

Ultrasound and the Family: to Create or not to Create

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Imagine waking up and going for a walk. You go to get a coffee, the person behind the counter is a man. All the customers are men. In fact, you will not see a woman all day, except maybe if you look in the mirror and happen to be one yourself. What kind of dystopia might you be living in? In a world of almost 8 billion people, there is a roughly equal split between men and women. Although the experience of only seeing men is hyperbole, within some countries, there is a wide demographic imbalance between the sexes. This imbalance is already present at birth due to sex-selective abortion, facilitated by sex-determining methods such as ultrasound. In this paper, I will argue that ultrasound technology should not be used for sex-determining purposes in countries at high risk for sex-selective abortion. In addition, the societal role of obstetric ultrasound in western countries will be analyzed to determine the role ultrasound plays in the social creation of the family.

Methods

The methods that this paper will use are a review of the sociological literature on the practice of prenatal ultrasounds and the ethics surrounding their use. These sources include case studies and interviews, with the intent of introducing ethical discussions. A qualitative study on Norwegian midwives' view of obstetric ultrasound serves to introduce ethical considerations on how ultrasound relates to disability (Åhman et al., 2019). Interviews with ultrasound workers in abortion care will further serve to guide ethical arguments with regard to ultrasound viewing. The social construction of family thesis will be supported by an ethnographic study of fathers and their relation to the ultrasound process (Draper, 2002).

The sociological framework used to analyze the practice of prenatal ultrasound will mainly be the social construction of technology (SCOT) framework (Bijker et al., 1989; Latour, 1996). In terms of the ethics used to frame arguments and weigh situations, act utilitarianism and care ethics will be the main ethical schools of thought (*Care Ethics* | *Internet Encyclopedia of Philosophy*, n.d.; *Utilitarianism, Act and Rule* | *Internet Encyclopedia of Philosophy*, n.d.). Act utilitarianism argues that the outcome of an act is the only thing that matters in determining the morality of the act, and care ethics seeks to meet the needs of others and understand how different perspectives influence actions. One's perspective influences whether specific outcomes, such as abortion after finding out the results of an ultrasound, are thought of as good or bad, which will be taken into account. In the case of mandatory ultrasound viewing before abortion, as is the case in many US states, utilitarianism reasoning will be used to discuss this policy, with care ethics being a strong framework.

Background

In the global community, China is a country with one of the widest imbalances in the sex ratio at birth, with around 110 males born for every 100 females (*Figure 1.9 Sex Ratio at Birth, 1982–2017*, n.d.). The reasons for this are varied, but the main driver is the strong cultural “son preference,” which highly values male offspring in comparison to females. During the time of China's “one-child policy,” access to sex-selective abortion made it so some parents, who wanted their only allowed child to be a son, could abort females until they had a male child. While China has long since had a son preference, it is only with the advent of in-utero sex-determining technology that sex-selective abortions could affect the sex ratio at birth. Ultrasound is the most common sex-determining technology and can determine sex around the 16th week of

pregnancy (*When Technology and Tradition Collide*, n.d.). Due to the strong cultural son preference, if the fetus is determined to be female, many parents choose to abort.

Governments have been aware of this problem for some time, and countries with high sex ratios at birth like China, South Korea, India, Nepal, and Vietnam have enacted laws to restrict the use of ultrasound and other technology for sex-determination purposes. In China, there are nominal laws outlawing sex-selective abortion, but how well these laws are enforced varies widely. Abortion itself is legal in China, and it can be difficult to prove that an abortion is undertaken for sex-selective purposes rather than for family planning, making it effectively impossible for laws against sex-selective abortions to be enforced. This contributes to the imbalance of sex ratio at birth. Despite laws on the books banning sex-selective abortion, the sex ratio at birth in some rural parts of China can get as high as 140 males born per 100 females (*Selecting Sex: The Effect of Preferring Sons - ClinicalKey*, n.d.). The use of ultrasound technology for sex-determination is therefore contributing to fewer female births and the massive demographic problems China is facing. The phenomenon has a name: “missing women,” women who are missing because they were not born. It is estimated that 30-40 million women are “missing” from the Chinese population today as a result of son preference and sex-selective abortion (Barr, 2019).

It is difficult to quantify the demographic damage caused by the “missing women” phenomenon, because it is difficult to make accurate statements on demographics in China, due to the Chinese government’s secrecy with records. However, one area that is sure to be affected by missing women is the marriage market. If there are fewer women, then men will have fewer opportunities for marriage, referred to as “marriage squeeze” (Jin et al., 2015). Not only will there be fewer opportunities for men to get married, some men will never be able to get married

and are known as “involuntary bachelors” (Jin et al., 2015). These are “never-married men who want to get married, but cannot do so at a marriageable age because of their low socioeconomic status” (Liu et al., 2014). It is important to point out that it is the lowest socioeconomic status men who are hit hardest by this fact, as higher position men have a better chance to get married to the relatively smaller number of women. By 2030, it is estimated that 25 percent of Chinese men in their late 30s will remain unmarried due to the missing women phenomenon (Barr, 2019). With Chinese culture being very marriage-focused, these unmarried men are socially marginalized in addition to being unable to benefit in their personal lives from marriage (Shuzhuo et al., n.d.).

A lack of women also fuels the human trafficking industry. Some of these families and men with no marriage prospects turn to marriage brokers, some of which are fronts for human trafficking (Barr, 2019). Traffickers in countries like Myanmar promise higher-paying jobs to internally displaced women and smuggle them across the border into China, where the family who bought them expects them to become the wife of a Chinese man (Barr, 2019). The family does not always initially know they are purchasing a trafficked woman, but once they find out, they rarely let her go free. Trafficking victims suffer horrible crimes and are kept in captivity, often forced to bear their new husband’s child. Many trafficked women try to escape. Some are helped by Chinese police to return home, but others are jailed for immigration violations (Barr, 2019). Those that do escape often have to leave their new child with the family who bought them, leading to an unimaginable state of emotional distress. It is not known the number of women trafficked from Myanmar to China, according to the Myanmar Human Rights Commission, 226 women were trafficked to China in 2017 (*Bride Trafficking and The Chinese*

Gender Gap - Peace for Asia, 2021). The real number is likely much higher. The lack of women in China has far-reaching consequences, even beyond the borders of China itself.

While it is easy to point out the visible demographic problems associated with the “missing women” phenomenon, it is important to point out that the ones who are most affected are invisible. The women themselves were not born and are therefore unable to advocate for themselves.

Perspectives and Argument

In certain Asian countries, even today, knowing the biological sex of the child can dramatically change the likelihood of keeping it. In China, this effect has been magnified over time, so that the number of men greatly outnumbers the number of women (Barr, 2019). Mathematically, demographically, sex-selective abortion plays out on a massive scale. Twenty years ago in Korea, another country with a traditional son preference, nurses would not tell mothers the sex of their child for fear that, if the child turned out to be female, the mother would choose to undergo an abortion. In fact, this was put into law: in 1987, South Korea prohibited physicians from revealing the sex of infants to parents before birth (*South Korea*, n.d.). How would the doctors and nurses be able to tell the child’s sex? Through a fetal ultrasound. Thus, if we consider an act utilitarian frame of ethics, where the outcome is the only thing that matters in the morality of an action, telling the mother the sex of her child is an act that has moral significance, and the decision to do so depends on what she might do with that information. If the mother intends to abort if the fetus is female, then in order to prevent sex-selective abortion, the nurse should not tell the mother the fetus’ sex. On the other hand, if the mother does not intend to abort if the fetus is female, there will be no repercussions to telling her the sex of her baby. However, since it is not possible to know the intent of the mother before telling her, the

government of South Korea made the blanket decision prohibiting physicians from telling mothers that information. Ethically, this decision follows the utilitarian framework because the good of saving lives from sex-selective abortion is greater than the good that comes from parents knowing the sex of their child.

This utilitarian approach to laws and their effects is completely different from that of a rights-based legal system, which the United States has somewhat retained. It is interesting to point out that in 2008, South Korea overturned the 1987 ban on physicians revealing the baby's sex as unconstitutional, which may serve to show the cultural effect that the US has had on the country (*South Korea*, n.d.). In a rights-based legal system, the effects of laws are not considered as important as the freedoms granted to entities, whether they be individuals, corporations, or states. In a culture where sex-selective abortion is rare, the entire conversation of whether the nurse should tell the parents the sex of their child seems irrelevant. If a patient goes to the hospital in the US, the doctor is ethically and legally bound to tell the patient about their treatment, including the right to know information about their body. In the US, if a pregnant mother past 19 weeks of gestation undergoes an ultrasound scan, there is no doubt that she will be told the sex of her baby if she wants to know. However, the legal system of the US is not purely rights-based and does take into account the effect of laws. For example, it has been legislated that any person under the age of 21 should not be able to purchase alcohol. This is a restriction on the freedom of individuals, but the US legal system has decided that this restriction is worth making, due to the dangers of youth combined with alcohol. It is reasonable to imagine that, if the US was a culture that had rampant sex-selective abortion, the US legal system would put into place a mandate similar to that of South Korea.

Sex-selective abortions are not the only ultrasound-related medical repercussions that can affect the success of the pregnancy. Many physical birth defects and disabilities are diagnosable early in pregnancy by ultrasound imaging, such as Down syndrome and heart defects (*Diagnosis of Birth Defects* | CDC, 2022). Where abortion is legal, there is a decision that can be made to abort after finding out through ultrasound that the fetus has a deformity or a serious illness. The parents have to weigh the very difficult hardships of having a disabled child with their ethical and moral reasonings regarding abortion. Regardless of the choice the parents make, the reason they have the information about the child's condition is because they used ultrasound scanning technology. From a utilitarian framework, an anti-abortion advocate will have a negative view of ultrasound technology in this context, as it is the ultrasound technology that is uncovering the disability that can lead to abortion. In other words, ultrasound technology is enabling abortions through showing the parents that their child will likely have a disability.

This conflicts, however, with the policy of mandated ultrasound viewing before abortion, which many anti-abortion activists have pushed for. In some states in the US, if a pregnant woman desires an abortion, healthcare providers are obligated by law to use an ultrasound machine to show her the fetus inside her. Although ultrasound is nominally a non-invasive procedure, forcing a woman to go through a medically unnecessary procedure seems strange. The intended purpose of such legislation is to cause pregnant women to reconsider their desire to have an abortion once they see the living creature inside them. However, the majority of women who seek abortions are sure of their decision and report no change after ultrasound viewing (Evaluating the Impact of a Mandatory Pre-Abortion Ultrasound Viewing Law: A Mixed Methods Study - PMC). The mandatory viewing legislation has not at all been successful in its aim, and its primary effect is to cause further trauma to women who undergo abortions. This

added trauma that women who choose abortion undergo is unlikely to change the mind of a supporter of this law: in their mind, women who choose abortion should feel trauma, as a result of their negative actions. Also, even one life saved as a result of the mandatory viewing law outweighs the psychological damage done to women who choose abortion, in the mind of the anti-abortion advocate. To a true utilitarian, there is a balance between ultrasound aiding abortions in the case of fetal disability and hindering abortions in the case of mandatory viewing by the mother. It is not clear where this balance lies, because the effect that ultrasound technology has on the cumulative result of individual decisions is not an easy thing to study. The wider societal battle about abortion is spilling out into the microcosm of ultrasound technology, where non-medically necessary ultrasound scanning is mandated before the medical procedure of abortion.

Approaching this topic from the standpoint of care ethics necessitates a much less quantitative approach. The standpoint of care ethics hold that caring should be a very highly valued activity in society, if not the most valued (Herring, 2019). Yet, what it means to care is not fully defined or understood. In lieu of a definition, Herring provides four hallmarks of care: meeting needs, respect, responsibility, and rationality (Herring, 2019). The mandatory viewing law can be seen from different angles when viewed in a care ethics framework. On the pro-abortion side, there is very clearly a need felt by the pregnant women to not be a mother, or else she would not be seeking an abortion. As for respect, responsibility, and rationality, it seems very unlikely that she feels respected by this law, or that she does not rationally know the course of action that she is taking: ending her unborn child's life. The strongest argument for the mandatory viewing law, taking into account care ethics, is the need to have the woman seeking abortion understand exactly what she is doing, which is part of informed consent. This respects

her by treating her as a moral actor, that is, one who can rationally make decisions regarding her responsibilities. The decision to abort is undoubtedly a painful one, however, and it would probably be less psychologically painful to not think about one's own role in it. This brings up a difficult question. Is it more caring to force someone to be responsible for their actions and their consequences, as a rational, responsible adult, or is it more caring to assuage their feelings and meet their needs through what is undoubtedly a traumatic process? This is where Carol Gilligan's ethics of rights versus the ethics of care comes in (Kroeger-Mappes, 1994).

What is often left unspoken in rights-based societies is the need for responsibility given those rights (Sevenhuijsen, 2000). From a rights-based standard of ethics, there is no right without responsibility. In the US, one has the right to free speech, but even this right is curtailed. Speech that directly leads to harm is illegal; one cannot yell "fire" in a crowded theater. Many pro-abortion advocates support the idea of women's "right to abortion," but, given that, what would such accompanying responsibilities be? It seems to me to be reasonable that one of these accompanying responsibilities should be, in full knowledge, choosing their course of action. For both women who regret and who do not regret their abortions, this makes it clear exactly who chose the action. For those women who regret, this seems cruel, but is actually empowering. Recognizing that one's decisions are one's own brings agency, which can be a tremendous positive in one's life.

The pro-abortion position is strained, but not impossible to support from a care ethics perspective. If one takes that caring relationships are to be valued above all else, it follows that uncaring relationships, such as that between an unwilling mother and fetus, can be terminated in favor of caring relationships (Herring, 2019). It is this perspective that states: where a "relationship is not marked by care, then it does not have moral value, and the law should enable

the parties to find other caring relationships” (Herring, 2019). It is only by abstracting from the person entirely and viewing them only as a node on which relationships can fit where this reasoning makes sense. It is important to note what this perspective leaves out. The right of the individual to life, and rights in general, are de-emphasized from this framework. Rights are not attributed to persons because of their nature or personhood, but instead are attributed in relation to a relationship (Herring, 2019). From this perspective, there is no one so amoral as a hermit, who has no caring relationships. Care ethics’ strong stance that caring relationships are the only moral currency is strained by what it leaves out: the rights and value of the individual. There must be a compromise between rights and care, the scope of which is outside this paper.

Ultrasound and the Family

From Oxford Languages, a family is “a group of one or more parents and their children living together as a unit.” Therefore, the first time a couple sees their unborn child through ultrasound is the first time each parent has seen the child, and then their partner, together, as separate beings. From the father’s perspective, knowing that there is a child growing inside your partner is a different experience than seeing the child, albeit a fuzzy image of it, and undergoing the realization that you are going to be a father, with all of the responsibilities that come with it (Draper, 2002). Similarly, from the mother’s perspective, feeling the baby must be different from seeing the baby: while one sensation is internal, another is external. These experiences gained during the fetal ultrasound scan are incredibly powerful in creating the idea of family in the parents’ minds, which goes on to influence the family they will become.

In the Western world, ultrasound scans are a common part of pregnancies, even though in most cases they are not medically necessary (Roberts et al., 2015). Commercial ultrasound providers fulfil this need, with hospitals not being the appropriate place for non-medically

necessary scans. It was found that pregnant women undergo commercial ultrasound scans for five reasons: finding out the sex of the fetus, reassurance, seeing the baby, acquiring keepsakes, and facilitating bonding (Roberts et al., 2015). It is often said that ultrasound is the “baby’s first picture,” and the ultrasound scan is viewed similarly, as more of an event than a medical procedure. Although ultrasound is non-invasive, the use of advanced medical technology for an essentially recreational purpose is worthy of note. The reasons that women undergo commercial ultrasounds are illuminating: despite our increasingly egalitarian society, there is still a strong cultural push towards finding out the sex of the fetus. One need only look at the cultural prevalence of “gender reveal” parties to confirm how strongly biological sex plays a role, not only in the socialization of infants themselves, which corresponds to their interactions with society, but also in how society interacts with infants. A little boy will be treated differently than a little girl, the nuances of which are sometimes subtle. Finding out the sex of the baby is only relevant if there is some significance to that information: how the baby is going to be treated when it is born and raised.

Conclusion

Picturing the physicality of the ultrasound probe, it is difficult to imagine the sweeping social forces it leaves its mark on. A tool for scanning and imaging the human body has integrated itself into societal culture regarding pregnancy and, through that, the social creation of personhood. Ultrasound technology can reveal sex, which has implications on how infants will be treated. The abortion debate has pulled ultrasound technology into a tense ethical discussion regarding rights and responsibility, care and compassion, and how to integrate these two seemingly opposing ethical frameworks, if even it is possible to do so. Utilitarian balances of lives saved and lost, decisions made and changed, are crucial to understanding the anti-abortion

position, and how ultrasound can point in either direction depending on the situation: towards abortion in its use diagnosing disability, and away from abortion in the context of mandatory viewing laws. In terms of concrete damage that ultrasound sex-determination technology has played a part in, the “missing women” phenomenon in China is a tremendous demographic problem for the country. Countless Chinese men will never have any marriage prospects, which will have strong implications on their social standing. The damage is not limited to China, however, with missing women fueling human trafficking in neighboring countries like Myanmar. At the root of this, policies have been enacted to combat sex-selective abortion, with legislation having been made to outlaw it directly, and to make it impossible through physicians being prohibited from telling parents the sex of their baby. From all of these effects, the humble ultrasound scanner has had a powerful influence on society, culture, and the world. There is no technology without a social aspect, and ultrasound is no exception (Bijker et al., 1989).

Bibliography

- Åhman, A., Edvardsson, K., Fagerli, T. A., Darj, E., Holmlund, S., Small, R., & Mogren, I. (2019). A much valued tool that also brings ethical dilemmas—A qualitative study of Norwegian midwives' experiences and views on the role of obstetric ultrasound. *BMC Pregnancy and Childbirth*, 19(1), 33. <https://doi.org/10.1186/s12884-019-2178-x>
- Barr, H. (2019). "Give Us a Baby and We'll Let You Go." *Human Rights Watch*. <https://www.hrw.org/report/2019/03/21/give-us-baby-and-well-let-you-go/trafficking-kachin-brides-myanmar-china>
- Bijker, W. E., Hughes, T. P., & Pinch, T. J. (1989). *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. MIT Press.
- Bride Trafficking and The Chinese Gender Gap—Peace for Asia*. (2021, April 5). <https://peaceforasia.org/bride-trafficking-and-the-chinese-gender-gap/>
- Care Ethics* | *Internet Encyclopedia of Philosophy*. (n.d.). Retrieved February 22, 2023, from <https://iep.utm.edu/care-ethics/>
- Diagnosis of Birth Defects* | *CDC*. (2022, June 16). Centers for Disease Control and Prevention. <https://www.cdc.gov/ncbddd/birthdefects/diagnosis.html>
- Draper, J. (2002). 'It was a real good show': The ultrasound scan, fathers and the power of visual knowledge. *Sociology of Health & Illness*, 24(6), 771–795. <https://doi.org/10.1111/1467-9566.00318>
- Figure 1.9 Sex ratio at birth, 1982–2017*. (n.d.). Retrieved February 12, 2023, from <https://www.unicef.cn/en/figure-19-sex-ratio-birth-19822017>
- Herring, J. (2019). Ethics of Care and the Public Good of Abortion. *University of Oxford Human Rights Hub Journal*, 2019, 1–24.

- Jin, X., Guo, Q., & Feldman, M. W. (2015). Marriage Squeeze and Intergenerational Support in Contemporary Rural China: Evidence from X County of Anhui Province. *The International Journal of Aging and Human Development*, 80(2), 115–139.
<https://doi.org/10.1177/0091415015590304>
- Kroeger-Mappes, J. (1994). The Ethic of Care vis-à-vis the Ethic of Rights: A Problem for Contemporary Moral Theory. *Hypatia*, 9(3), 108–131.
- Latour, B. (1996). On actor-network theory: A few clarifications. *Soziale Welt*, 47(4), 369–381.
- Liu, L., Jin, X., Brown, M., & Feldman, M. (2014). Involuntary Bachelorhood in Rural China: A Social Network Perspective. *Population, English Edition*, 69, 103–125.
<https://doi.org/10.3917/pope.1401.0103>
- Roberts, J., Griffiths, F. E., Verran, A., & Ayre, C. (2015). Why do women seek ultrasound scans from commercial providers during pregnancy? *Sociology of Health & Illness*, 37(4), 594–609. <https://doi.org/10.1111/1467-9566.12218>
- Selecting sex: The effect of preferring sons—ClinicalKey*. (n.d.). Retrieved February 12, 2023, from <https://www.clinicalkey.com/#!/content/playContent/1-s2.0-S0378378211002763?returnurl=https:%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0378378211002763%3Fshowall%3Dtrue&referrer=https:%2F%2Fen.wikipedia.org%2F>
- Sevenhuijsen, S. (2000). Caring in the third way: The relation between obligation, responsibility and care in Third Way discourse. *Critical Social Policy*, 20(1), 5–37.
<https://doi.org/10.1177/026101830002000102>
- Shuzhuo, L., Qunlin, Z., Xueyan, Y., & Attané, I. (n.d.). Male Singlehood, Poverty and Sexuality in Rural China: An Exploratory Survey. *Population*, 65(4), 679–693.

South Korea: Doctors Can Disclose Gender of an Embryo. (n.d.). [Web page]. Library of Congress, Washington, D.C. 20540 USA. Retrieved March 24, 2023, from <https://www.loc.gov/item/global-legal-monitor/2008-09-05/south-korea-doctors-can-disclose-gender-of-an-embryo/>

Utilitarianism, Act and Rule | *Internet Encyclopedia of Philosophy.* (n.d.). Retrieved February 22, 2023, from <https://iep.utm.edu/util-a-r/>

“When Technology and Tradition Collide: From Gender Bias to Sex Selection,” Fact Sheet. (n.d.). PRB. Retrieved February 12, 2023, from <https://www.prb.org/resources/when-technology-and-tradition-collide-from-gender-bias-to-sex-selection-fact-sheet/>