ARE TRANSSEXUAL WOMEN
PRESENT
IN THE ACADEMIA?

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Abstract

This paper analyzes the frequency of post-operative transsexual women among the US and Italian members of the International Astronomical Union and in an academic professional society (the American Astronomical Society). Expectation from various estimates of the prevalence of transsexualism suggest that transsexual women are likely over-represented. While numbers considered in this study are by necessity small (3 transsexualism cases), and findings may not be easily extendable to the entire academic world, the observed frequencies can be explained if transsexual women have, on average, an intelligence quotient higher than that of the adult male general population.

I. Introduction

Transsexual women have, in several cases, achieved prestigeous positions in academic institutions in the USA and elsewhere. This precence – even if extremely rare – is striking, considering that transsexual women remain heavily stigmatized and marginalized in America and in Europe. In this paper we consider the expected and actual numbers of transsexual professional astronomers in America and in Italy.

II. Prevalence of Transsexualism

There is a considerable latitude of uncertainty in the estimate of the prevalence of transsexualism. Results from various studies until 1993 are reviewed by Landen (1999, p. 21-22). Prevalence of transsexualism, for M-F ranges from $p < 1: 2,900$ in the case of Singapore, to $p \sim 1:20,000$ in most European countries. These results have been questioned, since the estimated total number of post-operative transsexual (tsx) women in the United States indicates a prevalence $p > 1:2,500$ among adult males (Conway 2002). Considering the uncertainty in p, and

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the goal of this paper (see § IV), we adopt a prevalence value of $p \sim 1:2,500$, eventually discussing how our results change if $p \sim 1:10,000$.

In this paper we consider exclusively post-operative transsexual women. This limitation is clearly extreme; it allows only to set a firm lower limit on the prevalence of transsexual women among professional astronomers since (1) pre-operative transsexuals are ignored; (2) the number of "closeted" transsexual women is unknown; (3) we may not be aware of additional cases of post-operative transsexuals.

III. The Sample of Professional Astronomers

The International Astronomical Union IAU is the largest professional organization for astronomers worldwide. Membership is strictly on a national basis, and the basic professional requirement is the completion of some successful activity in Astronomy after Ph. D. obtainment. There are 2457 USA members of the IAU, of which 10.34% are women, leaving $\approx 2,200$ male astronomers. Considering the American Astronomical Society (AAS) members as a reality check yields similar results. The AAS is the largest professional astronomer society in the United States. The basic membership requirement is the obtainment of a Ph. D. in Astronomy. It has ≈ 4100 full members; ≈ 800 members belong to foreign institutions and are most likely not US citizens, leaving 3200 professional astronomers working in the US (not necessarily US citizens). If we consider that the frequency of women among the tenure track faculty in Astronomy is 12.2% (Lopez & Nelson 2004), there are $\approx 2,800$ members that are male professional astronomers working in US institutions which are AAS members. The two samples are expected to be largely overlapping. The slightly lower IAU numbers reflect the fact that the IAU members considered here are all US nationals. Regarding Italy, there are 443 IAU Italian members, 353 of which are males. The frequency of astronomers (per 100,000 adult males of age ≥ 30 yr) is < 3.6 from the AAS membership, 2.8 from the IAU membership from USA astronomers, and 2.0 for Italian astronomers from IAU membership. We therefore do not find order-of-magnitude differences between the occurrence of astronomers in Italy and the USA[2]. To increase the number of tsx women among astronomer N_{tsx} to 3 we consider together N_{tsx} for Italy and the USA, in a total AAS sample. We are aware that this total AAS sample is less rigorously defined than the previous ones.[3]

We note in passing that the "prevalence" of being an astronomer is smaller than the prevalence of being a transsexual: if we assume the conservative estimate $p \sim 1:10,000$) then we will have 10 transsexual women over 100,000 males; if we consider that the number of transsexuals in Italy has been estimated around 8000 (Italian nationals; Movimento Identità Transessuale[4]), we have a prevalence of 44 tsx women for 100,000 males ($\approx 1:2500$, interestingly close to the value given by Conway (2002) for the US.

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[2] Considering $\approx 77,000,000$ males of age ≥ 30 yr in the USA (US Bureau of Census, Census 2000) and $\approx 18,000,000$ in Italy (ISTAT, Censimento Generale della Popolazione e delle Abitazioni 2001), we obtain a frequency of 2.9 (IAU USA members) and 2.0 astronomers per 100,000 in the USA and Italy respectively.
[3] About 800 members of the AAS work in countries other than the US and Italy.
[4] It is unlikely that this estimate refers to post-operative transsexuals only; however, we assume this value of p since larger values of p tend to make our result more robust.

IV. Results

The expectation value of transsexual astronomers will be in general writable as $N_{tsx}^* = pN_{astr}$, where N_{astr}; are the numbers of professional astronomers in a sample. Table 1 summarizes the properties our samples and our results. If $p \approx 1{:}10{,}000$, N_{tsx}^* is always close to 0; if $p \approx 1{:}2500$, the $N_{tsx}^* \approx 1$ for US astronomers while it is still $N_{tsx}^* \approx 0$ for Italian astronomers. Since we have an actual number of transsexual astronomers $N_{tsx} = 2$ in the US, $N_{tsx} = 1$ case in Italy and 3 cases for the full AAS male population, the observed prevalence is always higher than its expectation values, with ratio ≈ 2 or larger if $p \approx 1{:}2500$.

Table 1

Sample	N_{astr}		N_{tsx}	N_{tsx}^*	$P(N_{tsx})$	Ratio[a]	N_{tsx}^*	$P(N_{tsx})$
	All	Males		$p{\approx}1{:}2{,}500$	$P{\approx}1{:}2{,}500$	$p{\approx}1{:}2{,}500$	$p{\approx}1{:}2{,}500, IQ{\geq}118$	
IAU Italy	450	350	1	0.14	0.12	7.1	0.0168	0.017
IAU US	2500	2200	2	0.88	0.16	2.3	0.11	0.0054
AAS US	3300	2900	2	1.16	0.21	1.7	0.15	0.0097
AAS	4100	≤ 3600	3	1.44	0.03	2.1	0.1728	$7.2{\times}10^{-4}$

[a] Defined as N_{tsx}/N_{tsx}^*, the ratio between the observed number of tsx astronomers and the one expected according to Poisson statistics.

Do these numbers (N_{tsx}^* and N_{tsx}) suggest a statistically significant excess? Table 1 provides the results of a simple application of the Poisson statistics. We see that the N_{tsx} do not appear to be highly significant above the expectation values if becoming an astronomer and being a transsexual woman are two processes randomly occurring in the general population. While there is no convincing *a priori* argument against this assumption for tsx women, the assumption is most likely invalid for astronomers. Professional astronomers are all Ph. D. holders. This means that the sample of astronomers is most likely restricted on the basis of the intelligence quotient (IQ). The distribution for the general population is known to be well-represented by a Gaussian function with maximum IQ = 100 and dispersion = 30 in the Stanford-Binet test (e.g., Wortman, Loftus & Marshall 1992, p. 427-434). We may consider only the upper half of the IQ distribution, simply lowering the prevalence of transsexual by a factor 2; or, more properly, we may consider the upper part of the Gaussian giving an average IQ = 125, which has been estimated by Stanford-Bennett as the average IQ of Ph.D. holders and medical doctors. Solving the equation below for an expectation value IQ* = 125, where the variable q stands for the IQ:

$$q^* = \frac{\int_{q_{min}}^{\infty} qP(q)dq}{\int_{q_{min}}^{\infty} P(q)dq} = 125$$

implies a $q_{min} = 118$. Only $\approx 12\%$ of the population has an IQ equal of higher than this value, making all expectation values even closer to 0 (see last column of Table 1). In this case, N_{tsx} is always significantly larger than N_{tsx}^*. The increase in tsx women over the expectation value by a factor of 2 can be explained if the Gaussian curves for the general population of adult male and that of transsexual women are slightly displaced. Assuming the same dispersion, a shift to a peak IQ = 107 accounts for our results.

V. Conclusions

This paper indicates that, among astronomers, *there are* transsexual women, with a frequency that is likely higher than that expected from the frequency of astronomers in the general population. However, the relative rarity of the transsexual phenomenon, and its highly uncertain prevalence makes it difficult to do a reliable statistical study: the number of tsx women expected is small even in a sample of several thousand people.

It is also important to point out that there is a strong bias regarding access of tsx women to the Academia. In 2 cases over 3, professional astronomer transitioned after they achived academic status (no information on the 3rd case). Prevalence of transgender women in samples that are IQ segregated, larger, and less affected by anti-trasgender bias – as well as data concerning the IQ distribution of tsx women – should yield larger N_{tsx} and hence set the tentative results of this paper on a firmer basis.

Ultimately, an average increase in IQ may be a consequence of the inability of transsexuals to adjust with their own body (and hence with the relational self) that transsexual women experience since early adolescence. This may lead them toward a richer and deeper intellectual life than that of the average adolescent male.

In an human rights context, it is very important to stress that the findings of this paper go against prevalent stereotypes and prejudices associated to tsx women.

VI. References

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