in the Search for a Sperm Donor: Internal Versus External Attributes

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SELECTION CRITERIA IN THE SEARCH FOR A SPERM DONOR:

INTERNAL VERSUS EXTERNAL ATTRIBUTES

Benno Torgler and Stephen Whyte*

Abstract: Despite extensive literature on female mate choice, empirical evidence on women's preferences in the search for a sperm donor is scarce, even though this search, by isolating a male's genetic impact on offspring from other factors like paternal investment, offers a naturally 'controlled' research setting. In this paper, we work to fill this void by examining the rapidly growing online sperm donor market, which is raising new challenges by offering women novel ways to seek out donor sperm. We not only identify individual factors that influence women's preferences but find strong support for the proposition that inner values are more important in these choices than exterior values. We also find evidence that physical factors matter more than resources or other external cues of material success, perhaps because the relevance of good character in donor selection is part of a female psychological adaptation throughout evolutionary history. The lack of evidence on a preference for material resources, on the other hand, may indicate the ability of socialisation and better access to resources to rapidly shape the female decision process. Overall, the paper makes useful contributions to both the literature on human behaviour and that on decision-making in extreme and highly important situations.

Keywords: Online sperm donor market, donation recipients preferences, mate choice, sexual selection, evolutionary psychology, internal attributes, exterior attributes

JEL Classification: J13, D10, Z00

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Sterility has been said to be the bane of horticulture; but on this view we owe variability to the same cause which produces sterility: and variability is the source of all the choicest productions of the garden.

Charles Darwin, *Origin of Species*

For months, Beth Gardner and her wife, Nicole, had been looking for someone to help them conceive. They began with sperm banks, which have donors of almost every background, searchable by religion, ancestry, even the celebrity they most resemble. But the couple balked at the prices – at least $2,000 for the sperm alone – and the fact that most donors were anonymous; they wanted their child to have the option to one day know his or her father. So in the summer of 2010, at home with their two dogs and three cats, Beth and Nicole typed these words into a search engine: 'free sperm donor'.

Tony Dokoupil,"'Free Sperm Donors'" and the Women Who Want Them"

I. INTRODUCTION

Despite knowing a great deal about the way values shape people's daily interactions in families, neighbourhoods, or work groups, we have only limited understanding of their role in extreme, large-scale, or permanent situations. Reproductive decisions and the creation of life typify such situations, especially when they involve the search for a sperm donor in the online sperm donation market. Hence, in this paper, we seek to understand the degree to which females searching for a donor care about internal attributes like kindness or reliability as opposed to external attributes like physical attractiveness, height, weight, eye and hair colour, skin complexion, or exterior resource measures like occupation and income as indicators of material success. We also look at openness and explore the importance of educational level as a possible proxy for ability.

The advantage of studying behaviour around such a major decision is that donation recipients are forced to reveal their true preferences. That is, in contrast to the limited choices offered by private sperm banks, which mean that expressed preferences may be biased by availability, the Internet sperm market offers a much larger option set with

greater potential for locating the desired characteristics. Recipients in the online sperm donation market, therefore, have a strong incentive to maximise their chances of finding the closest match to their stated preferences in order to reduce any potential search costs and future negative externalities.

For many years before the advent of this new market, women had access only to limited non-identifying donor information and had little say in donor choice. In most cases, this latter was made at the physician or nurse's discretion, dependent mainly on physical similarity to the women's partner so as to increase acceptance (Scheib 1997). The rationale for this latter was the desire to "invoke a biological relationship" (Burr 2009, p. 716) even when there was no genetic tie (see also Kirkman 2004, Hargreaves 2006). This limited access may explain why the empirical literature on recipient preferences is substantially less developed than that on extensively explored topics like mate selection, which goes back to early work by Hill (1954) or Christensen (1947). In general, despite millions of dollars poured into in-vitro fertilisation (IVF) research worldwide, the literature and research on recipient preferences is notably underdeveloped. In fact, much of the current research on donor insemination (DI) focuses on the increase in both recipient and donor support of disclosure to offspring (e.g., Brewaey 2005, Daniels 2007, Daniels et al. 2009, Thorn et al. 2008) even in countries with strong legal frameworks upholding donor anonymity.

The communicative ability of the Internet and social media, however, has greatly changed the industry, eliminating past scenarios in which some potential recipients (e.g., single women) may have been rejected because of social concerns. They may, for example, have been considered "unsuitable" because of inadequate relationships or social support; traumatic and unresolved family histories; limited financial resources; psychological instability; or an unhealthy desire for, the lack of a male role model for, or stigmatisation

of the child (Klock et al. 1996). In many instances, such biases may have been unreasonable; for example, Klock et al. (1996) identify no significant differences in reported levels of psychiatric symptomatology or self-esteem between single and married women seeking DI. Both groups show low levels of psychiatric distress and average levels of self-esteem. Likewise, Acker (2013), after exploring the risks and benefits of private and institutionalised sperm donation, stresses that the 'benefits of unregulated private sperm transactions outweigh the risks, which are not so substantial than they warrant an intrusion into a woman's right to choose the method of her impregnation' (p. 3). Nevertheless, the development of the online sperm donation market, while expanding opportunities for donor location, has increased risks to recipients, which raises new challenges for legislators.

Evolutionary psychology helps to find mental adaptations that have been shaped over a long period of time to solve survival and reproduction problems (Miller and Todd 1998). Historically, humans have spent most of their time as hunter gatherers (Lancaster 1991), so evolutionary theories suggest that human mating is strategic, and related choices (whether conscious or unconscious) are made to maximise some entity, match, or balance. Accordingly, the sex that invests more in offspring is likely to be more discriminating about its mates (Buss and Schmitt 1993, p. 205). Among mammals, it is the female that usually invests more heavily than the male, so female humans prefer males with a drive to acquire, bond, learn, and defend: 'First, they would select a male with wealth and status or, at least, a likely bread-winner with ambition; a person with a drive to acquire…They wanted not only a good hunter but one who would actually bring the bacon *home*; a person with a drive to bond. Third, they would be looking for someone who was not only smart but who seemed reliable, committed to using his brain to figure things out on a consistent basis; a person with a drive to learn. Fourth and finally, these females would be looking for someone who was healthy and strong and prepared to protect them from all hazards: a

person with a drive to defend' (Lawrence and Nohria 2002, p. 176). *Intersexual selection*, therefore, is based on the power to 'charm the females,' although it must also be complemented by *intrasexual selection*, the power to 'conquer other males in battle' (Symons 1980, p. 172). Contest competition through threat and force are used to exclude same-sex rivals from mating opportunity allowing the winners to exclude to losers from proximity to potential mates (Puts 2010) although there are also other mechanisms of sexual selection beyond competition such as scrambling (finding the mate before rivals do, see Andersson and Iwasa 1996). There is also some evidence that in humans, male reproduction success is linked to cultural success or status as defined by resources, power, and prestige (see, e.g., Flinn 1986, Townsend 1989, Mulder 1990, Pérusse 1993, Li et al. 2002).

Such preferences are likely to be driven by the fact that females bear a heavy biological burden of gestation, birth, and lactation and that children develop slowly to reproduction age, meaning that females need assistance to successfully rear their young (Lancaster 1991). Reproductive strategies can thus be seen as a female attempt to map ways of directly or indirectly controlling necessary resources (Lancaster 1991). Among mammals especially, there is an asymmetry in parental investment, with females investing more in their offspring than males, which creates pressure on females to be discriminating in selection and avoid bad choices (Scheib 1997). In this context, necessary resources provide immediate material advantage (for females and offspring), social and economic benefits (enhanced reproductive advantages for offspring), and genetic reproductive advantage (assuming that variation in the qualities leading to resource acquisition is partly heritable) (Buss 1989, p. 2). Hence, Powers (1971), in a compilation of the results from six studies conducted between 1939 and 1967, observes that female students tend to rank emotional stability first, followed by ambition, a pleasing disposition, good health, refinement, desire for home and children, education and intelligence, similar educational background and

religion, good financial prospects, chastity, favourable social status, and political background, with good looks placed last on the list. In another study, the 10 (out of 75) characteristics most valued in a mate by both male and female are being a good companion, considerate, honest, affectionate, dependable, intelligent, kind, understanding, interesting to talk to, and loyal. The characteristics not viewed as highly desirable, on the other hand, are wanting a large family, dominant, agnostic, night owl, early riser, tall, and wealthy (Buss and Barnes 1986).

To emphasise the importance of parental engagement aspects that go beyond the cost (down)side (Trivers 2002), Trivers (1972) coined the phrase 'parental investment' as an alternative to Fisher's (1958) term 'parental expenditures'. This new terminology was part of a theoretical framework for understanding how natural selection acts on the sexes, one emphasising that sexual selection favours different male and female reproductive strategies and interests. In other words, sex differences in mate preferences reflect differences in the adaptive problems that ancestral men and women faced when choosing a mate (Buss 1995). As a result, the literature has tended to focus in detail on sex differences in mate selection criteria. Kenrick et al. (1990, p. 108), for example, report that females are generally more selective than males for the following characteristics: power, wealth, high social status, dominance, ambition, popularity, desire for children, good heredity, good housekeeping, religiosity, and emotionally stability. On the other hand, such differences in mate selection criteria could be driven by differential socialisation and access to resources that may fade from importance as women become more financially autonomous ('structural powerlessness hypothesis', see, e.g., Buss et al. 2001, Townsend 1989).

In an exploration of sex differences in human mate preferences among 37 cultures, Buss (1989) reports that females in 36 of these cultures value good financial prospects in a potential mate more highly than do males, and female subjects in general tend to express

higher preferences for ambition-industriousness than males (statistically significant in 29 cultures). Males, in contrast, prefer mates who are younger and place a higher value on physical attractiveness. This difference is confirmed by Buss and Barnes (1986), who observe that women want a spouse to have a good family background and be considerate, honest, dependable, kind, understanding, fond of children, well-liked by others, ambitious, career-oriented, and tall, while men seek a female who is physically attractive, good looking, a good cook, and frugal. Other desirable characteristics include moral traits, which may serve as a signal of individual fitness (Miller 2007), as well as cooperative behaviour, generosity, and altruism, which may increase reproductive success for males (Gurven et al. 2000, Alvard and Gillespie 2004). The mate choice literature has focused less on psychological traits such as kindness and more on physical or visual cues, as such exterior cues are relatively easy to measure (Miller and Todd 1998).

It still remains unclear, however, to what extent the selection process is driven by the female's desire for her offspring to have traits similar to the male's and to what degree by her wish to guarantee the male's contribution of important skills that will increase her success in raising them. Miller (1997), for example, points out: "The problem is that these studies have not been able to distinguish whether the moral virtues are preferred because they signal good genes, good parents, and/or good partners" (p. 110). He provides some suggestions how to proceed stressing that "[m]uch more research is needed along these lines" (p. 82). The advantage of focusing on females searching for a sperm donor in the online market is that, even though some character traits may reduce anticipated problems in child rearing, it isolates trait preferences from the desire for parenting assistance. In other words, the more controlled setting ensures that a male's genetic impact on his offspring can be isolated from other factors and explored independently (Scheib 1997).

In particular, we examine the relevance of perceived 'good genes' when the characteristics of a 'good parent' are ignored. Interestingly, Kirkpatrick and Ryan (1991), while studying the preference for elaborate mating displays among females that receive little more from the male of their species than sperm, find growing support for the direct selection hypothesis of mating preference evolution. That is, 'preferences evolve because of their direct effects on female fitness rather than the genetic effects on offspring resulting from mate choice' (p. 33). If this assumption is true then, because human infants require greater paternal investment than other male mammals, individuals may care less about the paternal investment factors (e.g., kindness and reliability) that contribute to cooperative work.

The evidence, in fact, paints a very different picture. Scheib (1994) and Scheib et al. 1997) find that women seeking a sperm donor value the same attributes as they would in a long-term marital partner, such as those that indicate good companionship (see also Scheib 1997). Similarly, Klock et al. (1996) identify 'personality' as the second (third) highest rated information variable requested by a single (married) woman selecting a potential donor. Among both single and married females, personality had a higher frequency than ethnicity, intelligence, or family medical history. This similarity between donor preferences and those for a potential spouse can be explained by the evolutionary perspective: if long-term relationships are the human solution to the survival and reproductive problems faced by our ancestors (Buss 1995), then the psychological mechanisms dealing with this element would occupy a central place in the human evolutionary process, one that may still be reflected in sperm donor choice.

II. DATA COLLECTION

Participants for our survey, conducted between 23 November, 2012, and March 1, 2013, were recruited by posting survey URLs, a short outline of the research, and a call for volunteers on both regulated and semi-regulated sites, as well as several unregulated free

forums.[1] The first post became active on or just after the initial start date of November 23, 2012 (on paid regulated sites[2] requiring prior administrator permission, posting was subject to a short time lag); a second blog, again calling for volunteers, was posted on January 4, 2013; and a final blog was posted on January 31, 2013. All three blogs were reviewed and cleared by QUT Ethics prior to uploading (QUT Ethics Approval Number 1200000106). During the course of the research, no researcher joined any web site as a participant or engaged in any interaction or commentary on any of the forums, and on all unregulated sites, the posts were clearly identified as research based. This absence of any research team participation, as well as the standardisation of the three blog posts, was imperative to eliminating any influence over participants or any bias within the sample. Throughout November 2012, we also collected email addresses from both donors and recipients who had posted them on these sites (no email addresses were taken from any web site that was not already posted as part of a public forum). On December 19, 2012, a mass email containing the text of the first post and the two survey URLs were sent to over 1,200 individuals identified as active participants across a range of free forum web sites. In total, 254 individuals read the abstract provided, and we focus on 74 women who completed the survey.[3] This sample, although not large, is larger than that in many studies using student populations rather than actual sperm recipients.

According to the summary statistics provided in Appendix *Table A1,* only 35% of the women in our sample are heterosexual and only 34% are single. Not surprisingly, the online sperm donor market is attractive to lesbian couples or single women without male partners, particularly because in some countries (e.g., the U.S.), insurance will not cover donor insemination unless a woman can report inability to become pregnant (Dokoupil

[1] VoyForum.com, TadpoleTown.com, BubHub.com, FertilityFriends.co.uk – Infertility and Fertility Support, PSD (privatespermdonor.com).
[2] Co-Parent.net, Co-ParentMatch.com, PrideAngel.com, and Modamily.com.

[3] Twenty-one others provided barely any information and so were excluded from our analysis.

2011). Of these 74 women, 91% are Caucasian, originating from six different continents, although a large proportion are from the U.S. (31.9%), followed by Australia and the UK (24.6% each). Their ages range between 19 and 43 with an average of 32, and their perceived health and well-being average 5.4 and 5.6 (out of 7), respectively.

Because some may criticise our focus on preferences rather than actual choices, it is important to stress that choices are a manifestation of preferences (Cotton et al. 2006). In fact, there is substantial evidence that self-reported data are often consistent with behavioural measures (see Scheib et al. 1997, for an overview). For example, a validity test by Buss (1989) of whether self-reported preferences are accurate indices of actual preferences indicates that actual age differences at marriage reflect preferred age differences between spouses while preferred age at marriage and preferred mate age correspond closely in absolute value to the actual mean ages of grooms and brides. Buss (1989) also finds that across countries, samples preferring larger (smaller) age differences reside in countries where actual marriages show larger (smaller) age differences. Moreover, as Scheib et al. (1997) stress, when women can choose the insemination donor, they usually do so based on questionnaire self-report, and 'what women say they want is what they get' (p. 144). This matching may be even stronger in the online sperm donor market.

III. RESULTS

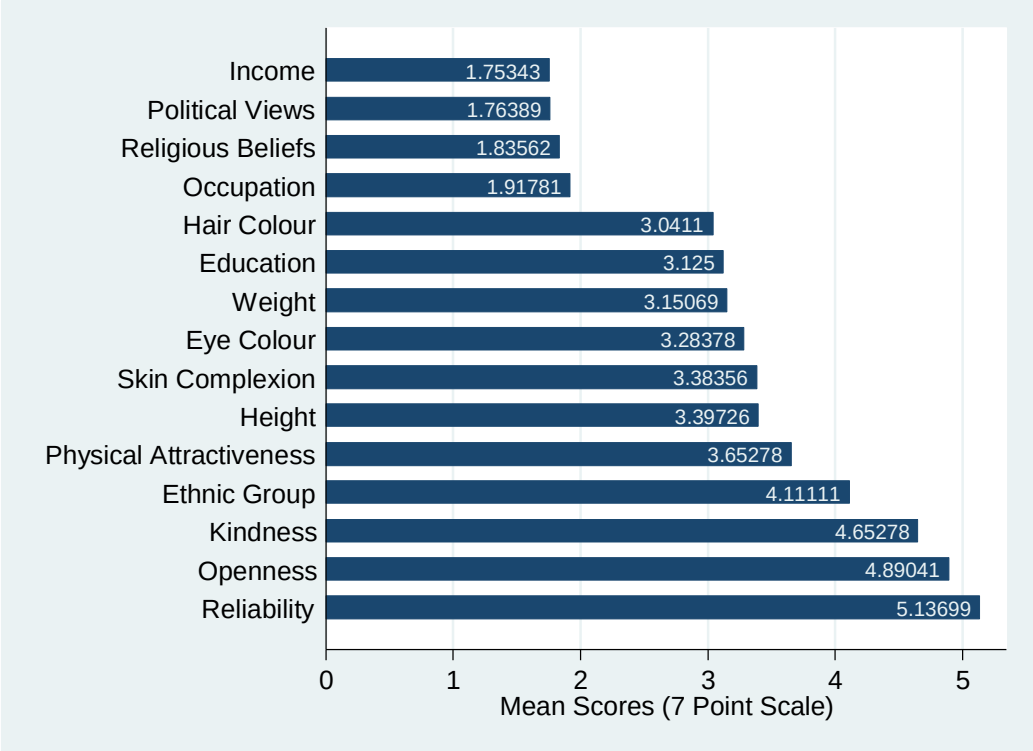
1. DESCRIPTIVE ANALYSIS

The survey questionnaire asked the sperm recipients to rank 15 characteristics on their importance in the donor decision on a scale ranging from 'not relevant at all' to 'an essential requirement'. As *Figure 1* shows, character values like reliability, openness, and kindness top the list, suggesting that these inner attributes are seen as very important. Interestingly, ethnic

group also ranks highly, which may indicate that identification and identity also matter. On the other hand, income, a general indicator of material success, is assigned the lowest value and does not seem to matter at all. Also assigned low values are political views and religious beliefs, two factors whose potential for genetic determination is likely to be limited. Occupation as an additional indicator of success is also not perceived as important, although education does matter, possibly as a more accurate proxy of potential, ability, or capacity. From an evolutionary perspective, education may also contribute to ensuring offspring survival, particularly in unexpected situations. Nevertheless, education is ranked as less important than physical attractiveness and physical appearance indicators like eye colour, skin complexion, weight, and height, with only hair colour rated as less relevant than education. Height is seen as more important than weight and physical attractiveness as more valuable than these other factors. Moreover, although our data do not allow a female/male comparison, our results do indicate that, relatively, women care less about socioeconomic status than physical attractiveness, which suggests that females do have a certain 'standard of beauty'. Buss et al. (2001) observe looking at mate preferences across a 57-year span that the importance attached to good looks has increased. They argue that the bombardment of images featuring physically attractive models and actors may trick the evolved mating mechanism deluding people into believing that they are surrounded by many potentially attractive partners. They also point out that the increasing number of men active in appearance-enhancing efforts provides circumstantial behaviour evidence for a value shift. There is also evidence that physical attractiveness is used as the basis for evaluating pathogen resistance in potential mates, a resistance developed over time through sexual selection of 'good genes' (Gangestad and Buss 1993). Leiblum et al. (1995) likewise identify the physical attributes of ethnicity, height, weight, hair colour, eye colour, and skin tone as six of the top seven characteristics selected by recipients choosing a donor, with 'years of college' as number one.

The six physical attributes are followed by occupation, special interests, body build, religion, and blood type.

FIGURE 1: RECIPIENT PREFERENCES



2. *MULTIVARIATE ANALYSIS*

Tables 1 and 2 report the results of using each of these 15 attributes as dependent variables with which to explore the determinants of preference. Although here we report simple OLS estimations, it should be noted that the results using an ordered probit model are relatively similar although more factors are statistically significant in the ordered probit model. It is also worth noting that Ferrer-i-Carbonell and Frijters (2004), using panel data, show that the choice of a cardinality or ordinality assumption is relatively unimportant when exploring general satisfaction (well-being), whereas the manner in which time-invariant unobserved

factors are accounted for definitely matters. We present estimations with standard errors adjusted to clustering over six regions (continents) to take into account cultural differences.

As independent variables, we use only recipient characteristics, employing the same set in all 15 regressions. As a first set of independent variables, we use recipient's age, education[4], household's annual wage[5], height[6], and weight[7]. In selecting these variables, we take into account that women's standards and preferences can be affected by their own potential earning power, occupation status and conditions. Next, we additionally control for subjective health[8] and well-being[9], followed by marital status (with single as the reference group), ethnic group (a dummy for Caucasian), sexual orientation (a dummy for heterosexual), religiosity (a dummy for atheist), and the Big Five personality test variables used in earlier research to predict women's aesthetic preferences when choosing a mate: agreeableness, conscientiousness, emotional stability, extraversion, and openness (see the appendix). Of these, Welling et al. (2009) find extraversion to be positively correlated with women's preferences for masculine men, while openness to experience is associated with women's preferences for femininity in both men and women. In other research using the Big Five, Botwin et al. (1997) show significant differences for women with respect to agreeableness, emotional stability, and conscientiousness, although both sexes demonstrate consistently high values for openness and agreeableness as desirable qualities in a mate.

[4] Question: My highest level of education achieved at this point in time (1 = below Grade 10, 2 = Grade 10, 3 = Grade 11, 4 = Grade 12, 5 = Technical college (prevocational, trade college, apprenticeship), 6 = undergraduate university study (diploma, bachelor's), 7 = post-graduate university study (graduate diploma, graduate certificate, master's), 8 = doctorate/PhD.

[5] My household's annual wage would be in the range of 1 = below $20,000, 2 = $20,000 - $50,000, 3 = $50,000 -$80,000, 4 = $80,000 - $110,000, 5 = $110,000 - $150,000, 6 = $150,000 - $180,000, 7 = $180,000 - $210,000, 8 = $210,000 - $240,000, 9 = $240,000 - $270,000, 10 = $270,000 - $300,000, 11= above $300,000.

[6] 9=Over 220cm (taller than 7ft 1in), 8 = 210cm - 220cm (6ft11in - 7ft 1in), 7 = 200cm - 210cm (6ft 7in - 6ft 11in), 6 = 190cm - 200cm (6ft 3in - 6ft 7in), 5 = 180cm - 190cm (5ft 11in - 6ft 3in), 4 = 170cm -180cm (5ft 7in - 5ft 11in), 3 = 160cm - 170cm (5ft 3in - 5ft 7in), 2 = 150cm - 160cm (4ft 11in - 5ft 3in), 1 = under 150cm (shorter than 4ft 11in).

[7] 1 = under 50kg (110lb), 2 = 50kg - 60kg (110lb - 132lb), 3 = 60kg - 70kg (132lb - 154lb), 4 = 70kg - 80kg (154lb - 176lb), 5 = 80kg - 90kg (176lb - 198lb), 6 = 90kg - 100kg (198lb - 220lb), 7 = 100kg - 110kg (220lb - 242lb), 8 = 110kg -120kg (242lb - 264lb), 9 = 120kg - 130kg (264lb - 286lb), 10 = 130kg - 140kg (286lb - 308lb), 11 = over 140kg (308lb).

[8] All things considered, how would you describe your health (1 = very unhealthy, 7 = very healthy).

[9] All things considered, how satisfied are you with your life (1 = very unsatisfied, 7 = very satisfied).

Such factors as agreeableness, conscientiousness, and emotional stability, it should be noted, may have been important for survival in a hominid group (for a discussion, see Kenrick et al. 1990). Moreover, there is evidence that shows that conscientiousness and agreeableness are sought in long-term mates, predict good partner traits which could indicate that they have been shaped by sexual selection (for an overview, see Miller 2007).

As *Table 1* shows, recipient age is positively correlated with preferences for donor height, while donor eye colour is less relevant for the older cohort. Recipient education seems not to matter at all when selecting for physical characteristics. The recipient's annual household wage is negatively correlated with the dependent variable in two cases: ethnic group and hair colour. Recipient height and weight do appear to influence preferences for all proxies of donor physical characteristics, but happier recipients care less about weight than others. In fact, the estimated regression coefficient for happiness shows that with each additional one unit increase on the happiness scale, the importance of weight decreases an average of 0.245 points. In addition, all else being equal, healthier recipients care about height but not weight, although they do care about physical attractiveness. For marital status, we observe a tendency for single recipients (the reference group) to care less about physical attributes than other recipients (particularly those in a de facto or civil union). Caucasian recipients care less about height and weight than those in other ethnic groups, but sexual orientation barely influences preferences for physical characteristics. Religiosity also appears irrelevant, as does openness. Interestingly, agreeableness is positively correlated with the importance of such attributes as weight and hair colour, while conscientiousness is negatively correlated with height. On the other hand, even though ethnic group preference is positively correlated with emotional stability, it is negatively correlated with extraversion.

TABLE 1: DETERMINANTS OF PHYSICAL CHARACTERISTICS

Dependent Variable	**Height**	**Weight**	**Eye Colour**	**Hair Colour**	**Skin Complexion**	**Physical Attractiveness**	**Ethnic Group**
Age	0.099**	0.028	-0.057*	-0.013	-0.226	0.009	0.029

Education	0.180	-0.090	0.261**	-0.105	0.175	0.087	0.024
Household's Annual Wage	-0.032	-0.013	0.015	-0.234**	-0.023	-0.055	-0.340***
Height	-0.212	0.016	-0.141	-0.036	-0.300	-0.060	0.102
Weight	-0.212	-0.058	-0.076	-0.039	-0.113	-0.267	-0.217
Health	0.378***	0.242	-0.107	0.156	0.118	0.234*	-0.458
Happiness	-0.330	-0.245*	-0.145	-0.294	-0.445	-0.128	-0.052
Civil Union	0.959***	0.908	1.874**	2.764***	1.518*	1.358***	0.782
De Facto	1.339**	0.836	3.324**	2.185**	3.092**	1.836	0.216
Divorced	1.429**	0.365	0.174	-0.058	0.570	0.430	0.701
Engaged	1.345**	0.374	0.881	1.850**	1.650*	1.153	1.514
Married	0.816**	0.693	0.962	0.729	-0.072	-0.126	1.852**
Caucasian	-2.177***	-1.375**	-0.949	-0.830	-0.884	-1.210	-0.929
Heterosexual	0.382	0.272	1.029	1.171*	0.871	0.826	0.152
Religiosity (Atheist)	0.671	0.718	0.210	-0.186	-0.474	0.670	0.420
Agreeableness	0.195	0.247**	0.082	0.272***	0.152	0.195	0.238
Conscientiousness	-0.619**	-0.233	0.066	0.178	0.333*	-0.048	0.120
Emotional Stability	0.258	0.061	0.007	0.089	-0.016	0.112	0.353*
Extraversion	0.025	-0.095	0.056	0.375	-0.073	0.209	-0.500***
Openness	0.272	-0.213	-0.184	-0.127	0.100	-0.077	-0.055
N	65	65	65	65	65	64	64
R-squared	0.4938	0.3054	0.2969	0.3423	0.3704	0.3381	0.2962

Note: The reference group for marital status is single. *, **, and *** designate statistical significance at the 10%, 5%, and 1% levels, respectively.

As indicated in *Table 2*, recipient age seemingly matters for religious beliefs, while recipient education is uncorrelated with preferences for resources (occupation and income), education, inner attributes (kindness and reliability), or openness and political views. The same is true for recipient income, suggesting that matching through similarities is unimportant. Surprisingly, happier recipients seem to care less about inner attributes like

kindness and reliability, while healthier recipients care more about openness. In line with the *Table 1* results, singles seem to care less about exterior values, while married recipients care more about income and openness, engaged individuals care about reliability, and divorcees care about religious beliefs. Those in a civil union also care about resources (occupation and income) and religious beliefs. Caucasians care less about occupation and education, while heterosexual recipients care more about both these attributes, as well as kindness. Atheists, on the other hand, care more about reliability and openness but, as might be expected, less about religious beliefs. Agreeableness is negatively correlated with educational preference, but conscientiousness is positively correlated with income. Moreover, even though recipients with higher emotional stability care more about donor occupation and kindness, preferences for kindness are negatively correlated with higher openness.

TABLE 2: DETERMINANTS OF RESOURCES, CAPACITY, INNER VALUES, AND RELIGIOUS OR POLITICAL VIEWS

Dependent Variable	**Occupation**	**Income**	**Education Level**	**Kindness**	**Reliability**	**Openness**	**Religious Beliefs**	**Political Views**
Age	0.186	0.017	-0.037	-0.038	-0.002	-0.042	-0.046**	-0.044
Education	-0.034	0.015	0.440**	0.263	0.087	0.111	0.010	-0.012
Household's Annual Wage	0.013	-0.053	-0.083	-0.235	0.143	0.054	-0.031	0.176
Height	0.190	0.167	0.175	-0.023	-0.359	-0.293	0.203	0.090
Weight	-0.110*	-0.171*	-0.146***	-0.059	0.051	0.022	0.000	-0.036
Health	0.074	-0.055	0.016	0.273	0.399	0.285**	0.034	0.231
Happiness	-0.262	-0.013	-0.115	-0.362**	-0.494**	-0.221	0.147	-0.019
Civil Union	1.272***	1.486*	0.115	1.258	0.014	0.993	0.990*	0.476
De facto	0.487	0.598	-0.610	0.617	1.018	1.231	0.248	-0.264
Divorced	0.502	0.776	-0.167	-0.306	0.595	0.806	0.960*	0.808
Engaged	0.201	0.147	-1.561	0.602	1.033***	0.586	-0.257	-0.555*
Married	0.254	0.498**	0.136	0.422	0.150	0.947**	1.305	0.430
Caucasian	-0.782*	0.079	-1.253*	1.170	0.062	0.591	0.069	0.148

Heterosexual	0.996*	1.007	0.562**	0.343**	-0.34	0.081	0.668	0.032
Religiosity (Atheist)	-0.158	-0.619	-0.249	0.706	1.032***	1.184***	-0.558**	0.149
Agreeableness	-0.197	0.036	-0.217***	-0.051	0.003	-0.104	0.018	0.169
Conscientiousness	0.005	0.154***	0.294	-0.190	-0.462	-0.486	0.114	-0.002
Emotional Stability	0.311***	0.066	0.205	0.378*	0.374	0.497	0.051	0.066
Extraversion	0.071	0.106	0.080	0.123	0.026	0.096	0.195	0.010
Openness	0.242	-0.018	-0.235	-0.595***	0.123	-0.134	-0.066	-0.091
N	65	65	65	64	65	65	65	64
R-squared	0.3866	0.4231	0.367	0.2564	0.2524	0.2668	0.2884	0.2313

Note: *, **, and *** designate statistical significance at the 10%, 5%, and 1% levels, respectively.

Next, we assess the relative strength of inner (kindness, reliability) versus exterior values (income, occupation, physical attractiveness) by deriving the differences between and the individual scores. To find the value differences, we subtract the individual score for an exterior value, e.g., income, from that for an inner value, e.g., kindness (calculation: kindness score – income score). Then, to take the kindness/income relation as an example, if individual A has a higher positive value than individual B, she has a higher preference for kindness over income. The first three columns of *Table 3* report the kindness relations; the last three, the reliability relations.

As the table shows, healthier recipients, engaged women, and atheists care more about kindness and less about income, while happy and open recipients care less about inner values. On the other hand, when occupation is substituted for income (column 2), only openness matters. This pattern changes yet again when ratio (calculation: preferences for kindness/preferences for income) is used instead of difference: then the females with a higher household income care relatively more about occupation and less about kindness. The results for physical attractiveness relative to kindness (column 3) indicate that only the recipient's weight matters: heavier women care more about kindness than physical attractiveness.

TABLE 3: DETERMINANTS OF RECIPIENTS' INNER VALUE PREFERENCES RELATIVE TO EXTERIOR ATTRIBUTES

Dependent Variable	**(Kindness -Income)**	**(Kindness - Occupation)**	**(Kindness - Physical Attractiveness)**	**(Reliability - Income)**	**(Reliability - Occupation)**	**(Reliability - Physical Attractiveness)**
Age	-0.056	-0.056	-0.052	-0.019	-0.020	-0.019
Education	0.279	0.276	0.178	0.071	0.121**	-0.003
Household's Annual Wage	-0.207	-0.231	-0.175	0.196***	0.130	0.209***
Height	-0.154	-0.238	0.013	-0.526	-0.550	-0.344**
Weight	0.086	0.069	0.209**	0.222	0.161	0.324**
Health	0.317**	0.205	0.032	0.454*	0.325	0.155
Happiness	-0.310***	-0.128	-0.236	-0.481	-0.232	-0.376
Civil Union	-0.045	-0.138	-0.097	-1.472**	-1.258	-1.371
De Facto	0.096	0.077	-1.218	0.420	0.531	-0.829
				0.9	*0.73*	*-0.61*
Divorced	-1.088	-0.804	-0.791	-0.181	0.093	0.074
Engaged	0.478*	0.386	-0.551	0.886**	0.832	-0.124
Married	-0.064	0.160	0.520	-0.348	-0.103***	0.228
Caucasian	1.256	1.838	2.409	-0.018	0.844	1.292
Heterosexual	-0.683	-0.639	-0.429	-1.352*	-1.340*	-1.077
Religion (Atheist)	1.228*	0.931	-0.038	1.651**	1.190*	0.253
Agreeableness	-0.035	0.111	-0.248	-0.032	0.200	-0.203
Conscientiousness	-0.344	-0.194	-0.119	-0.616	-0.466	-0.376
Emotional Stability	0.230	0.122	0.242	0.308	0.062	0.235
Extraversion	-0.041	0.092	-0.105	-0.080	-0.044	-0.205
Openness	-0.564**	-0.846**	-0.506	0.141	-0.118	0.218
N	64	64	63	65	65	64
R-squared	0.3719	0.3547	0.2737	0.3962	0.2877	0.3007

Note: *t*-statistics in italics. *, **, and *** designate statistical significance at the 10%, 5%, and 1% levels, respectively.

For the relation between reliability and income (column 4), we find that women with a higher annual household income care relatively more about reliability than about income, although the coefficients differ by marital status (e.g., negative for civil union but positive for engaged). Atheists, on the other hand, care more about reliability than income. For occupation preference (column 5), recipient education level is obviously important: as in the reliability/income relation, more educated females value reliability over occupation, suggesting that once a recipient has achieved income and/or education, reliability becomes more important. Interestingly, heterosexual recipients care relatively less about reliability than occupation, as do married recipients in comparison to singles. Atheists again rank reliability higher than religious women. Finally, as with the reliability/income relation, the recipient's household finances are positively linked to a preference for reliability over physical attractiveness, while recipient weight is linked to caring more about inner attributes. Interestingly, height is negatively correlated with a preference for reliability, suggesting that in this case, physical attractiveness is more important.

IV. CONCLUSIONS

In this paper, we analyse the internal and external attributes of women looking for a sperm donor in the online donation market, together with the donor characteristics they are seeking. We find strong support for the proposition that female recipients care more about a donor's inner values than his exterior traits, with reliability being the most important, followed by openness and kindness. Physical characteristics such as ethnicity, physical attractiveness, height, skin complexion, eye colour, or weight rank next as next most important. Although education level seems to matters more than occupation and income, none of these factors is highly rated. In fact, income is the least important factor, preceded by religious and political beliefs or views.

Overall, like Scheib (1994) and Scheib et al.'s (1997) analyses for Canada and Norway, our study provides evidence that character is more important than physical attributes, abilities, and resources, a remarkable finding given prior research evidence that character values are perceived as less likely to be biologically transmitted (Scheib 1997). As one explanation for this anomaly, Scheib et al. (1997) and Scheib (1997) suggest that such outcomes could be driven by the psychology of long-term mate selection developed over an evolutionary history in which reproduction and mate choice were inseparable. We provide support for this assumption by gathering multinational data from across the online sperm donor market, whose importance is growing as social networking becomes important for women seeking donor sperm (Acker 2013). The lack of evidence on any preference for material resources, on the other hand, may indicate that, from an evolutionary perspective, socialisation and better access to resources can have a rapid impact on female choices.

Our results also make a useful contribution to the literature on human decisions in extreme situations (see, e.g., Elinder and Erixson 2011, Frey et al. 2010), providing in our case support for the idea that even in these life-altering circumstances, individuals still care about social norms. Our investigation, however, goes beyond previous research by exploring how individual recipients' characteristics shape their preferences for donor traits. In particular, we explore the importance of inner versus exterior values. This latter analysis strongly suggests that although individual characteristics matter, their influence depends greatly on the inner and exterior values considered.

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APPENDIX

Our Big Five questionnaire, taken from Saucier's (1994) work on the 'mini-marker', is a 36-item condensed version of Goldberg's (1992) robust set of 100 markers for Big Five factor analysis. In our version, adjectives with a negative connotation were reversed (designated by the symbol R), so that the numerical value for all answers reflected the same low to high scale. To ascertain each participant's numerical score for each factor, responses were aggregated on each factor and then averaged based on the number of questions on each. The extraversion factor contained one more question (8 in total) than the other four (each with 7).

The five factors we aggregated from the following scale items:

Factor 1: Extraversion

- Talkative
- Withdrawn (R)
- Bashful
- Quiet (R)
- Extroverted
- Shy (R)
- Enthusiastic
- Lively

Factor 2: Agreeableness

- Sympathetic
- Harsh (R)
- Kind
- Cooperative
- Cold (R)
- Warm
- Selfish (R)

Factor 3: Conscientiousness

- Orderly
- Systematic
- Inefficient (R)
- Sloppy (R)
- Disorganised (R)
- Efficient
- Careless (R)

Factor 4: Emotional Stability (Neuroticism)

- Envious (R)
- Moody (R)
- Touchy (R)
- Jealous (R)
- Temperamental (R)
- Fretful (R)
- Calm

Factor 5: Openness (Intellect and/or Imagination)

- Deep
- Philosophical
- Creative
- Intellectual
- Complex
- Imaginative
- Traditional

TABLE A1: SUMMARY STATISTICS: WOMEN SEEKING DONORS

Variable	Mean	Std. Dev.	Min.	Max.
Age	32.270	6.046	19	43
Education	5.342	1.216	2	8
Household's Annual Wage	3.071	1.627	1	10
Height	3.081	0.856	1	5
Weight	4.569	2.068	1	9
Health	5.397	1.277	3	7
Happiness	5.630	1.173	2	7
Civil Union	0.162	0.371	0	1
De Facto	0.068	0.253	0	1
Divorced	0.095	0.295	0	1
Engaged	0.149	0.358	0	1
Married	0.189	0.394	0	1
Caucasian	0.905	0.295	0	1
Heterosexual	0.351	0.481	0	1
Religion (Atheist)	0.194	0.399	0	1
Agreeableness	4.942	0.934	1.429	6.571
Conscientiousness	4.527	0.992	2.143	6.429
Emotional Stability	4.261	1.047	1.571	6.143
Extraversion	3.988	0.940	1.875	6.500
Openness	5.042	0.958	2.714	6.857