Social Science & Medicine
Gendering gametes: The unequal contributions of sperm and egg donors
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GENDERING GAMETES:
The Unequal Contributions of Sperm and Egg Donors

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

INTRODUCTION

Assisted reproduction technologies have made it possible for women to become mothers under conditions that were previously medically impossible (a male partner's infertility; female infertility) or socially unacceptable (single women; partnered lesbians). The availability of donor gametes (donor sperm and donor eggs) and embryos composed entirely of donor gametes underwrites these new possibilities.[1] Decades of scholarship have demonstrated that sex has to do with biology (chromosomes, hormonal profiles, internal and external sex organs). Certainly, there is ambiguity in the determination of the sex of newborns (Fausto-Sterling, 2008) but gametes themselves are clearly sexed as one or the other and it takes both sperm and egg to make an embryo (regardless of what sex or gender characteristics that embryo will eventually turn out to have). Gender, by way of contrast, is social, having to do with the characteristics that a culture delineates as masculine or feminine, and gametes do not carry gender.

Daniels (2006, pp. 6–7) has argued that men and women are viewed quite differently as contributors to biological reproduction with men viewed as being secondary to. In their assessment of this argument, Almeling and Waggoner (2013, p. 831) counter that althought differences between the views of men and women may exist in the later parts of reproduction, "when it comes to genetics and family history, women and men are assigned equal parts in the reproductive equation." But equality may very well not be sameness. As Martin (1991) demonstrated years ago, even if men and women are "assigned equal parts in the reproductive equation," scientific texts "gender" the gametes necessary for reproduction. Sperm has traditionally been depicted in texts as acting in stereotypical masculine ways: it carried out a "perilous journey" where the survivors "assaulted" and penetrated the egg which, in some accounts, would die unless "rescued by a sperm." By way of contrast, the egg was depicted as passive, weak, and timid. When new research revealed that sperm and egg come together not as a result of assault and penetration but "because of adhesive molecules on the surfaces of each" a new but equally gendered imagery appeared. Now the egg was depicted as being more active, but also "disturbingly aggressive," much like a spider lying in wait in her web, ready to "capture and tether" the sperm.[2]

Related research has revealed not only that the experiences of egg and sperm donors are differentiated in ways that cannot be accounted for by bodily differences alone (Almeling, 2011, 2007; Johnson, 2011) but that that eggs and sperm are marketed in different ways (Krawiec, 2009; Rubin, n.d.; Tober, 2001). One key difference is that sites that advertise egg donors often offer contemporary photographs of the donors in addition to written profiles while sites that advertise sperm donor have usually offered, at most, a photograph of the donor when he was a baby in addition to the written materials (and sometimes voice recordings). Beyond what is included in marketing materials themselves, Daniels and Heidt-Forsythe (2012, pp. 626–727) 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.

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[1] Other groups have also benefited from new reproductive technologies, especially when surrogacy is included. This, paper, however, focuses on donated gametes carried by women who are the gestational parents of the children they raise.

[2] For a recent update of these findings, see (Campo-Engelstein and Johnson, 2013).

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.... The egg donation industry also appeals to traditionally feminine traits in its advertising to young potential donors by framing egg donation as both altruistic and, simultaneously, part-time work for which young women will be competitively compensated.

In addition to marketing practices, research on the organizations that make reproductive gametes available to recipients demonstrate that the staff work harder to create boundaries between donor and recipient in egg donation than they do between donor and recipient in sperm donation. These extra efforts are made because it is assumed that women will be more attached to their eggs than men to their sperm (Johnson, 2013).

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

Moreover, these equivalencies may well be distorted by a set of issues beyond those related to the marketing of gametes. 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 or 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). One study that has explored women's feelings about egg donation (Berkel et al., 2007, p. 07) suggests that women whose children had been conceived through IVF "expressed more denial and showed more defensive reactions, anxieties and uncertainty" when they had used donor eggs than did mothers whose children had been conceived through IVF using their own eggs. However, that study does not compare use of donor eggs to use of donor sperm and no studies we know of look at the situation where *both* donor eggs and donor sperm are used.

In this paper we ask questions that build on the scholarship about gendered gametes and reliance on donor gametes to conceive a child by focusing on 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 egg, women who have conceived with donor eggs and a partner's sperm, and women who have conceived with embryos composed of both donor egg 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 sets of conditions.

LITERATURE REVIEW

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) has 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, Furhnam 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.

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 appear as persons 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, 1998; MacCallum and Golombok, 2007; Murray and Golombok, 2003; Readings et al., 2011; 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.

METHODS

Data Collection

The data for this study comes from an online survey developed by the authors. Invitations to answer the survey were 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), and to a variety of other organizations including Single Mothers by Choice (SMC).[3] Invitations to participate in the survey were also posted on Craigslist in four large urban areas as well as on several other websites including ParentsviaEgg donation.com (PVED), and Resolve.com. Several organizations also 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. Rosanna Hertz also 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 Middlebury College and Wellesley College.

It is impossible to assess response rates because of the multiple sites through which the survey was available. In any case web surveys generally have relatively low response rates (Couper, 2000; Monroe and Adams, 2012; 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). We know of no entirely random study of parents who have used donor games.

[3] Details of the study were also available on the DSR website on an open-access Webpage and on Single Mothers by Choice Facebook page.

Participants

As noted, 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, 1596 relied only on donor sperm, 76 only on donor eggs, and 108 on a donated embryo.

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 someone of the same sex. Respondents relying on egg donations alone almost exclusively in relationships with someone of the other sex; 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 partnership with someone of the same sex and 16% were in a partnership with someone of the opposite sex. The respondents were, on average quite 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.

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). Second, respondents were asked to indicate how they imagined the donor, checking from a similar list with ten attributes. Third, respondents were given the opportunity to indicate who 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.

FINDINGS

Choosing a donor

Women choosing eggs and sperm place a premium on good health as assessed through the donor's profile of his/her own health and the donor's assessment of family health (Table 2; Column E). Educational level is third, quite possibly for many as a stand-in for intelligence that the data would suggest is assumed to be passed on through genes. Race is the fourth most frequently chosen attribute.[4] Personality, an issue assessed from profiles, statements, and recordings and photos if they are available, comes next. Two physical attributes follow with height leading the pack, followed by eye color. Ethnicity is admixed in here. More specific physical attributes (such as hair type or facial structure) are considerably lower, as is religion.

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. But

[4] On most websites, no distinction is made between race and ethnicity. Our survey separated these two; we do not know, of course, precisely how the respondents interpreted these separate options.

choosing a donor is more complicated than that, and 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).[5]

As Table 2 (column F) shows, as the sole gamete provider, sperm donors are valued considerably more than are egg donors for height (22% difference) and education (15% 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 G versus column F).[6] 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). The only difference that is greatly exaggerated (when considering egg donors as parts of embryos as opposed to egg donors alone; Column I) 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 H).[7]

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).[8] 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.

As Table 3 shows, as the *only* donor (column F), 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 F) are 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 more likely than egg donors (Column G) 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 I) 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

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[5] 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.

[6] As Table 2 shows, there are differences in the magnitude of the interest in the various attributes carried by the egg and the sperm, differences which derive in part from the fact that respondents checked on average more different attributes (from the five they were "allowed" to choose) when they were choosing sperm donors either by themselves (4.4) or as part of embryos (4.2) than they did attributes for egg donors either by themselves (3.4) or as parts of embryos (3.8).

[7] 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).

[8] If they know, or have seen pictures of, other children conceived through the same donor (donor siblings), they might also use that knowledge to help construct an image of the donor.

rather than on their own sperm donors gain in talents, good looks, youth, and warmth (Column H) but with respect to the last two of these, egg donors gain even more.

Who 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. 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).

With respect to talents, 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 (column H):[9] 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.[10]

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). On their own sperm donors are accorded more importance by those who use them in comparison with the importance accorded to egg donors by those who use them, especially for math ability and athletic ability; as parts of a whole, sperm donors are accorded more importance with respect to intelligence, math ability, athletic ability, and artistic ability. The same is not true for the issues of character: personality and temperament. Sperm donors are viewed as being more important as shapers of temperament when they are used in an embryo than when they are viewed on their own.

Physical characteristics reveal an even more complex story. Sperm donors alone are more often viewed as modestly influencing skin tones and significantly influencing 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 20.5 versus 6.3 for egg donors), physical characteristics (24.5 versus 15.0) but barely for character (10.8 versus 9.7). In short, women discount the contributions of egg donors relative to sperm donors in the formation of their child's attributes.

DISCUSSION

Two significant themes emerged in this analysis of survey data: gametes are gendered and gametes are unequal in importance in a way that privileges sperm.

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[9] If they know donor siblings, they might be more aware of what comes from the sperm donor because they see resemblances in other children.

[10] Which individual takes over in terms of being the person to whom the mother believes is responsible for a particular attribute is an interesting question to pursue but we do not do that here.

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 two 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) 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 on their children) what the donors of their children must be like (when they do not know the donor).[11] 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 finding – *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 three 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' contribution for 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).

[11] They might also draw on the images of donor siblings of their children if they know of them.

Second, 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 (if there is one) generosity (if there is no sperm donor) and youth (especially when there is also a sperm donor). 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 egg. Third, 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 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 her, 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).[12] The explanation for findings like these builds 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 arouses 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 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.[13] A different set of sociological and

[12] There is considerable controversy about this kind of research. See Pahlke et al. (2014) for a good review of this research)
[13] Women who rely on egg donors are also less likely to have had contact with a child's donor siblings from egg donors than from sperm donors and therefore they have less information that they can use to "construct" the donor.

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.

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 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); women apparently do the same with egg donors (Applegarth, 2014; Berkel et al., 2007; Kirkman, 2003). Our research suggests that after the fact of conception with an egg donor or a donated embryo 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.

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 demographic differences among those who rely on different forms of assisted reproduction technologies. In comparison with women who rely on sperm donation alone, women who rely on egg donations alone are wealthier, more likely to be part of a heterosexual couple, 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, for many of those issues the greater difference in attitudes was found between those who used *embryos* 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 do 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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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*	78	78	67	70	8	11‡	0	3
Family health	65	65	57	61	4	8	0	4
Education*	57	52	38	37	15†	19†	-5	-1
Race	44	42	40	36	6	4	-2	-4
Personality	40	37	33	33	4	7	-3	0
Height*	33	39	17	17	22†	16†	6	0
Eye color	32	28	25	17	11†	7	-4	-8
Ethnicity*	24	27	14	30	-3	10‡	3	16†
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*	9	7	13	18	-11†	-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

*Probability of Chi-square test of difference across all four categories is significant at ≤05.
†Probability of Chi-square test of difference across two categories is significant at ≤ .05.
‡Probability of Chi-square test of difference across two categories is significant at between ≥.05 and ≤ .10.

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†	-6
Good looking*	58	39	50	42	-3	8	-19†	-8
Generous*	31	37	46	67	-30†	-15†	6	21†
Young*	27	16	58	39	-23†	-31†	-11†	-19†
Likable	46	46	58	45	1	-12‡	0	-13‡
Sexy*	12	4	17	3	1	-5	-8†	-14†
Smart	54	49	50	45	4	4	-5	-5
Funny*	27	26	29	10	16†	-2	-1	-19†
Sensitive	35	31	38	29	2	-3	-4	-9
Warm*	42	29	58	29	0	-16†	-13†	-29†

*Probability of Chi-square test of difference across all four categories is significant at ≤05.
†Probability of Chi-square test of difference across two categories is significant at ≤ .05.
‡Probability of Chi-square test of difference across two categories is significant at between ≥.05 and ≤ .10.

TABLE 4: WHO DOES THE CHILD MOST RESEMBLE?
(Percent Checking Each Type of Donor)

WHO 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) %	COMPARISONS: Difference Between Sperm donor and Egg donor alone %	COMPARISONS: Difference between Sperm donor and Egg donor when used in embryo %
TALENTS						
General Intelligence	26	14	6	6	8‡	20†
Math Ability*	26	23	5	3	20†	21†
Athletic Ability*	29	27	6	11	16†	23†
Artistic Ability*	18	18	6	13	5	12†
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*	49	41	18	26	15†	31†
Face Shape	36	25	23		2	12†
Eye color*	43	30	19	27	3	24†
Average for Physical Characteristics	**38.0**	**31.2**	**26.2**	**26.5**	**6.0**	**8.5**

*Probability of Chi-square test of difference across all four categories is significant at ≤05.
†Probability of Chi-square test of difference across two categories is significant at ≤ .05.
‡Probability of Chi-square test of difference across two categories is significant at between ≥.05 and ≤ .10.

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**
	(N=608)	**(N=481)**	**(N=371)**	**(N=64)**
Athletic Ability*†	**%**	**%**	**%**	**%**
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*
	(N=603)	**(N=473)**	**(N=364)**	**(N=64)**
Height*†	**%**	**%**	**%**	**%**
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*
	(N=611)	**(N=475)**	**(N=371)**	**(N=59)**
Math Ability*†	**%**	**%**	**%**	**%**
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*

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

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