



# Sex, Science and Equity

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## 'Sex Politics' in Science

At present, the push for the rights of transgender and non-binary people is at the front of the political debate and has brought the science community into the discussions. Healthcare in particular has been a central focus and the evidence to support gender-affirming care. However, underpinning these discussions is a Western view of the world that has been cloaked in objectivity and universalism. The role of science in sex/gender equity has been political in Western society for many years but especially in the last 10 years. However, its foundation goes back to the beginnings of Western society and Western science. These heterosexist ideas were held by many of the greats that have been looked to including Aristotle, Hippocrates, Galen, Plato, and so on. Their ideas of what sex should be [1] still persist in our imagination today.

To improve equity in science, especially surrounding sex/gender, it is critical to have a complete understanding of how we got to the current place, and how populations such as intersex and transgender people are impacted in the current equity system in science. This piece will focus on intersex people and how they have not been contemplated in the notion of equity in science. Intersex people, formerly known as hermaphrodites, are also referred to as people with variations of sex characteristics or people with a disorder of sexual development.

Before discussing intersex people and equity in science, first it is necessary to provide some background. How did the terms of sex and gender become mainstreamed? What impact has this had on intersex people? Then, the current understandings of equity in science and the implications for intersex people can be analyzed.

## Sex and gender in science

Though not always respected, there has been recognition of hermaphrodites/intersex people for more than 2000 years, as there

was of males and females [1]. Aristotle was noted as referring to the "feminine nature of hypospadias, saying of such patients that they seemed to have the nature of man and woman at the same time" (p.818) [2]. The knowledge of sex and how it was understood within society has changed overtime. In science and medicine females were first seen as the inverse of males in the one-sex model by the early Hellenist scientists. It was not till the beginning of the two-sex model that females were seen as not just the inverse of males, but as different [1]. Though women have not always had the same respect as men, they have been more included and recognized in Western science. The same cannot be said for hermaphrodites/intersex people who were either put to death or forced to assimilate into the two-sex world [1-4]. However, as science was discovering the greater diversity in sex and its various aspects, it became more complex to fit sex into the male-female binary beyond an ideological 'reproductive' basis. Sex was in crisis [5]. The term sex could no longer hold the boundary of the two-sex model. To maintain the two-sex model, a new institution was required.

The savior of this new institution was Dr John Money. With his research in intersex children (hermaphrodites), he came up with an idea of 'gender' [6,7]. According to Money, gender was a way to determine an intersex child as male or female in their social role and orientation. Where necessary the medical professionals would adjust their body to the assigned gender. The notion of gender, as established by Money, was critical to maintain the Western two-sex institution. Gender was extended by Dr. Robert Stoller who was working with transgender people (formerly referred to as transsexuals) who introduced 'gender identity' and the 'sex-gender split' [8,9]. Gender identity referred to a person's internal, psychological, sense of self as a male or female [8]. The sex-gender split indicated that sex, the biology, was determined at birth, and apart from some health issues that may arise, sex was virtually

superfluous and was beyond critique [8,10,11]. The sex-gender split has become the standard view, including in science. Gender serves to reinforce the idea that sex represents the raw material more fully elaborated and maintaining the binary of social production and reproduction of male and female identities and behaviors [8,10,12-14]. Biology had little impact on sex role differences [10,11] and was rendered passive and oppositional to the active category of cultural gender [10]. Sex over the last twenty years has been relegated to health issues that arise but has little impact in the day-to-day lives of people in society. These concepts have infiltrated and become normalized within medicine and were introduced into the public sphere by feminists which has now been main-streamed [10-16]. These ideas remain.

Superficially today, sex and gender have superficial differences in meaning. For example, “sex” refers to ‘biology’ and “gender” refers to self-representation influenced by social, cultural, and personal experience [17]. Even in science, it is not uncommon for these terms to be used interchangeably with gender as a focus. In reality, the conflation of meaning is by design, not by accident. In reality gender is now the central notion of understanding males/men and females/women and today gender-diverse people. Gender is more than a term; it is an institution. What is lost in conversations, even amongst discussions in the sexual minorities’ community, is the impact that the institution of gender has had on intersex people [18]. Gender was never an inert, objective term but an institution to erase a population and forcibly assimilate them into society. In doing so, it also denied the notion of sex (identity) as a unifying concept, containing the biological and the social/psychological sides of a person’s world has been displaced with a reductionist basis of a sex, gender, and sexual orientation.

## Sex (and Gender) Equity in Science

Given the background, it is now important to consider equity and science. There are several issues to consider regarding equity in science: (1) representation in the field of science (as in the workforce) and (2) how data represents sex and gender. Though it is usually analyzed in terms of women and men, the analysis will use intersex people (hermaphrodites) as the illustrator.

### Representation in staff

The current consideration of equity in science refers to the balance of gender - males and females - in the science profession (including those teaching science). Although there is a growing push for greater balance in representation, there is more work to do. Women have not achieved an equal balance as yet. UNESCO noted that women still account for only 28% of engineering graduates and 40% of graduates in computer science and informatics [19]. The gender gap widens as women progress in their academic careers, with lower participation at each successive rung of the ladder from doctoral student to assistant professor to director of research or full professor [19]. However, diversity is broader than male or female. There are intersex and transgender people who are minority populations but deserve equity representation in the workforce. At present few studies or analyses are provided for these minority populations. In saying that, hermaphrodite/intersex

people are not yet recognized as equal in recognition as male or female, let alone them being represented in the sciences.

## Representation in Information and Data, and Research

A larger and important critique focuses on data and information, especially in research. Many analyses focus on sex or gender. In fact, it is one of the most widely used standards of analysis. However, do these analyses represent the minority population, intersex and transgender people, as well the majority? To improve equity in science research, the European Association of Science Editors (EASE) established a Gender Policy Committee in 2012 to develop guidelines for reporting of sex and gender equity in research (p.3) [20]. The aim of the Committee is to standardize the reporting and to enable an equity analysis in research [20]. These came to be known as Sex and Gender Equity in Research (SAGER). The idea was to avoid confusion of these terms which often became conflated. Appropriate use would improve the ability to conduct meta-analyses of published and archived data.

These guidelines have prescribed a process to decide whether sex, gender, both or neither are relevant in the scientific investigation [20]. Sex indicates a classification of male or female based on biological distinction to the extent that this is possible to confirm - based on self-report or assigned following external or internal examination of body characteristics, or through genetic testing or other means [20]. Gender indicates the socially constructed roles, behaviors, and identities of female, male and gender-diverse people [20]. The SAGER guidelines recommend careful use of the words sex and gender in order to avoid confusing both terms. Both terms, sex and gender as, used here perpetuate the historical background that science and medicine have used to erase the idea of intersex and ensure the binary structures, even if there is a more diverse acceptance from a social perspective under ‘gender’.

First is the lack of understanding of the terms sex and gender, and how and why they came into being [10,11]. They are often portrayed in simplistic terms that obfuscate the foundations of the term gender and its cause for establishment. Ignoring these foundations can lead to harm for an entire population such as intersex people [18]. Noting that today’s gender is diverse, and not just binary and does not change its very foundations and purpose. Secondly, it continues to make intersex people invisible. It ensures that where recognized, they are only recognized in their medicalized form and where intersex is a pathology or a disease to be fixed, cured. It ensures that the Western world view continues and is furthered through the institution of gender. It forces other cultural understandings to understand themselves through the Western institution of gender.

Thirdly, science bounces between biology as an essentialist (biological determinist) ideal or as a social constructionist positioning [20]. Both are problematic from an equity and a science perspective. Both perspectives also hinder scientific analysis and innovation with inaccurate understandings of sex/gender. Both have the issue of disembodied people from their personhood and the interconnectedness of biology with the social environment. The only existence intersex people can have is as people with ‘variations

of sex characteristics (as anomalies), and only understands these (intersex) people as a person with a 'gender identity' as Money and Stoller established.

## Conclusion

If equity is to be effective and enhance all people, it must acknowledge the background of institutions such as 'gender'. The current SAGER guidelines for reporting of sex and gender equity ignores a population, intersex people, that is at least 2.3% of the overall population [21], possibly even higher. Moreover, basing sex on self-identification or 'assignment at birth' limits how accurate analysis based on sex is. Few people have been tested for their chromosomes, hormonal system, and so on, which can be diverse. When a 'sex box' is ticked, it is what was noted on the person's birth certificate. If testing was done, it has the potential to provide different results for research into pharmaceuticals, health issues, for instance. Ensuring intersex people are represented within equity of science is not only a human rights issue that overcomes the denial of their personhood and being for hundreds of years, but also recognizes how institutions such as gender have impacted them by denying their sex(ual) identity. By rectifying the issues imposed by the introduction of gender, this not only improves equity of people, but also equity and benefits of data and information for science and research. It will strengthen and make the research more accurate for health or innovation and other fields while also enhancing personhood.

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## Conflict of interest

No conflict of interest.

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