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Biological Perspective from Neurosciences on Gender Dysphoria and Transsexualism

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Introduction

Being a woman or a man is a very relevant aspect of ourselves, configuring our behavior and preferences and also the social expectations. Transsexualism, the most extreme form of Gender Dysphoria, is an individual's unshakable conviction of belonging to the opposite sex than the chromosomes say, which often leads to a request for expensive and painful sex-reassignment surgery and hormonal treatment for life [1,2]. Transsexual people desire to live and be accepted, that is dressing like and being included in groups of like-minded people, as a member of the gender opposite to that assigned at birth Figure 1 [3].

Persons experiencing gender dysphoria need a diagnostic term that protects their access to medical-health care and will not be used against them in social, occupational or legal areas. Gender dysphoria (GD) is a DSM-5 diagnosis that was separated from sexual dysfunctions or paraphilic disorders. However, the difficulty in providing healthcare and clinical care for this diagnosis lies in the fact that people with gender dysphoria do not feel ill, because identity can not be an illness. A non-pejorative term that keeps alive the flame of medical care, social sensitivity and human respect. In other words, "insult me if you wish, but give me my medical treatment and healthcare."

From a biological perspective, gender identity is established in the brain prenatally during fetal development and under the influence of certain genetic and/or hormonal factors. Under the microscope some brain structures in transexual patients are more similar to those of the gender which they identify than to those of their genetic sex assigned at birth [4]. Consequently, it makes no sense to invest in chemical-pharmacological or mechanical-physical therapies from a psychiatric perspective which are aimed to change their identity, because that is an intrinsic and permanent biological characteristic, not a choice or a purely psychiatric disorder. The brain is already defined at birth for gender identity. Nevertheless, the care and counselling of professional Psychologists who sustain the biologicism of gender identity is more than convenient in terms of better transitional processes Figure 2. When puberty or adolescence arrives, the hormonal surge could activate the brain circuit of gender identity towards the one previously established during gestation.

There are a number of reasons to logically consider sexual orientation and gender dysphoria as different processes in our brains [4]. For instance, it is widely accepted, since Kinsey's scales, there are many grades in sexuality, defined as a continuum from 0 to 6, from exclusive heterosexual behavior to exclusive homosexual behavior. While for transexualism there are only two categories (male to female -MtF- and female to male -FtM-). Although inside the gender dysphoria a third one can be also considered in cases of gender indeterminacy at birth [5-8].

Usually, the gender assigned at birth is that one corresponding to the chromosomal information because the vast majority of the world´s population experience a match between their genetic sex and their gender identity. But in a small minority, some dissonance exceptions in specific cases might happen (in demographic studies 1-2% of the general population) [9]. That is the reason why this genetic criterion is used because these two parameters (chromosomes-gender) are practically equivalent and always correlated in the animal kingdom [10]. However,

even the self-identity or self-recognition as the image of their own individuality reflected on a reflective surface of a mirror is not a widespread ability in the animal group: it clearly happens only in higher mammalian species with brains of a precise size and in specific habitats [11]. Transsexualism, as a particular feature of hominid identity, is an inherently humanoid property which is attached to the particular resources of our evolutionarily larger, social and visual brains Figure 3. Therefore, the study and research of transsexuality as an extreme manifestation of gender dysphoria become essential to broadening our understanding of gender male and female and, consequently, of our own human nature. This study and research also aim to protect and support transgender and/or gender dysphoric people, expanding our knowledge to a better understanding for caring for them.

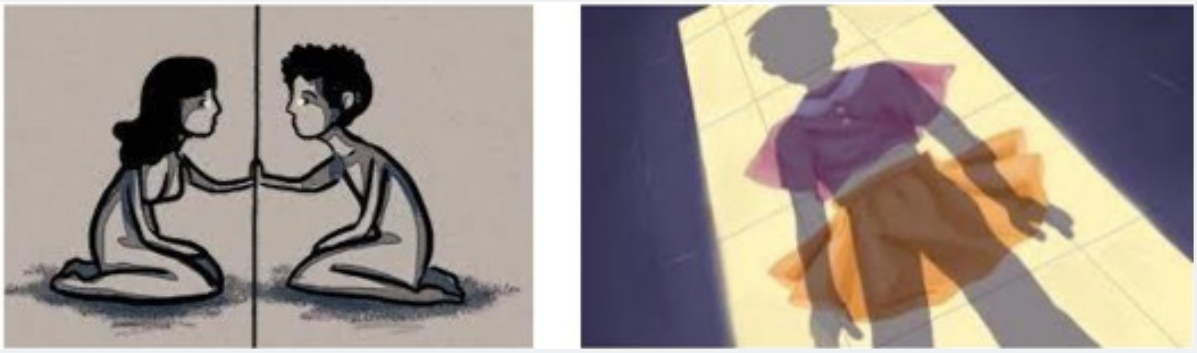

Figure 1: This drawing represents the feeling of gender nonconformity experienced by people with dysphoria, in terms of intensity, frequency, and duration, within the clinical parameters of the diagnosis.

Figure 2: These comics are ironically highlighting the senselessness of unlimited human intervention in determining people's gender, since the percentage of patients with dysphoria is very small in the general population. Gender identity is an intrinsic and permanent biological characteristic, established before.

Regardless of how and despite this unique human trait nature, there is still much confusion surrounding transsexualism because of its dissertation's huge complexity. That puzzlement to the extreme might conducts to patient maltreatments, such as emotional, physical or sexual abuse and/or neglect toward gender dysphoric patients [8,12]. Similarly to other marginalized populations in minority, transgender patients recurrently experience discrimination in their healthcare setting: commonly and unfortunately, they may not have access to medical balanced professionals who can provide competent care [13]. Moreover, and through history, concepts of feminine and masculine have been modified as it is noticeable in the questionnaires and tests that try to quantify those traits [14].

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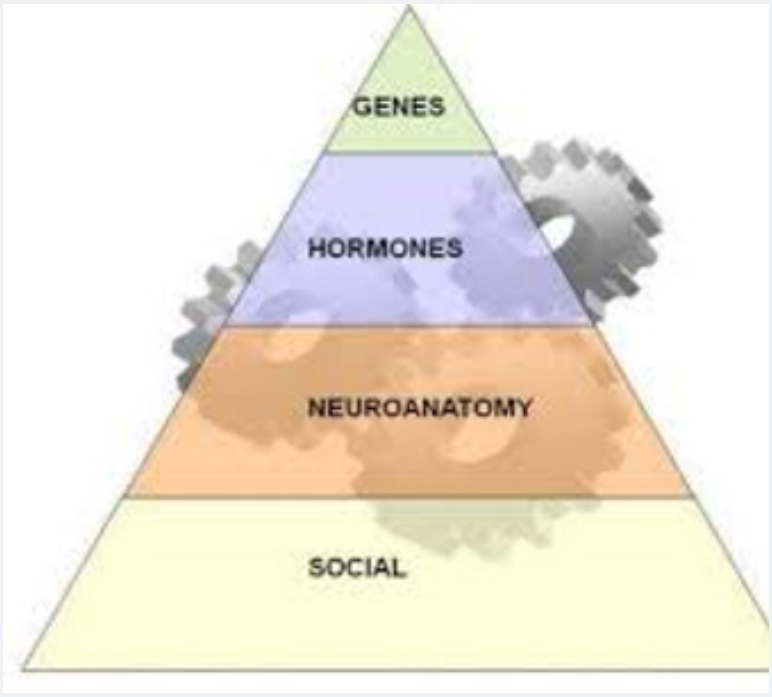

Figure 3: This diagram represents the hierarchical, stratified, and iceberg-like organization of the components that make up gender identity. Thus, although society occupies the largest space, it is the last to have a significant impact on gender identity, which is established prenatally in the brain, due to genetic, hormonal, and neuroanatomical factors and is not a purely social construct.

Not far away in time (1991), with psychoanalytic approaches, male to female transsexualism was understood as a simply deep hatred towards the masculine [15]. Nevertheless, even with those former reductionist perspectives, there were incomprehensible contradictions: when the causes of transsexualism were thought to be defence and detains development, no defence mechanism could possibly exist, because they (detains defense) were not likely to be linked or happening at the same time, since they are organically discordant systems [15]. Transsexuality, inevitably and irremediably, highlights the struggle between the sexes in human beings, like between two different sports teams. This struggle changes meaning when takes place within the same person: during fetal development in its embryonic stage (weeks 4-6 of gestation), the bipotential gonad is directed toward one gender or the other (depending on the presence or absence of the SRY chromosome, code 1-0, testes or ovaries), but the remaining organs, including the brain, can follow alternative paths due to alterations in hormone levels and/or the expression or non-expression of other specific genes yet to be determined.

State of the Art

As we stated earlier, gender dysphoria is not very common in the general population. About 0.17 to 1.33 cases every 100.000 newborns worldwide [16]. The prevalence for male-to female (MtF) is estimated at 1: 10,000-45,000, while the female-to-male (FtM) is 1: 30,000-200,000, which are certainly small proportions. The ratio is bigger in the MtF cases compared to the FtM (3:1 vs 4:1) [17]. Moreover, gender dysphoria diagnostic and reassignment clinics are usually located then provided only in large cities, so that, although the treatments might be paid for by the state health system, only a very small percentage of the population has access to this healthcare. Consequently in rural areas, with few populations, or with old mind demeanours, are left out. Continuing with this funnel shape, for instance in Spain and along 10 years of care, a total of 457 adult cases arrived at the hospital asking for gender reassignment treatments and providing their personal clinic historical information. Within those person, 66 cases (14.4%) were missed due to false positives, one suicide, and other diagnostic exclusion criteria. The remaining cases (391) are still receiving treatment [18].

The psychological state of established gender dysphoria patients is still being studied. In some cases, defined psychological diagnoses are imprecisely given to exclude gender dysphoria prognosis. In the psychiatric field, requiring medication to heal, it has been shown in several countries that people with gender identity disorder present more psychiatric problems compared to the general population such as affective (depression, bipolar disorder), stress or anxiety response syndrome, etc. [19]. Those psychiatric problems are considered as priority to be treated, precluding the explicit management of gender dysphoria [20]. In other cases, the psychological assessments are mainly focused

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on the family of the patients instead of the patient itself. With the purpose of optimizing family support, helping them to better cope with the new changing situation and gender-related decisions [16,21].

Nonetheless, some specific psychological states do occur in gender dysphoric patients and in the general population but they have not received much attention for enhanced therapeutic counselling. Recently it has been Scientifically proven that transgender patients do not want to see the shape bodies of their gender assigned at birth (genetic bodies) and subsequently "deactivate" somehow their visual path when pictures of that gender are shown [21]. The transgender group activates exactly the same brain areas as control groups when looking at body shapes that fit with the opposite gender bodies to their genetic ones. Control groups do the same when looking at their own genetic body shapes. But when cognitive contradiction is high, transgender groups have learned somehow to close that neural visual path not activating the little area surrounded or located in the optic chiasm and the oculomotor nerve. This psychological mechanism of concrete denial could be of adaptive use for them to cope with difficult situations concerning the mirror image. However, when denial encompasses an entire past within a life, in which they belonged to their genetic gender, this adaptive functionality might not be as psychological beneficial. Moreover, the optic chiasm, surrounding regions of these results and the oculomotor nerve information would need to be provided in MNRI coordinates, Z-max and cluster size (mm3) [21]. Neuroanatomical studies under the microscope have revealed some brain structures in transexual patients are more similar to those of the gender which they identify than to those of their genetic sex assigned at birth [4] Figure 4.

Psychological Traits for Gender and Questionnaires

Gender questionnaires are valuable and necessary tools for measuring gender identity as a quantifiable trait provided, they are based on neuroanatomical findings [14]. These questionnaires include, present, daily life and future projections inside each gender. The questionnaires collect basic psychological variables such as self-esteem. happiness when identifying as man or woman, comforts or discomfort with gender role behavior or secondary sexual characteristics, the perception of social treatment received in the gender role and future perspective regarding one´s own gender. The questionnaires attempt to quantify them using operational definitions and objective measures of frequency, intensity, and duration. The responses should provide guidance on the person's identity and should provide insights for determining the best possible clinical (medical-psychological) treatment to provide.

Currently the paths of gender identity and sexual orientation in the brain from the biological perspective are broadened and widely helping to understand and explain our nature depending on different hormones, their actions and reactions in a human lifespan. Consequently diagnosis, laws, treatments and social care should be according to these scientific neuroanatomic, biologicist and neuroscientific research results.

Conclusion

Interest in the scientific investigation and explanation of gender dysphoria and human transsexuality emerged very recently, during the 1980s, when scientific questions were closely linked to social movements. As is often the case, as we investigated, we realized that the questions multiplied with each small answer we found. Therefore, research on gender identity must be a constant priority in an evolved world adapted to our superior brain, with a larger and more complex cerebral cortex that allows us to have an elaborate self-concept that we recognize in the mirror.

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