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# Gendering gametes: The unequal contributions of sperm and egg donors

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Highlights

- Women chose egg donors and sperm donors for different qualities.
- Women imagine sperm donors and egg donors differently.
- Sperm donors are viewed more often than egg donors as the origin of a child's talents.
- Gametes are gendered and sperm is given a privileged status.

Abstract

This paper compares three groups of gestational mothers who relied on gametes from donors they did not know. The three groups are women who have conceived with donor sperm and their own eggs, women who have conceived with donor eggs and a partner's sperm, and women who have conceived with embryos composed of both donor eggs and donor sperm. The paper explores three issues. First, it considers whether intending parents select sperm and egg donors for different attributes both when they are chosen as the only donor and when they are chosen as donors contributing to an entire embryo. Second, it examines how women imagine the donor. Finally, it looks at how women conceptualize the donor as an individual who contributes to their child's characteristics. Two significant findings emerged in this analysis of survey data. First, the data show that gametes are gendered with different attributes both when those gametes are separate and even more so when seen as complementary parts of a whole. Second, the data show that women minimize the impact of the egg donor (both when a sole contribution and especially when part of the complementary whole) and thus ignore the influence or impact of the egg donor relative to how they make sense of the influence or impact of the sperm donor. The data for this study comes from an online survey developed by the authors.

Keywords

United States; Sperm donors; Egg donors; Embryos; New reproduction technologies; Gender; Gestational mothers

1. Introduction

Women's experiences with reproduction can be conceptualized as both a biological and a social process located within the broad context of medicine, markets, cultural norms, and their own personal histories. Medicine and markets combine to make available new

reproductive technologies enabling women to become gestational mothers under conditions that were previously physiologically impossible or socially unacceptable. The availability of donor sperm, donor eggs, and ready-made embryos underwrites these new possibilities. In this analysis, we explore how cultural norms about gender shape the understanding of the biological nature and influence of donor gametes among the women who rely on them. We consider as well how these norms about gender interact with the personal histories of physiological or social infertility that lead to reliance on donor gametes. Our analysis emerges from the intersection of two sets of research. The first demonstrates that gametes are viewed and sold in contemporary society as if they carry gender as well as genetic matter. The second suggests that in addition to these social interpretations, individuals rely on their own reproductive histories to impose gendered attributes on the donor gametes they use.

Gametes come biologically "sexed," as one or the other and conception still requires both sperm and egg. In general, the public acknowledges both equivalent significance and difference. As Almeling and Waggoner (2013, p. 831) note, "when it comes to genetics and family history, women and men are assigned equal parts in the reproductive equation." However, as Martin (1991) demonstrated years ago, even though men and women are broadly perceived as having "equal" social roles, gametes are also embedded in culture and even scientific texts "gender" gametes. These texts depict sperm as acting in stereotypical masculine ways: sperm are proactive, strong, and brave. These same texts depict eggs as being stereotypically feminine: eggs are passive, weak, and timid (see also Campo-Engelstein and Johnson, 2013). Moreover, there are two good reasons to believe that women who rely on donor gametes might be especially likely to regard them through a lens of gender and assign unequal parts to the two.

First, the broader context of medicine and marketing becomes relevant again because medical markets both provide gametes and sell them. Research shows that the experiences of egg and sperm donors are differentiated in ways that cannot be accounted for by bodily differences alone (Almeling, 2011, Almeling, 2007, Johnson, 2011 and Johnson, 2013) and that eggs and sperm are sold in different ways (Krawiec, 2009, Rubin and Tober, 2001). One key difference in marketing strategies is that sites that advertise egg donors often offer contemporary photographs of the donors in addition to written profiles, while sites that advertise sperm donors have usually offered, at most, a baby photograph of the donor in addition to the written materials (and sometimes audio recordings).

Beyond what is included in marketing materials themselves, Daniels and Heidt-Forsythe (2012, pp. 626–627) suggest that the profiles of *sperm donors*, "clearly reflect a preference for those men who most closely match idealized traits of race, class, and masculinity." Similarly, Moore and Schmidt (1999, p. 245) argue that "[s]emen banks prioritize differences [among sperm donors] believed important to the client through the ordering of the characteristics of men" with race/ethnic origin first and social and behavior characteristics toward the end. The marketing patterns for *egg donors*, Daniels and Heidt-Forsythe (2012, p. 733) argue, are quite different: "Patterns of stereotypical femininity—with women portrayed as youthful, attractive, and polite—are frequently employed by the egg donation industry."

In short, donor gametes are depicted in entirely gendered ways and sold on the market in ways that reflect prevailing gender stereotypes: sperm are sold as carriers of "hegemonic masculinity" or pervasive cultural dynamics that privilege men (Connell and Messerschmidt, 2005); eggs are sold as carriers of "emphasized femininity" which heightens gender stereotypes (Connell, 1987). Moreover, this is so even though neither gamete inevitably carries with it either masculine or feminine traits. Aside from sex-linked characteristics (e.g., balding and color blindness), the two gametes contribute equally to such characteristics as height or attractiveness and the two gametes might be thought of as being equally irrelevant to such characteristics as sense of humor or politeness.

Second, these equivalencies may well be distorted by women's personal histories.

Reliance on donor eggs and reliance on donor sperm emerge from and reflect different experiences of infertility. All women rely on sperm to achieve conception: the attribution of “donor” has to do with the woman's partnerships and ultimately to her relationship to the man supplying the sperm. That is, reliance on a sperm donor may be caused by the absence of a male partner or a male partner's infertility; it does not reflect a woman's infertility. Reliance on a donor egg (whether alone or as part of an embryo), however, is occasioned by a woman's own reproductive difficulties. We might anticipate, therefore, that a woman would have more difficulty coming to terms with or accepting donor eggs (whether as components of an embryo or on their own) than they would coming to terms with or accepting donor sperm (Applegarth, 2014). For instance, Berkel et al. (2007, p.97), who compared women who conceived through IVF with their own eggs versus with donated eggs, suggest that the latter group “showed more defensive reactions, anxieties and uncertainty.” However, their study does not compare use of donor eggs to use of donor sperm and no studies look at the situation where *both* donor eggs and donor sperm are used. This is a unique contribution of our analysis.

In this analysis we ask questions that build on the scholarship about gendered gametes and reliance on donor gametes to conceive a child by exploring the perspective of *gestational* mothers selecting gametes both as they reflect back on their reasons for choosing one rather than another donor's gametes and as they think about the relevance of the gamete donor for their children's lives. The first of these questions has to do with how women retrospectively think about how they selected sperm and eggs; this question addresses the issue of whether selection reflects the gendered information available to an intending parent. That is, we ask whether intending parents select sperm and egg donors for different attributes both when they are chosen as the only donor (that is, when a woman only needs donor eggs or donor sperm) and when they are chosen as donors contributing to an entire embryo. Second, we ask about how women imagine the donor (Hertz, 2002). Do they think about the donor as having stereotypical gendered attributes so that sperm donors are imagined differently from egg donors? Finally, we ask about how women think about the donor (or donors) as an individual (or individuals) who contributes to their child's characteristics. Does gender enter in here? And, if so, how does it enter? That is, do they view sperm donors and egg donors as shaping different aspects of a child's talents, character, and physical characteristics?

For each of the questions we compare three groups of respondents, all of whom are the gestational mothers and all of whom relied on gametes from donors they did not know: women who have conceived with donor sperm and their own eggs, women who have conceived with donor eggs and a partner's sperm, and women who have conceived with embryos composed of both donor eggs and donor sperm. These comparisons allow us to assess how the practices of “gendering” and the assessment of a donor's influence (through resemblance between donor and child) occur under three different kinds of personal histories.

2. Literature review

2.1. Criteria for selecting eggs and sperm

A substantial body of literature has explored how it is that intending parents actually choose donors from those available through banks and clinics. Scheib (1994, p. 113) compared donor selection to mate selection in an experimental context, demonstrating that “attributes believed likely to affect a resultant child were significantly more important in a donor than in a long-term mate” although recipients were also “partly relying on the psychology used to choose a long-term mate when they assessed attributes in a sperm donor.” More recently, Torgler and Whyte (2013) found that women looking for a sperm donor in the online donation market cared more about a donor's inner values (such as reliability) than his exterior traits (including physical characteristics and education); on this issue see also Whyte and Torgler, 2014). Interestingly, Rodino et al. (2011, p. 998) found that single women “placed higher value on biographical traits reflective of the donor's level of potential resources (occupation, hobbies, age and good character)

compared with either partnered lesbian or heterosexual women; they also found that sperm donor recipients were interested in the reason why the donor decided to donate.

In one of the few studies that compare selection criteria for sperm and egg donation, Furnham et al. (2014) report on two separate research scenarios where respondents were asked to help an imaginary friend make a decision about egg and sperm donation. When the hypothetical donor was an egg donor, the respondents showed a preference for younger Caucasians; when the hypothetical donor was a sperm donor, the respondents chose middle class, tall, Caucasians. In both cases, the occupation of the donor was the factor that participants most relied on to differentiate among donors with a strong preference for donors coming from recognized professions rather than skilled workers. The authors note that professional status might be a proxy for intelligence and therefore a marker of economic success. And while studies have shown that women favor intelligent men who they think will be good providers (Prokosch et al., 2009), the study by Furnham et al. showed that egg donors also were valued for this quality. In fact, this similarity might be a recent development. Flores (2014, p. 830) reports that donor egg recipients have changed over time: although previously women receiving eggs focused on "similar appearance of gene pool," the percentage making requests for health, athleticism and intelligence increased over a five year period. In short, the existing scholarship has not resolved the issue of whether or how gametes are gendered by intending parents. Studies contradict each other with some arguing that gender comes into play when intending parents choose donors (i.e., they prefer younger egg donors and taller, successful sperm donors) while others suggest that gender is *not* relevant insofar as intending parents stress the same characteristics for both sperm and egg donors.

2.2. Thinking about the donor

Studies that have explored selection criteria stop with selection itself and do not consider what it is that people who have used sperm and egg donors subsequently believe came from those donors in terms of the influence on their children. Grace and Daniels (2007) argue compellingly that parents of donor-conceived children imagine genes to be relevant in some domains (e.g., health-related or medical conditions) while declaring them to be irrelevant in others (e.g., the constitution of the family); similarly, Grace et al. (2008) argue that the donor himself is simultaneously negated and appears as a person in family discourse. (See also Indekeu et al., 2014). Studies of women who have used egg donors suggest that in order to claim children as their own women engage in mental processes that diminish the role of the donor and that they may conceal donor conception from their children (Hershberger et al., 2007, Konrad, 2005, Konrad, 1998, MacCallum and Golombok, 2007, Murray and Golombok, 2003, Readings et al., 2011 and Stuart-Smith et al., 2012). In short, the research suggests that *both* sperm and egg donors might be perceived as threats to parental status but the research does not compare the threat posed by sperm donors in contrast with egg donors when the intended parent is a woman.

3. Methods

3.1. Data collection

The data for this study comes from an online survey developed by the authors. Invitations to answer the survey were first sent to parents via email to all members of the Donor Sibling Registry (DSR), a US-based worldwide registry that helps donor-conceived individuals search for and contact their donor and donor siblings (i.e., half-siblings). Sixty-eight percent of the total number of respondents came to the survey through the DSR. Second, the survey was sent by invitation to via email to all members Single Mothers by Choice (SMC), a support group for networking through both online forums and local chapters. Nine percent of the respondents came through that national organization; many of the DSR respondents may be members of the SMC organization and there is no way to assess overlap. Third, invitations to participate in the survey were

posted on Craigslist in four large urban areas as well as on several other websites including DSR, SMC, ParentsviaEgg donation.com, Resolve.com and Circle Surrogacy. Several organizations spontaneously posted to their memberships on their Facebook or newsletter sites (facebook.com/colage,/pflag, ourfamilycoalition, familyequality.org, and mombian.org) which asked people to participate. Finally, Rosanna Hertz posted on several alumni Facebook pages and a post about the study went out as a tweet to various organizations mentioned above. The surveys were online from 12 May 2014 to 15 August 2014. Ethical approval for this study was obtained from the Institutional Review Boards at Wellesley College and Middlebury College.

It is impossible to assess response rates because of the multiple sites through which the survey was available. We do know that the email invitation from the DSR (which went to parents, donor-conceived offspring, and both egg and sperm donors) had a 35% "open rate." Among the 2461 parents who "clicked" on to the survey from the email, 2142 (87%) completed at least some portion of it. In any case web surveys generally have relatively low response rates (Couper, 2000, Monroe and Adams, 2012 and Wright, 2005) and concerns about response rates have to be weighed against the advantages of trying to make contact with hard to reach populations such as those who have relied on donor gametes (Freeman et al., 2009).

3.2. Participants

As noted above, among the respondents to the parent survey we focus exclusively on women who were the gestational mothers of their children and only on those who relied on sperm or egg donors who were initially anonymous (even if the donors were open to being identified later). From the original 2137 respondents, this narrowed the pool to 1779 respondents. Among these, we have responses to relevant questions from 1659 women: 1499 who relied only on donor sperm, 68 who relied only on donor eggs, and 92 who relied on a donated embryo. The unequal numbers of respondents in these three groups reflects three simple facts: egg and embryo donation are developments that are more recent; they are also more difficult to use than sperm donation; and they are very expensive procedures. Having unequal sample sizes is not a problem for our analysis that keeps the three groups of respondents separate and relies on descriptive and inferential statistics.

The demographic characteristics of these respondents are shown in Table 1. Over half of the respondents had incomes of at least $100,000. On average, those relying on egg donations alone were wealthier than the other respondents were. The sample was fairly evenly divided among those who were single at the time of conception and those who had a partner; more of those with a partner were partnered with a woman. Respondents relying on egg donations alone conceived exclusively in relationships with men; respondents with embryo donations were most likely to be single; half of the respondents relying on sperm donation were single women, one third were in partnerships with women and 16 percent were in partnerships with men. These numbers reflect the population shift of parents relying on donor sperm which has changed from heterosexual couples to single mothers and the members of lesbian couples partly as a result of technological advances such as ICSI (intracytoplasmic sperm injection) and partly as a result of changes in social norms (Cahn, 2012 and Mamo and Alston-Stepnitz, 2015). At the time of the survey approximately half of the respondents were single, a third were living with or married to a woman and 16 percent were in partnerships with men. As was the case for living arrangements when conception occurred, these different living arrangements are associated with differences in type of gamete used. Taken as a whole, the respondents were well educated with over half having received more than a BA; those who relied on egg donations alone were most likely to have had an education beyond a BA. The vast majority of the respondents were Caucasian. Respondents who relied on embryo donations were the oldest. On average, respondents who had relied on sperm donation alone had the oldest children.

Table 1.
Demographic characteristics of sample.

	Used an embryo (N = 92) %	Used an egg donor only (N = 68) %	Used a sperm donor only (N = 1499) %	All respondents (N = 1659) %
Current household income				
LT $50,000	11	4	14	14
$50-99	32	20	40	39
$100,000–$149,000	28	33	24	24
$150,000 or more	29	43	22	23
Total	*100*	*100*	*100*	*100*
Living arrangement when conceived oldest child				
Single	75	0	51	50
Partner was a woman	12	0	33	30
Partner was a man	13	100	16	19
Total	100	100	100	99
Marital arrangements at time of survey				
Single never married	51	0	36	36
Other “single” (e.g., widowed, divorced)	22	3	17	17
Living with or married to a woman	13	3	34	31
Living with or married to a man	13	95	13	16
Total	*100*	*101*	*100*	*100*
Highest level of education				
LT BA	10	6	16	16
BA	42	29	30	30
MA or Above	48	65	54	54
Total	*100*	*100*	*100*	*100*
Caucasian	96	93	94	94
	Mean	**Mean**	**Mean**	**Mean**
Average (mean) age of mother	48.9	46.6	45	45.3
Average (mean) age of oldest child	7.6	7.3	10.7	10.2

Table options

3.3. Measures

Three separate questions provide the basis for this analysis. First, respondents were asked to indicate from a list of 16 items the *five* attributes they chose for an egg or sperm donor (or both the egg and the sperm donor if they used an embryo). (We chose to limit the choices for respondents in order to encourage respondents to think through their responses and to differentiate carefully among the range of possible options.) Second, respondents were asked to indicate how they imagined the donor, checking from a similar list with ten distinct attributes. Third, respondents were given the opportunity to indicate whom they thought their child most resembled with respect to a range of abilities of various sorts, character traits, and physical features. The options each time were one's self, a partner, other relatives of the child, a sperm donor, an egg donor, or not being sure about the source of the attribute.

4. Findings

4.1. Choosing a donor

At a rational level, one could argue that since half the genes come from each side whatever is valued (health, education, personality, height) would be equally valued in an egg and a sperm donor. However, as Table 2 shows, choosing a donor is more

complicated than that and there are differences across the four groups (created by looking separately at the use of sperm and eggs as components of embryos as well as sperm and eggs when used alone) with respect to the importance placed on health, height, ethnicity, and facial features. Moreover, gender emerges both as difference (men are seen as the privileged carriers of certain traits; women are seen as the privileged carriers of other traits) and to a minor extent here but more substantially in other questions as something that has to do with complementarity (it happens more when *both* the egg and the sperm are being considered as is the case for embryos). We note that women relying on embryos may have altogether less choice if they are not constructing the embryo themselves; but the lack of choice applies equally here to the egg and the sperm donor.

Table 2.
Choosing a donor. (Percent Choosing Each Characteristic).

Column	A	B	C	D	E	F	G	H
	Sperm donors		Egg donors		Comparisons			
Items selected	Embryo sperm (N = 92) %	Only sperm (N = 1499) %	Embryo egg (N-92) %	Only egg (N = 68) %	Only sperm – Only egg %	Embryo sperm – Embryo egg %	Only sperm – embryo sperm %	Only egg – embryo egg %
Health[a]	78	78	67	70	8	11[c]	0	3
Family health	65	65	57	61	4	8	0	4
Education[a]	57	52	38	37	15[b]	19[b]	−5	−1
Race	44	42	40	36	6	4	−2	−4
Personality	40	37	33	33	4	7	−3	0
Height[a]	33	39	17	17	22[b]	16[b]	6	0
Eye color	32	28	25	17	11[b]	7	−4	−8
Ethnicity[a]	24	27	14	30	−3	10[c]	3	16[b]
Hair	22	24	20	26	−2	2	2	6
Temperament	18	20	23	16	4	−5	2	−7
Interests	14	21	16	20	1	−2	7	4
Body type	14	16	20	16	0	−6	2	−4
Facial features[a]	9	7	13	18	−11[b]	−4	−2	5
Skin tone	9	11	9	11	0	0	2	2
Hair type	5	4	4	3	1	1	−1	−1
Religion	7	5	1	1	4	6	−2	0

a Probability of Chi-square test of difference across all four categories is significant at ≤05.

b Probability of Chi-square test of difference across two categories is significant at ≤ .05.

c Probability of Chi-square test of difference across two categories is significant at between ≥.05 and ≤ .10.

Table options

As Table 2 (Column E) shows, as the sole gamete provider, sperm donors are valued considerably more than are egg donors for height (22% difference) and education (15% difference) and eye color (11% difference). Egg donors are valued substantially more only for facial features (11% difference). Some of the differences between sperm donors and egg donors are even more substantial when the comparison is between egg donors and sperm donors as component parts of an embryo (Column F versus Column E). Under those conditions the difference in the number of respondents saying that education was important for sperm donors and the number of respondents saying that education was important for the egg donors grows to 19% (from 15%). In addition, a 10% difference is found with respect to ethnicity (where previously the difference had been 3% in the opposite direction) and an 11% difference is found with respect to health while the importance placed on eye color declines into insignificance. The only difference that is

greatly exaggerated (when considering egg donors as parts of embryos as opposed to egg donors alone; Column H) is that of ethnicity which appears more important among egg donors chosen alone than among egg donors as components of embryos. For sperm donors, whether chosen alone or as part of an embryo essentially the same attributes are considered desirable (Column G). Of course, women needing only sperm may know what characteristics they bring (e.g., good looks) and women needing only eggs know what characteristics their partners bring (e.g., height). We explore this issue more fully below when we turn to the question of whom the child most resembles.

4.2. Imagining the donor

Women imagine the donor on the basis of what they know from the materials available to them when they choose their donors as well as from how they see the donor reflected in their own children (Hertz, 2002). (If they know, or have seen pictures of, other children conceived through the same donor, they might also use that knowledge to help construct an image of the donor.) As noted above, respondents were asked to answer a question about how they imagined the donor for each donor they used: those who relied only on donated sperm or only on donated eggs answered the question once; those who used an embryo answered the question twice, once for each donor. Differences emerged among the respondents with respect to good looks, generosity, youth, sexiness, sense of humor and warmth.

As Table 3 shows, as the *only* donor (Column E), in comparison with sperm donors egg donors are imagined to be generous (difference of 30%) and young (difference of 23%). When they are the only donors, sperm donors (Column E) are also more often imagined to have a good sense of humor (i.e., to be funny) (difference of 16%). Sperm donors who contribute to embryos are modestly but not significantly more likely than egg donors (Column F) to be thought of as talented (difference of 9%). However, egg donors as parts of embryos are highly valued with respect to generosity, youth, warmth and being likable. That is, egg donors who contribute to embryos gain relative to egg donors alone (Column H) and their gains are in highly gendered areas: as contributors to embryos, egg donors are young, likable, and warm. They are also sexier and funnier. The only virtue left to the egg donor alone is generosity. When parts of an embryo rather than on their own sperm donors gain in talents, good looks, sexiness, youth, and warmth (Column G) but with respect to the last two of these, egg donors gain even more (Column H).

Table 3.
Imagining the donor. (Percent Assuming Each Characteristic).

Column	A	B	C	D	E	F	G	H
	Sperm donors		Egg donors		Comparisons			
Assumed Attributes	Embryo sperm (N = 92) %	Only sperm (N = 1499) %	Embryo egg (N-92) %	Only egg (N = 68) %	Only sperm – Only egg %	Embryo sperm – Embryo egg %	Only sperm – embryo sperm %	Only egg – embryo egg %
Talented	42	31	33	27	4	9	−11[b]	−6
Good looking[a]	58	39	50	42	−3	8	−19[b]	−8
Generous[a]	31	37	46	67	−30[b]	−15[b]	6	21[b]
Young[a]	27	16	58	39	−23[b]	−31[b]	−11[b]	−19[b]
Likable	46	46	58	45	1	−12[c]	0	−13[c]
Sexy[a]	12	4	17	3	1	−5	−8[b]	−14[b]
Smart	54	49	50	45	4	4	−5	−5
Funny[a]	27	26	29	10	16[b]	−2	−1	−19[b]
Sensitive	35	31	38	29	2	−3	−4	−9
Warm[a]	42	29	58	29	0	−16[b]	−13[b]	−29[b]

[a] Probability of Chi-square test of difference across all four categories is significant at ≤05.

[b] Probability of Chi-square test of difference across two categories is significant at ≤ .05.

c Probability of Chi-square test of difference across two categories is significant at between ≥.05 and ≤ .10.

Table options

4.3. Whom does the child resemble?

Respondents were given an opportunity to comment on the importance of donors to a child's attributes with a question asking specifically what individual the mother thought the child most resembled. In Table 4, we look separately at three types of characteristics: talents (general intelligence, math ability, athletic ability and artistic ability), character (personality and temperament) and physical attributes (skin tone, hair color, height, facial shape and eye color). We look first at these issues for *all* respondents. We then examine these issues separately by *family type* because we want to examine more closely whether the weight given to one gamete or another is determined by the sex of the gamete or the presence or absence of a partner.

Table 4.
Whom does the child most resemble? (Percent checking each type of donor).

					Comparisons	
Whom does the child most resemble?	Sperm donor when used an embryo (N = 92) %	Sperm donor alone (N = 1499) %	Egg donor when used an embryo (N = 92) %	Egg donor alone (N = 68) %	Difference between sperm donor and egg donor alone %	Difference between sperm donor and egg donor when used in embryo %
Talents						
General intelligence	26	14	6	6	8[c]	20[b]
Math ability[a]	26	23	5	3	20[b]	21[b]
Athletic ability[a]	29	27	6	11	16[b]	23[b]
Artistic ability[a]	18	18	6	13	5	12[b]
Average for talents	*24.8*	*20.5*	*5.8*	*8.3*	*14.7*	*21.3*
Character						
Personality	10	8	10	10	−2	0
Temperament	16	13	9	14	−1	11
Average for character	*13.0*	*10.5*	*9.5*	*12.0*	*−1.5*	*5.5*
Physical characteristics						
Skin tone	31	28	33	23	5	−2
Hair color	31	32	38	30	2	−7
Height[a]	49	41	18	26	15[b]	31[b]
Face Shape	36	25	23		2	12[b]
Eye color[a]	43	30	19	27	3	24[b]
Average for physical characteristics	*38.0*	*31.2*	*26.2*	*26.5*	*6.0*	*8.5*

a Probability of Chi-square test of difference across all four categories is significant at ≤05.

b Probability of Chi-square test of difference across two categories is significant at ≤ .05.

c Probability of Chi-square test of difference across two categories is significant at between ≥.05 and ≤ .10.

Table options

4.3.1. All respondents

With respect to *talents*, there are significant differences across the four groups with respect to math ability, athletic ability, and artistic ability. More specifically, in each of the

cases where the sperm donor used alone is compared to the egg donor used alone, the frequency with which the sperm donor was named as the person the child most resembled far outweighs the frequency with which the egg donor is named: the difference is greatest for mathematic ability, followed by athletic ability; it is smaller for general intelligence and artistic ability. In *no* case of talents do those who use an egg donor name her as being more "important" than do those who used only a sperm donor. The "relative" importance when sperm and egg are compared as parts of an embryo is far greater than the "relative" importance when sperm and egg are evaluated as separate components for these issues of ability (average of 21.3 versus average of 14.7) and it shows up with respect to all four talents. None of these differences is true for the issues of character (i.e., personality and temperament).

Physical characteristics reveal an even more complex story. Across the board, there are differences with respect to the two characteristics of height and eye color. Sperm donors alone are more often viewed as influencing only height. When viewed as contributors to an embryo, sperm donors are accorded even greater influence with respect to height, eye color and now, also, the shape of one's face. The issue of eye color is particularly interesting since it is equally likely to come from the egg donor as the sperm donor (as opposed to height, which might come from the sperm donor since egg donors might not be particularly tall).

Overall, men are accorded more significance as determinant of a child's characteristics with respect to talents (average for sperm is 24.8 and 20.5 versus 5.8 and 8.3 for egg donors), physical characteristics (38 and 31.2 versus 26.2 and 26.5) but barely for character (12 and 10.5 versus 9.5 and 12). In short, women largely discount the contributions of egg donors relative to sperm donors in the formation of their child's physical characteristics and talents, but not their character.

4.3.2. Family type

As noted in Table 1, sperm donation is used by women who are single, women in partnerships with other women, and women in partnerships with men; egg donation is predominantly used by women in partnerships with men; embryo donation is predominantly used by those who are single. Given these imbalances in numbers, we can only "control" for family type among those in partnerships with men *at the time of conception* to see whether a *partner's* sperm is given more weight when there is an egg donor (thus reducing altogether the impact of the egg donor) than one's self is given weight when there is a sperm donor (thus reducing altogether the impact of the sperm donor). In the former case, sperm would still be in a sense "privileged." We look at the three instances of whom the child most resembles where sperm donors were accorded greater weight than egg donors when the respondents used only one type of gamete (as shown in Table 4): math ability, athletic ability, and height.

Table 5 demonstrates that there are differences among the four groups of respondents with how they attributed influence for athletic ability, height and math ability and also between the two groups of women in partnerships with men with respect to these three traits. The table also shows that with respect to both athletic ability and height, nothing much changes when we control for family form. That is no matter who is receiving the sperm, the sperm donor is highly valued as the origin of those attributes. We look at each of these two attributes separately.

Table 5.
Attribution of resemblance by family form.

	Single	Partner is a woman	Partner is a man	
	Used a sperm donor	Used a sperm donor	Used a sperm donor	Used an egg donor
Athletic ability[a,b]	(N = 608) %	(N = 481) %	(N = 371) %	(N = 64) %

	Single	Partner is a woman	Partner is a man	
	Used a sperm donor	Used a sperm donor	Used a sperm donor	Used an egg donor
Self	28	35	31	5
Partner	0	3	3	36
Sperm donor	28	25	31	–
Egg donor	–	–	–	3
Other/DK	44	37	35	56
Total	*100*	*100*	*100*	*100*
Height[a,b]	(N = 603) %	(N = 473) %	(N = 364) %	(N = 64) %
Self	31	38	32	6
Partner	0	3	4	45
Sperm donor	40	38	43	–
Egg donor	–	–	–	23
Other/DK	29	22	21	25
Total	*100*	*100*	*100*	*100*
Math ability[a,b]	(N = 611) %	(N = 475) %	(N = 371) %	(N = 59) %
Self	32	35	44	5
Partner	0	2	6	34
Sperm donor	18	24	6	–
Egg donor	–	–	–	2
Other/DK	49	38	44	59
Total	*100*	*100*	*100*	*100*

a Probability of Chi-square test of difference across all four categories is significant at ≤05.

b Probability of Chi-square test of difference across two categories when partners is a man is significant at ≤ .05.

Table options

First, we look at athletic ability and we focus initially on women in partnerships with men. Women in partnerships with men who have used an *egg* donor (and a partner's sperm) are no more likely to credit their partner as being the origin of this trait (36%) than their counterparts (also women in partnerships with men) who have used a *sperm* donor are to credit themselves (31%) as being the origin of this trait. That is, women who use a partner's sperm (and a donor egg) are no more likely to privilege sperm as the source of a child's athletic ability than are women who use donor sperm (and their own egg) likely to privilege the egg as the source of a child's athletic ability. In the case of the women in partnership with men who used an *egg* donor, more than half the women (56%) say they don't know where athletic ability came from rather than attributing it to themselves, their partners, or the egg donor. Only 3% of these women see the egg donor as having a significant influence in contrast with a third of the women with sperm donors seeing the donor as having a significant influence. The other two groups of women who rely on sperm donors (women who are single and women in partnerships with women) respond much as do women in partnerships with men with respect to the perception of shared influence from themselves and the sperm donor.

Second, we look at the variable of *height* and again examine initially women in partnerships with men. Women in partnerships with men who have used an *egg* donor (and a partner's sperm) are more likely to credit their partner as being the origin of this trait (45%) than their counterparts (also women in partnerships with men) who have used a *sperm* donor are to credit themselves (32%) as the origin of this trait. Moreover, among women in partnerships with men who have used an egg donor, 23% view the egg donor as having an influence but this is considerably less than the proportion of women who see the sperm donor as having a considerable influence (43%). Among women in partnership with men, sperm from a partner is valued more highly than eggs from oneself (45% versus 32%) and sperm from a donor is valued more highly than eggs from a donor (43% versus 23%). Once again, women who have used sperm donors and are either

single or in partnerships with women respond much the same way as do women in partnerships with men in terms of attributing influence to themselves (about one third in each case) the sperm donor (about two-fifths in each case) or some other source (about a quarter in each case).

The third issue, that of *mathematic ability*, is even more complex. The comparison between the two groups of women in partnerships with men suggest as was the case before that egg donors are not perceived as being influential (2%) but in this case (in contrast to the earlier examples of athletic ability and height) sperm donors are not perceived as being influential either (6%). In fact, women in partnerships with men who use a *sperm* donor are somewhat more likely to claim that they themselves are the origin of a child's math ability than are the other two groups of women who rely on a sperm donor (women who are single and women in partnerships with women). Moreover, the women in heterosexual couples not only assume greater responsibility for this ability but relative to the other two groups of women they diminish the role of the sperm donor altogether (only 6% say that he is important in comparison with 18% and 24% of the other two groups of women). Women in heterosexual couples who use an *egg* donor are less likely to claim that their (male) partners are the source of a child's math ability than women in heterosexual couples who use a *sperm* donor are likely to claim themselves as the source of a child's math ability (34% versus 44%).

Taken as a whole the comparisons from these four groups of women suggest that among heterosexual couples sperm from a partner is not necessarily privileged relative to one's own eggs: the relevant differences, placing a partner's sperm first and oneself (eggs) second, are 36% versus 31% for athletic ability; 45% versus 32% for height, and 34% versus 44% for math ability. The comparisons also show that sperm from a donor is invariably (no matter what the family form) privileged relative to eggs from a donor.

5. Discussion

The data reported here came from a variety of different sources. Much of it came from respondents who learned about the survey from an email link sent from the Donor Sibling Registry, an organization that attracts people who are particularly interested in learning about individuals with whom their children have some genetic tie (donor siblings or the donor). We see no reason to believe that this interest in genetic ties would shape the way they think about the sperm donor in contrast with how they think about the egg donor. The second largest group of respondents came through Single Mothers by Choice. As we showed above, single women who used a sperm donor responded similarly to other women who used a sperm donor (those with partners who are women and those with partners who are men) with respect to the attribution of athletic ability and height, and like women with partners who are women with respect to the attribution of math ability. Thus, we see no reason to believe that having a substantial number of respondents who were single biases our results. At the same time, we acknowledge that our sample is not random and that our findings of the two significant themes that emerged in this analysis of survey data should be assessed with an awareness of a potentially distinctive group of respondents. These two themes are first that gametes are gendered and second that gametes are unequal in importance in a way that often privileges sperm.

5.1. Gendered gametes

The first theme – that of gendered gametes – emerged through an analysis of all three questions: how the donor was chosen, how the donor was imagined, and how often the parent thought the child resembled the donor with respect to certain characteristics. The data show that sexed gametes are gendered with different attributes both when those gametes are separate and sometimes even more so when seen as complementary parts of a whole. On their own, when recipients choose a donor not previously known to them, sperm donors are selected for height, intelligence (as measured by education level), and eye color more often than are egg donors when they are chosen on their own. As parts of a whole, sperm donors are selected for two of the same attributes (height and

intelligence) as well as ethnicity and health more often than are egg donors. While height and intelligence are classic “male” traits in our society, the last two are somewhat different. They suggest that gamete recipients (when they can separate out race as a separate attribute) believe the ethnic line and health are carried by the man/father more so than by woman/mother. On their own, egg donors are chosen for their facial features (which can be observed through photographs, often at different ages, made available by egg clinics) more often than are sperm donors (for whom recipients do not have the same information). Significantly, egg donors are classically gendered with beauty rather than brains as selection criteria.

This same “gendering” of gametes occurs when individuals imagine (from the material they received prior to conception and from gazing at their children) what the donors of their children must be like (when they do not know the donor). Compared to egg donors, sperm donors are imagined as having a good sense of humor; compared to sperm donors, egg donors are imagined to be both generous and young (although there is no reason to believe that egg donors would, in fact, be younger than sperm donors*)*. Some of these gendered differences are more pronounced and broader when sperm donors and egg donors are both involved and the parent used an embryo. Under that set of conditions egg donors retain predominance in youth, and generosity and gain in warmth and being likable. Finally, when seen as contributors to the three realms of talents, character, and physical attributes, sperm donors were viewed more often as the determinant of a child's talents, *especially* when they were part of an embryo. The same was true of the determination of height and eye color, both of which were magnified for sperm donors as parts of embryos. In short, gendered differences emerge among gametes when mothers have only used either sperm or eggs; these differences are sometimes both enhanced and broadened when both gametes have been used to create an embryo. Then sperm become real men and eggs become real women.

The first of these findings – *what we might think of as simple gendering* – is, perhaps, not at all surprising. As noted above, the existing scholarship demonstrates sexed gametes are gendered by scientific texts, sperm and egg donors are marketed in ways that reflect gender stereotypes, and recipients select donors for qualities that would make a good (gendered) mate. Our findings extend this scholarship in several ways. First our findings show that when women think about a sperm donor's contribution to an embryo they emphasize intelligence (as assessed through the stand-in of education), health, ethnicity and height more often than when they think about an egg donor's contribution to an embryo; women do not assume the egg donor carries any special characteristics more so than does the sperm donor. Similarly, women selecting egg donors and women selecting sperm donors attribute gender to the gametes themselves. Sperm is valued because it carries intelligence, height and eye color. Eggs are valued for beauty (which can be seen on photographs).

Further, our findings show that on average when parents look at their children and imagine what the donor might be like, they are especially likely to attribute to the egg donors generosity and youth. Of course, gamete recipients are likely to know the age of the donors. Even so, the fact that age is a reason for female infertility (needing to use a donor egg) may help determine the primacy given to an egg donor's youth in the mind of the woman who has used a donor's eggs. In addition, our findings demonstrate in yet another way (when women imagine the origin of their children's talents, character, and physical attributes) that sperm donors are believed to be the source of the “male” traits of talent and height while egg donors are believed to offer little that is distinctive to the shaping of any of the three sets of attributes (i.e., talents, character, and physical appearance).

The second finding about gender – *what we might think of as gender as complementarity* – is more surprising and it is unique to this study because most studies do not look at processes of selection, imagination, and assessment of influences with respect to sperm and eggs both separately *and* in conjunction as components of a single embryo. For all

three issues discussed here, some gender differences are magnified when a donated embryo is under consideration in comparison with what happens when a woman has relied only on donor eggs or donor sperm. This set of findings suggests that women are viewing the eggs and sperm that go into the embryo as complementary to one another, combining to make a whole. The imagination of that combination (a form of *in vitro* "mating") assumes that desirable characteristics allied with men (height, intelligence) can or will be provided by the sperm and that desirable characteristics allied with women (warmth, being likable) can or will be provided by the eggs.

A variety of sociological and social psychological studies help explain why there is *more* gendering when sperm and egg are seen in combination (as complementary parts of an embryo) than when they are separate. Consider, for example the fact that some studies of single sex versus co-educational schooling suggest that girls might have higher achievement motivation and self-esteem and be more likely to pursue STEM careers in the former environment (Cherney and Campbell, 2011) or the finding that girls in single-sex environments have higher achievement in math, science, reading and writing (Else-Quest and Peterca, 2015). (For a critique, see Pahlke et al. 2014.) Other studies find similar patterns of difference on a range of behaviors. Booth and Nolen (2012), for example, find that girls in single sex school were more likely to take certain kinds of risks than were those in coed schools; Spencer et al. (2013) report that girls in single-sex schools have less rigid body ideals that those in mixed-sex schools. The explanations for findings like these build on the notion that teachers and students alike engage in less gender stereotyping when the students are in a single sex environment than when the students are in a co-educational one. We could imaginatively extend these findings to the situation of viewing egg and sperm separately as opposed to viewing them as parts of a created embryo. That is, we might suggest that the embryo itself is seen as the result of a "matching" (or even mating) of male and female (creating a coed environment, so to speak); the "making" of an embryo reinforces gender stereotypes more so than does simple sperm or egg use (existing in a single sex environment, so to speak).

Other explanations are possible. For whatever reason, recipients might have less information altogether about one or another of the components when they conceive with an *embryo (which they have paired*) than when they conceive with either sperm or egg donor gametes alone. Indeed this is the case with the respondents in this study. Three quarters (74%) of those who relied only on an egg donor and three-quarters (74%) of those who relied only on a sperm donor said that they had enough information to answer their child's questions about the donor. Similarly, almost three-quarters (71%) of those who relied on an embryo said they had enough information about the *sperm* donor to answer questions but only 56% of the respondents answered similarly *about the egg* donor who had contributed to an embryo. A different set of sociological and social psychological findings come into play as explanation: the less information someone has about another, the more likely they are to rely on stereotypes (in this case gender stereotypes) to imagine the other (Kunda and Thagard, 1996). The greater gendering of egg donor gametes as parts of embryos might be the result of the stereotypes substituting for knowledge but it does not help to explain the greater gendering of sperm in the same situation.

5.2. Valuing sperm, discounting eggs

A second theme in these findings is closely related to that of gendered gametes. By minimizing the impact of the egg donor (both when a sole contribution and especially when part of the complementary whole), mothers ignore the influence or impact of the egg donor relative to how they make sense of the influence or impact of sperm donors. These findings suggest the straightforward influence of a society that often privileges men at the cost of assigning equal value to women. In addition, these findings suggest that both mothers who use an egg donor alone *and* mothers who rely on embryos view the egg donor as a greater threat to their own relationship with their children than do mothers who have relied on sperm donors (whether alone or as a component part of an

embryo) view the sperm donor. This is not surprising in and of itself. A substantial body of literature suggests that *men* see sperm donors as threats to their fatherhood (Cousineau and Domar, 2007, Dhillon et al., 2000, Fisher and Hammarberg, 2012 and Frith et al., 2012); women apparently do the same with egg donors (Applegarth, 2014, Berkel et al., 2007 and Kirkman, 2003). Our research suggests that after the fact of conception with an egg donor or an embryo created with two donors women reduce the threat of the egg donor still further by not acknowledging, or not assessing as of importance, the genetic impact the egg donor could have on the child. The bodily processes of pregnancy, birth and nursing may be drawn in to enhance a woman's claims to motherhood relative to the claims of the egg donor. Put differently, in comparison with egg donors, sperm donors are accorded more weight and value because they are not viewed as diminishing the claims of the woman raising a child conceived with donor gametes.

As our data show, not only is the experience of coming to motherhood through donor gametes different for women who rely on donor eggs and donor sperm, but there are also demographic differences among those who rely on different forms of new reproductive technologies. In comparison with women who rely on sperm donation alone, women who rely on egg donations alone are wealthier, more likely to be in a partnership with a man, have younger children, and are more highly educated. We might anticipate, therefore, that these two groups would have different attitudes on a number of variables having to do with issues under consideration in this paper. However, women in partnerships with men who use egg donors are *not* more likely to say the child resembles a male partner than women who use sperm donors are likely to say the child resembles themselves with respect to the attributes of athletic ability, height and math ability. In addition, with respect to both athletic ability and height, women who use sperm donors are more likely to say their child resembles the donor than are women who use egg donors likely to say their child resembles the egg donor. Moreover, for many of the issues discussed above, the greater difference in attitudes was found between those who used *embryos* (or two donors) as opposed to those who used *sperm alone* even though the differences in demographic variables between these two groups were not quite as large as it was between those who used *eggs* or *sperm alone*.

Obviously, the use of donor sperm by women – no matter what family form they live in – does not call into question their own fertility; reliance on egg and embryo donors does that in ways that need to be further explored. In addition, the unequal weight accorded sperm might reflect a broader cultural belief that men contribute more than their scientific half of genetics to the making of a child. Infertility and male privilege combine to create views of simply sexed and essentially equal sperm and eggs as the carriers of qualities that are significantly different in both substance and value.

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