# Why parents should not be told the sex of their fetus 

Tamara Kayali Browne

## Correspondence to

 Dr Tamara Kayali Browne Research School of Biology, Australian National University, Robertson Building 46, Acton, Canberra, ACT 2601, Australia; t.kayali.05@cantab.net, tamara.browne@anu.edu.au
## Received 2 July 2015

Revised 29 September 2015
Accepted 28 October 2015

- http://dx.doi.org/10.1136/ medethics-2015-102948

To cite: Browne TK. J Med Ethics Published Online First: [please include Day Month Year] doi:10.1136/
medethics-2015-102989


#### Abstract

A new technique called non-invasive prenatal testing (NIPT) has been developed, which can detect a range of genetic and chromosomal diseases, as well as fetal sex earlier, more easily and more reliably. NIPT, therefore, potentially expands the market for sex determination and sex selective abortion. This paper argues that both practices should be prevented by not including fetal sex in prenatal test reports. This is because there is a discrepancy between what parents are concerned with (gender) and what the prenatal test can provide (sex). The paper first presents arguments, which indicate a difference between sex and gender before presenting parental motivations for sex selection and sex determination to show that parents are not concerned with their child's sex chromosomes, or even their genitalia, but the gender role that their child will espouse. That, however, is not something that a prenatal test can provide. We are thus left with a situation in which what parents are told, and what they think they are being told, are two different things. In other words, as the conflation of sex with gender is implicit in the disclosure of fetal sex, it may be more accurate to refer to it as misinformation. This misinformation promotes sexism via gender essentialism, which is neither in the interests of the future child nor society.


## INTRODUCTION

A new technique called non-invasive prenatal testing (NIPT), which involves a simple maternal blood test, can detect a range of genetic and chromosomal diseases, as well as fetal sex earlier, more easily and apparently more reliably than older techniques. ${ }^{1}$ NIPT could thus expand the market for sex selective abortion and sex determination. (Note that throughout this paper, I use the terms 'sex selection' and 'sex determination' to refer, respectively, to sex selective abortion for social purposes or sex determination for social purposes, not for the detection of sex-linked diseases.) Sex selection entrenches sexism by reinforcing stereotypes about gender, which underlie sex discrimination. ${ }^{2}$ Thus, even if the demand for sex selection in the West is for 'gender balancing', it is still driven by gender essentialism. Moreover, the implication that families with children of just one gender are somehow 'unbalanced' is problematic, as is the so-called need to 'balance' genders. ${ }^{3}$
While it may not be practically feasible, nor desirable, to restrict abortion on the basis of 'legitimate' or 'illegitimate' reasons, there is a way to prevent prenatal sex selection without curtailing the right to abortion-by not including fetal sex in prenatal test reports. ${ }^{4}$ A ban on sex determination appears, of course, to impinge on a patient's right to information regarding fetal sex. This paper questions this 'right' (which may be more accurately
called a preference) by highlighting a fundamental misunderstanding that drives the demand to know fetal sex in the first place-a mistaken belief that sex equals gender. Seavilleklein and Sherwin highlight how the marketing of preimplantation genetic diagnosis (PGD) for sex selection conflates sex with gender, explaining that ' $[0]$ ur argument is not that the marketing of sex selection services is the source of such expectations but that it accepts them unquestioningly and provides them with a scientific and medical veneer that makes them appear biologically based and unproblematic' (ref. 5, p.16). I argue that sex determination also accepts gender essentialist beliefs and provides them with the scientific and medical veneer that perpetuates them. My argument is twofold:

1. that prenatal sex determination is wrong in principle due to the widespread and mistaken belief that sex is the same as gender-a belief which sex determination helps to encourage;
2. that any indignation felt by parents at not knowing fetal sex would be outweighed by the benefit of undermining gender essentialist beliefs which underlie sexism. (This is particularly so since the indignation would stem from the same gender essentialist beliefs that we should fight.)

## SEX VERSUS GENDER

According to the WHO, "'sex' refers to the biological and physiological characteristics that define men and women', whereas 'gender' refers to the socially constructed roles, behaviours, activities and attributes that a given society considers appropriate for men and women". ${ }^{6}$ While the meanings of the terms 'sex' and 'gender' are contested, the WHO definition at least highlights the commonly held and useful distinction between them. Prospective parents interested in the sex of the fetus assume that gender differences are largely a product of biological differences, but no credible evidence has emerged to support this claim. ${ }^{7}$ In contrast, there is much research that demonstrates the role of culture in the acquisition of gender. ${ }^{8}{ }^{9}$ As West and Zimmerman note, ‘[d]oing gender means creating differences between girls and boys and women and men, differences that are not natural, essential, or biological. Once the differences have been constructed, they are used to reinforce the 'essentialness' of gender' (ref. 8, p.136). As table 1 shows, possessing the XX karyotype does not guarantee that one will have unambiguous female genitalia, identify with being a woman, heterosexual and feminine with the typical jobs, hobbies and family roles associated with being a woman (and vice versa for the XY karyotype).
These distinctions are ignored by the general public, including fertility clinics that advertise sex

Table 1 Diversity between and within sex and gender

| Chromosomal sex | Physiological sex | Gender identity | Sexual orientation | Social identity |
| :---: | :---: | :---: | :---: | :---: |
| 1 in 400 pregnancies have an abnormal no. of $X$ and $Y$ chromosomes ${ }^{10}$ | Approximately $1.7 \%$ of live births have ambiguous external genitalia ${ }^{11}$ | Approximately 1 in 200 (0.5\%) people aged 18-64 years identify as transgender in the USA ${ }^{12}$ | Across the USA, UK, Australia, Canada and Norway, the percentage of adults who self-identify as lesbian, homosexual or bisexual ranges from $1.2 \%$ in Norway to $5.6 \%$ in the USA ${ }^{13}$ | $2.6 \%-6 \%$ of boys and $5 \%-12 \%$ of girls frequently display cross-gender behaviour ${ }^{14 *}$ |

*Studies reviewed were of primary school-aged children in Canada and the Netherlands.
selection services as they use the terms 'sex' and 'gender' interchangeably, marketing PGD as a means of gender selection when, in fact, it only distinguishes between embryos on the basis of their sex chromosomes. As Seavilleklein and Sherwin observe, the time, money and risk that prospective parents are willing to undergo to be able to select the sex of their embryos:

> indicates a strong belief that important differences attach to having a child of one sex rather than the other. This belief is not adequately captured by differences in physiological sex and can only be explained in terms of assumptions about the different social roles, including behaviors, interests, and practices, that are considered appropriate for boys and men and for girls and women. In other words, part of what is expected from sex selection techniques is a child that will conform to assumed (and desired) gender roles (ref. 5, p.11)

I contend that sex determination is also driven by a conflation of sex with gender. This paper takes the same argument that Seavilleklein and Sherwin use against sex selection via PGD and applies it to prenatal sex selection and sex determination. ${ }^{\mathrm{i}} \mathrm{I}$ add to their argument by drawing on Fine's investigation of studies of biological determinants of gender differences, suggesting that sex fails to guarantee gender (as Seavilleklein and Sherwin argue) and also that we have no evidence to support the assumption that biological components cause gender differences, whereas we do have evidence for societal causes of gender differences. As a result, sex determination and sex selection 'obscure the reality of such phenomena as intersexuality, transsexuality, homosexuality and, more generally, perpetuate harmful stereotypes that attach to traditional conceptualizations of gender' (ref. 5, p.7); they also obscure the role that harmful stereotypes have in producing the gender traits that parents so desire.

## CORRELATION DOES NOT EQUAL CAUSATION

One might argue that in seeking sex determination or sex selection, parents are merely acting on probabilities-that despite the fact that sex is not $100 \%$ correlated with gender, there is nonetheless a strong probability that a child with certain sex chromosomes will end up with a certain gender. There are two problems with this argument:

1. Most people presume that there is a biological component behind the probabilities. However, despite over 100 years of research, scientific studies have failed to provide good evidence to support this belief. In her book, Delusions of
[^0]Gender, Fine presents a range of problems with the studies, that have purported to show that differences in 'hard-wiring' of male and female brains explain gender differences. From the most basic methodological flaws to problems with the reasoning underlying the studies or the claims being made, Fine and other authors have effectively shown that it is only popular neurosexism that reinforces the myth that our brains or hormones are behind the differences we see. As Fine states, "[s]o far, the items on that list of brain differences that are thought to explain the gender status quo have always, in the end, been crossed off"( ref. 7, p. 186).
In contrast, there is no shortage of good studies, which show the alarming power that our sexist culture has to create gender differences. 'Stereotype threat', for instance, is now an established phenomenon that demonstrates how awareness of a negative stereotype about a particular group causes those in the group to underperform. When the stereotype threat is removed, the group differences in performances disappear. For example, in a study conducted by the University of Padova, women were divided into two groups and given a math test. Before the test, the stereotype threat group was told that 'recent research has shown that there are clear differences in the scores obtained by men and women in logical-mathematical tasks', whereas the control group was told that there were no sex differences in scores for these tasks. Before each question, the women were asked to write down any thoughts that arose. Women in the stereotype threat group wrote down at least twice as many negative thoughts about the test than the control group, and this eventually impacted on their performance. Both groups attained an average of $70 \%$ of the answers correct in the first half of the test, but by the end of the test, the stereotype threat group's score went down to $56 \%$, while the control group's score went up slightly to $81 \%{ }^{15}$

Stereotype threats have been shown to produce gender differences in math tests and also in several other fields, such as chess, ${ }^{16}$ mental rotation tasks, ${ }^{17}$ working memory capacity, ${ }^{18}$ driving ${ }^{19}$ and negotiations. ${ }^{20}$ As Fine explains, "the deadly combination of 'knowing-and-being' (women are bad at maths and I am a woman) can lower performance expectations, as well as trigger performance anxiety and other negative emotions" (ref. 7, p.32). Stereotype threat has also been shown to reduce interest in opposite-gender activities. ${ }^{7}$

Since correlation does not equal causation, and since we know that society causes many gender differences, whereas we do not know that biology causes gender differences, it seems unjustified to maintain a policy based on correlations when we do not base other policies on correlations. Indeed, if we were to base social policies on correlations, we may end up with some very strange policies (as demonstrated by the spurious correlations featured in the book of the same name). ${ }^{21}$ Further, as there is no evidence of a causal link between sex and gender, whereas there is evidence of a causal link between genetic abnormalities and disease/impairment, there is at least an
epistemic basis on which to defend selection for the latter but not for the former.
2. To note that, statistically speaking, the sexes are simply more likely to have different tastes, aptitudes and behaviours and to use this likelihood as grounds for permitting sex determination also ignores the problematic social and cultural norms, practices and expectations that produce these likelihoods in the first place. For example, it is known that attitudes play a key role in perpetuating men's violence against women. ${ }^{22}$ Factors that have been found to influence such attitudes include: gender roles and relations, participation in violent contexts, pornography and the media. ${ }^{22}$ Committing violence against women is thus not simply a result of being male, but a behaviour that is strongly influenced by a sexist society. If parents attach great importance to their child not committing acts of violence against women, they could take steps to teach their child to behave in moral ways and could support policies that prevent such violence. If parents attach great importance to their child not becoming a victim of violence, they could campaign for policies that prevent violence against women. Simply using sex selection to avoid a child who is more likely to perpetrate violence against women, or a child who is more likely to become a victim of violence against women, misunderstands or ignores the factors that cause men to be more likely to perpetrate, and women to be more likely to be the victims of, violence.
3. Analogously, African-Americans are arrested at disproportionately high rates compared with white people. For instance, African-Americans are nearly four times more likely to be arrested for murder and robbery than one would expect given their proportion of the US population. ${ }^{23}$ However, it would be incorrect to assume that ethnicity is the cause of violent crime. Rather, problematic social factors are important in influencing this correlation. ${ }^{24}$ It would seem wrong to have a health policy that plays into, rather than challenges, incorrect assumptions about race. Likewise, the evidence suggests that sex is a good predictor of certain behaviours because of the problematic societal factors which lead to those behaviours. To permit sex selection simply because of certain likelihoods would be to disregard the sexist reality on which those likelihoods are based. This sexist reality both feeds into, and is fed by, attitudes, such as those espoused by prospective parents who wish to select a child of a particular gender or who ask to know the sex of their fetus. Thus, merely explaining to parents that sex does not have a $100 \%$ correlation with gender, or that it does not appear to cause gender, would not sufficiently address the gender assumptions behind the desire to know fetal sex. We need an evidencebased policy-one aligned to the fact that thus far, there is no evidence of biological determinants for gender differences, whereas there is evidence for social determinants of gender differences-determinants that are problematic and need to be addressed. As Fine explains, myths about male and female brains "reinforce and legitimate the gender stereotypes that interact with our minds, helping to create the very gender inequalities that the neuroscientific claims seek to explain" (ref. 7, p.186). This is why, if we wish to stop creating these gender inequalities, we must cease having policies aligned with the myths that perpetuate them.

## WHY PARENTS WISH TO KNOW FETAL SEX

In studies conducted thus far as to why parents seek sex selection or sex determination, no respondents have stated that it is important to them that their child has particular genitalia.

Rather, implicit in all their desires is the assumption that the child will conform to certain gender roles and norms. When prospective parents have a preference for a boy or a girl, the most common reasons for this in the West are a desire for companionship/mutual identification, a desire for a particular type of parenting experience and for 'family balancing'. ${ }^{25} 26$

Regarding the desire for companionship, a prospective parent wants a child with similar tastes/propensities as oneself so that they can bond through an enjoyment of similar interests; for example, women who want to have a daughter so that they can enjoy talking, shopping and dancing, ${ }^{27} 28$ and men who want a son so that they can play baseball, basketball and go fishing together. ${ }^{27}{ }^{29}$ Yet, it is, of course, possible to enjoy all these activities with children of either sex, and evidence showing that such propensities are biologically determined is so far lacking. ${ }^{7}$ A similar issue lies at the heart of the desire for a certain type of parenting experience. In the majority, these are women who want a mother-daughter bond or men who want a father-son bond. Their expectation is that they would bond more easily with a child of the same sex (and not so easily with a child of the opposite sex). ${ }^{25-27} 29{ }^{30}$ Such a belief is unfortunate, yet it is societal prejudice about gender that prevents us from believing that we can bond and share the interests and activities we love most with either sex, not the physiological characteristics of the sexes. Prospective parents may alternatively cite that they have more experience with siblings or children of one sex and thus feel better equipped to raise a child of that sex. ${ }^{29}$ Yet, this feeling is also based on a belief that males and females have different aptitudes and abilities, and an expectation that sons and daughters will play different roles ${ }^{29}{ }^{30}$-all forms of gender essentialism.

We also know that the desire for 'gender balance' is not premised on the desire to have an adequate variety of genitalia or sex chromosomes in the household, but a desire to have a child who will conform to the gender roles, norms and stereotypes of the opposite sex to their current children. ${ }^{5}$ As such, the desire to have children of each sex is still premised on gender assumptions. One might argue that if this desire is the primary reason behind why families choose to have more than two children (at least in Western countries), it would be better for the environment (by reducing the surplus population) to allow those parents to use sex selection. However, it is not obvious that the fight for a sustainable environment, while noble and worthwhile, should take priority over the fight against sexism. Indeed, the two causes are not mutually exclusive. If my policy proposal is adopted and the public understands the reasons behind it, parents should begin to see that it does not matter if they have all female or all male children because there is no evidence that the correlation between sex and the gender traits that the parent has in mind is the result of biological hard-wiring. This means that the motivations behind the desire to have one of each gender are not based on evidence but on the gender assumptions that underlie sexism. Given that there are many parents who are either reluctant or unable to use abortion or embryo selection for 'family balancing', the benefit to the environment as a result of the awareness raised by this proposal could eventually be much greater than simply permitting sex selection for 'family balancing'.

Other reasons for sex selection include the desire to have a girl so that sons can learn to respect women and to pass on the family name. ${ }^{26}$ However, there is no evidence to support the assumption behind the former, and the latter is certainly a cultural norm. The family name is not inscribed in the Y chromosome but passed down (usually through the male line) in a social custom that humans have invented. However, males can
choose to change their names and women can choose to keep their names-indeed, this tendency to go against tradition is becoming increasingly popular.

Parents may not have a gender preference for their child, but simply wish to know its sex during the pregnancy rather than wait until the birth. Common motivations for wanting to know fetal sex are for practical/planning purposes, ${ }^{31} 32$ for example, '[w]hen I know the sex of the baby I feel confident about baby shopping', '[i]t is practical for decorating the baby's room, ${ }^{32}$ and even for planning a move or major home rearrangement. ${ }^{31}$ ii Yet, all these motivations entail gender assumptions, which are not rooted in biology.

## WITHHOLDING INFORMATION OR WITHHOLDING MISINFORMATION?

One might argue that a prospective parent has a right to information regarding the sex of their fetus. Yet, if such a right exists, the erroneous conflation of sex with gender undoes it. The discrepancy between the information the clinical health professional can provide (fetal sex) and the information the parents wish to know (gender) means that what is provided to the parents is not information but, more accurately, misinformation. This issue is therefore not one of withholding information that is of relevance/interest to parents, but one of withholding misinformation. Such an action would be reasonable and more ethical than the current state of affairs, which colludes with the conflation of sex with gender and, in doing so, misinforms parents. If the parent fully understands the distinction between sex and gender, then information regarding fetal sex is unnecessary. If the parent does not understand the distinction, then the information is misleading.

To draw an analogy, imagine there was a widespread but erroneous belief that there are fundamental differences in personalities, behaviours and propensities between left-handers and right-handers-a belief that underpinned discrimination between these two groups. Imagine also that it is possible to adduce prenatally whether one's child will be left-handed or right-handed. As it happens, some studies suggest a correlation between left-handedness and criminality. ${ }^{33}$ However, correlation does not equal causation, so any assumption that a fetus that is left-handed is biologically predisposed to criminality would be flawed. Yet, in a world in which such mistaken assumptions are widespread, a clinician receiving a request from a parent to determine fetal handedness knows that the parents are likely seeking this information because they espouse such mistaken assumptions. In this scenario, it is evident that to provide parents with this information would entrench the nonsense, causing them to be misinformed rather than informed. Considering the role that these erroneous beliefs play in the perpetuation of discrimination on the basis of handedness, a clinical health professional may in fact have a duty to challenge these beliefs. Likewise, clinical health professionals should challenge erroneous beliefs concerning gender by refusing to comply with requests for sex determination.

## CONSEQUENCES OF THIS MISINFORMATION FOR CHILDREN AND SOCIETY

One obvious ramification for society of disclosing fetal sex is that doing so can facilitate sex selective abortion, which both

[^1]stems from and exacerbates sexism. Yet, the harms of sex determination are not restricted to its contribution to sex selective abortion. As I have argued, parental interest in sex determination rests on the erroneous conflation of sex with gender. As de Melo-Martin asserts:

> Why should we not take the promotion of these beliefs as harmful? There is little doubt, and a considerable amount of evidence, that gender expectations have historically been used to limit the life options of men and, particularly, of women. Moreover, the traditional expectations that attach to standard gender roles are not unrelated to existing patterns of gender discrimination and sexual oppression. Given this evidence, it seems reasonable to believe that the consolidation-through the blessing of modern science and medicine-of such expectations can serve only to perpetuate this limitation of life choices and to further injustice (ref. 34, p.11)

The conflation of sex with gender also ignores all the points of diversity between and within them (as illustrated in the table earlier). Ignoring this diversity can render people less tolerant of difference and can contribute to discrimination within society. ${ }^{5}$ Children and adults are often stigmatised or bullied for failing to conform to gender stereotypes, which has a range of psychological consequences for those individuals.

Feinberg believes that a child has a right to an open future. By this, he means that parents should not make choices that limit their child's possibilities and opportunities to flourish. ${ }^{35}$ Davis applies this concept to sex selection, arguing that parents who invest in sex selection are more likely to limit the child's possibilities due to gender-stereotyped beliefs:

> If I insisted on having a girl because I believed that as a grandparent I would be more likely to have close contact with the children of a daughter than of a son, I think I would be find it much harder to raise a girl who saw motherhood as a choice rather than as a foregone conclusion. Parents whose preferences are compelling enough for them to take active steps to control the outcome, must, logically, be committed to certain strong genderrole expectations (ref. 36, p.14)

A child of the desired sex can thus be harmed by the imposition of gender stereotypes, which it may not be able to fulfil, just as a child of the undesired sex can be harmed by gender stereotypes. I contend that the same argument applies to parents heavily invested in knowing fetal sex. The more important it is to them to know this information, the greater the risk of harm as a result of their mistaken beliefs and the greater the imperative to withhold the information and educate them as to why it is no longer provided. Such a measure can potentially mitigate the constriction of the child's possibilities (as well as societal discrimination) that results when gender essentialist notions remain unchallenged.

In the case of prenatal disclosure of disability, it is understandable that the information itself would be valuable to parents, whether or not they would consider abortion, due to the potential for early treatment in some cases and the preparation and adjustments they may need to make (such as care provisions, wheelchair-accessible housing, special education, etc). In the case of sex, however, 'preparations' often consist of buying gender-specific clothes and toys or painting the baby's room pink or blue. Yet, such 'preparation' is trivial at best and, at worst, perpetuates gender essentialism, which forecloses certain opportunities that might otherwise have been available to the child. Even if the parent only wishes to 'mentally prepare' for the child rather than to decorate the child's nursery in gender-specific ways, such 'mental preparation' (or what

Kane refers to as 'gender anticipation') would nevertheless be based on an assumed connection between biological sex and gender roles-otherwise, why would such knowledge be interesting or meaningful enough to necessitate such 'mental preparation'?

Those with a social constructionist view of disability might state that the same argument applies to prenatal testing for disability due to the role that society plays in creating it. While it is worth educating people about the lived experience of those with disability and societal discrimination certainly exacerbates their suffering, there are established biological causes of diseases and disability, whereas this is not the case for gender. The gap between what the parent wishes to know and what the test can provide is thus not as great. For example, if a test reveals fetal blindness, parents understand that the baby will not be able to see. There is less risk of a mismatch between what the test provides and what the parent understands from the test result because in the case of disability, what the parent seeks to know is at least anchored in a biological reality in a way that gender is not.

Given the cultural assumptions associated with each sex, it is hard to imagine a scenario in which knowledge of fetal sex would not colour a parent's preconceived notions and expectations in some way-at least not in our current world. If learning the fetus' sex were as interesting to parents as learning the shape of the fetus' navel, there would be no issue in providing it. The assumption that fetal sex matters enough to be provided to parents entrenches sexism. Risman maintains that " $[\mathrm{g}]$ endered expectations in American families are major impediments to further movement toward equality" (ref. 37, $\mathrm{p} .151)$. The same is true around the world, where the assumption that men and women are better suited for certain activities and not others limits the possibilities for each sex from birth all the way to adulthood. Parents enact these assumptions both directly in the way they treat sons versus daughters, and in choices, such as toy selection, room décor and play activities, ${ }^{38}$ as well as indirectly in their own gendered roles as 'opportunity providers and managers of their children's activities and social experiences' (ref. 39, p.143).

It is these created worlds and the anticipation of them that constricts children's futures and contributes to the 'social reproduction of gender' (ref. 27, p.378). As Kane observed, before their children were even born, parents in her study were already anticipating that their children would be vastly different depending on which sex they were. ${ }^{27}$ Given that parents are known to play a crucial role in constructing their child's gender, Kane's observation of this prebirth/preadoption gendered anticipation shows how the motivation parents have to 'do gender' with and for their children may translate into a self-fulfilling prophecy. Knowledge of the sex of the fetus can also have other, quite physical, consequences for the child who is born. In two studies of post-partum mothers in Jordan, when mothers knew the sex of their baby prenatally, the average birth weight was significantly lower for female newborns than male newborns, whereas there was no significant difference when the sex was not known prenatally. ${ }^{40}{ }^{41}$ The authors suggest that these results are related to behavioural changes associated with son preference. If we are serious about fighting sexism, we must acknowledge the role of gender essentialism in promoting gendered anticipation and its consequences, and the part that sex determination plays in these processes.

If there is any psychological damage done to parents as a result of not knowing the sex of their fetus, it would be due to the strength of their gender essentialist beliefs, which place such mistaken importance on fetal sex-a factor that would only
make it all the more important to withhold the information and educate them. On the other hand, we know there is harm in the form of sex selective abortion, psychological harm to children and harm to society in the form of sexism that is rooted in gender essentialism. If this policy contributes even in a small way towards diminishing these harms, that benefit would outweigh a preference against the policy, since that preference is itself rooted in the mistaken beliefs underlying these harms. If there are individuals who understand the distinction between sex and gender, but who are nevertheless curious to learn its karyotype or genitalia for its own sake, they too should be educated about how sex determination reinforces gender essentialism in order for them to understand how the failure to satisfy their curiosity is a small sacrifice the fight against sexism.

One might claim that satisfying parental preferences is a good in itself. Yet, it does not seem justifiable to satisfy the preferences of as many parents as possible if doing so entrenches sexism. To do so would be morally wrong and would benefit the individual (in a limited sense) at society's expense, thereby disadvantaging many. Individuals may not share anti-sexist, anti-racist or antihomophobic agendas promoted by policies aimed at ending these forms of discrimination, but that is not sufficient justification for preventing such policies from being implemented. It at least, seems reasonable to expect our clinicians and policymakers to stand for equality.

One might also claim that even if a parent attempts to avoid gender assumptions when raising their child, the experience of raising a boy would still be different to that of raising a girl due to the social and cultural landscape, which treats them differently. While this may well be the case, to allow sex determination and sex selection based on this fact would only entrench these social and cultural norms. Rather than capitulating to them and admitting defeat, we should change the social situation to one which is more egalitarian. Going against social customs that treat boys and girls differently may be difficult for parents at first, but the more parents who become aware of the inherent sexism behind such customs (through policies such as that suggested here), the easier it will be in the long term-both for parents and for children.

I envisage that this policy proposal, although primarily motivated by collectivist reasons, would help to further social change such that in the future, individuals no longer feel social pressure to enact gendered parenting (eg, to dress their children in certain ways or to direct them to activities deemed 'more appropriate' for their gender). Individuals are part of society and as such, social policies can, and do, effect social change, which then translates into changes at the individual level. One can see this in the effect that social movements (eg, feminism, civil rights, etc) and resulting social policies have had on the lives of individuals. In other words, individuals may currently have reasons to take social pressure (such as buying different clothes for different sex children) into account, but the policy I am proposing would help to bring about the social change that would remove those reasons.

## CONCLUSION

In summary, in the absence of a desire to avoid sex-linked diseases, information about the sex of a fetus is only useful to parents if they associate it with certain assumptions about gender-assumptions that are not based on a biological reality. Clinicians should not play into such mistaken beliefs, as to do so promotes gender essentialism and the sexism that results. I do not claim that preventing sex determination is the only, or the most important, tool in the fight against sexism. This policy
should be implemented alongside other policies that promote gender equality. I do, however, suggest that it be viewed as one of the legitimate tools in this fight since it is unjustified both in principle (due to the misinformation it provides to parents) and in practice (due to the harmful consequences it promotes for children and society). If clinicians were to prohibit sex determination and explained the reasons why, parents may begin to understand that sex does not determine gender, and we may become more successful at undermining the assumptions about gender on which sexism is based. It would be wrong to base our policies on the correlation between sex and gender without recognising the sexist social norms, customs and expectations that produce the correlation in the first place. As these social factors both drive, and are driven by, practices, such as sex determination and sex selection, the policy I propose is one way in which we can bring about the social change needed for gender equality.

Acknowledgements Sincere thanks to Ryan Tonkens, Chris Ryan and Dominic Wilkinson for a fruitful discussion that contributed to this paper, and to the three anonymous reviewers for their feedback on earlier drafts.

## Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

## REFERENCES

1 Newson AJ. Ethical aspects arising from non-invasive fetal diagnosis. Semin Fetal Neonatal Med 2008;13:103-8.
2 Deckha M. (Not) Reproducing the cultural, racial and embodied other: a feminist response to Canada's partial ban on sex selection. UCLA Womens Law J 2007;1:10-11.
3 Dawson K, Trounson A. Ethics of sex selection for family balancing-why balance families? Hum Reprod 1996;11:2577-8.
4 Wertz DC, Fletcher JC. Fatal knowledge? Prenatal diagnosis and sex selection. Hastings Cent Rep 1989;19:21-7.
5 Seavilleklein V, Sherwin S. The myth of the gendered chromosome: sex selection and the social interest. Camb Q Healthc Ethics 2007;16:7-19.
6 World Health Organization. What do we mean by "sex" and "gender"? 2015. http://www.who.int/gender/whatisgender/en/
7 Fine C. Delusions of gender: how our minds, society, and neurosexism create difference. New York: W. W. Norton, 2010.
8 West C, Zimmerman D. Doing gender. Gend Soc 1987;1:124-51.
9 Kimmel M. The gendered society. New York: Oxford University Press, 2000.
10 World Health Organization. Gender and genetics. 2015. http://www.who.int/ genomics/gender/en/index1.html
11 Blackless M, Charuvastra A, Derryck A, et al. How sexually dimorphic are we? Review and synthesis. Am J Hum Biol 2000;12:151-66.
12 Conron KJ, Scott G, Stowell GS, et al. Transgender health in massachusetts: Results from a household probability sample of adults. Am J Public Health 2012;102:118-22.
13 Gates GJ. How many people are lesbian, gay, bisexual and transgender? 2011. http://www.escholarship.org/uc/item/09h684×2

14 Möller B, Schreier H, Li A, et al. Gender identity disorder in children and adolescents. Curr Probl Pediatr Adolesc Health Care 2009;39:117-43.
15 Cadinu M, Maass A, Rosabianca A, et al. Why do women underperform under stereotype threat? Evidence for the role of negative thinking. Psychol Sci 2005;16:572-8.
16 Maass A, D'Ettole C, Cadinu M. Checkmate? The role of gender stereotypes in the ultimate intellectual sport. Eur I Soc Psychol 2008;38:231-45.
17 Hyun J-S, Luck S. Visual working memory as the substrate for mental rotation. Psychon Bull Rev 2007;14:154-8.
18 Schmader T, Johns M. Converging evidence that stereotype threat reduces working memory capacity. J Pers Soc Psychol 2003;85:440-52.
19 Yeung NCJ, von Hippel C. Stereotype threat increases the likelihood that female drivers in a simulator run over jaywalkers. Accid Anal Prev 2008;40:667-74.
20 Kray LJ, Galinsky AD, Thompson L. Reversing the gender gap in negotiations: an exploration of stereotype regeneration. Organ Behav Hum Dec 2002;87:386-410.
21 Vigen T. Spurious correlations. New York: Hachette Books, 2015.
22 Flood M, Pease B. Factors influencing attitudes to violence against women. Trauma Violence Abuse 2009;10:125-42.
23 Walker S, Spohn C, DeLone M. The color of justice: race, ethnicity, and crime in america. 5th edn. Belmont, CA: Wadsworth Cengage Learning, 2012.
24 Walsh Z, Kosson DS. Psychopathy and violent crime: a prospective study of the influence of socioeconomic status and ethnicity. Law Hum Behav 2007;31:209-29.
25 Hendl T. Ethical aspects of gender selection for non-medical reasons. [PhD thesis]. Macquarie University, 2015.
26 Sharp RR, McGowan ML, Verma JA, et al. Moral attitudes and beliefs among couples pursuing PGD for sex selection. Reprod Biomed Online 2010;21:838-47.
27 Kane EW. "I wanted a soul mate": Gendered anticipation and frameworks of accountability in parents' preferences for sons and daughters. Symb Interact 2009;32:372-89.
28 Belkin L. Getting the girl. New York Times Magazine, 1999:26.
29 Goldberg A. Heterosexual, lesbian, and gay preadoptive parents' preferences about child gender. Sex Roles 2009;61:55-71.
30 Nugent CN. Wanting mixed-sex children: separate spheres, rational choice, and symbolic capital motivations. J Marital Fam 2013;75:886-902.
31 Shipp TD, Shipp DZ, Bromley B, et al. What factors are associated with parents' desire to know the sex of their unborn child? Birth 2004;31:272-9.
32 Kooper AJA, Pieters JJPM, Eggink AJ, et al. Why do parents prefer to know the fetal sex as part of invasive prenatal testing? ISRN Obstet Gynecol 2012;2012:1-7.
33 Bogaert AF. Handedness, criminality, and sexual offending. Neuropsychologia 2001;39:465-9.
34 de Melo-Martín I. Sex selection and the procreative liberty framework. Kennedy Inst Ethics」 2013;23:1-18.
35 Feinberg J. The child's right to an open future. In: Aiken W, LaFollette H, eds. Whose child? Children's rights, parental authority, and state power. Totowa, NJ: Littlefield, Adams \& Co, 1980:124-53.
36 Davis DS. Genetic dilemmas and the child's right to an open future. Hastings Cen Rep 1997;27:7-15.
37 Risman B. Gender vertigo. New Haven, CT: Yale University Press, 1998.
38 Kane EW. No way my boys are going to be like that! Parents' responses to children's gender nonconformity. Gend Soc 2006;20:149-76.
39 McHale SM, Crouter AC, Whiteman SW. The family context of gender development in childhood and adolescence. Soc Dev 2003;12:125-48.
40 Al-Akour N. Relationship between parental knowledge of fetal gender and newborns' birthweight among Jordanian families. Int I Nurs Pract 2009;15: 105-11.
41 Al-Qutob R, Mawajdeh S, Allosh R, et al. The effect of prenatal knowledge of fetal sex on birth weight: a study from Jordan. Health Care Women Int 2004;25:281-91.


[^0]:    ${ }^{\text {i}}$ The primary difference between PGD and prenatal sex selection (or sex selective abortion) is that the former involves selecting embryos outside the body prior to implantation, whereas the latter involves abortion of an embryo/fetus inside the woman's body. The former may be viewed as less problematic both because it involves discarding embryos that are days old in comparison with an embryo/fetus that is weeks or months old, and because the procedure occurs outside the woman's body.

[^1]:    ii The most popular reasons in Kooper et al's study were 'just want to know' and 'because it is possible', but these responses merely beg the question. ${ }^{32}$

