

Are transsexual brains different?

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The answer is probably yes, but not because of innateness. The altered brain microstructure is probably due to years of repetitive thinking, fantasy and preoccupation with body image. A recent relevant paper by Savic and Arver is discussed.

Transsexual people usually feel they have been born trapped in a body of the wrong sex, i.e. that the main difference is in their brains, and there has been increasing research to check this out.

This is very reminiscent of the similar much older stream of research about differences between homosexual and heterosexual brains. For a summary of the current position see Chapter Eight of *My Genes made me do it!* (www.mygenes.co.nz web site). The research showed a huge overlap in properties between homosexual and heterosexual brains, with only small and statistically minor differences. After an initial burst of research enthusiasm, most alleged structural differences did not prove replicable. The research also failed to rule out the possibility that any differences were caused by postnatal experiences. The theory was that a certain prenatal brain organisation was only activated at puberty but current research on brain plasticity renders very unlikely the theory that the brain can remain unchanged for the periods of years implied. This conclusion was based on observation of brain microstructure and it remains open whether there are innate biochemical differences.

There has been much research on transsexual brains, mostly using the various modern techniques associated with Magnetic Resonance Imaging (MRI) . Differences (again with much overlap between transsexual and heterosexual brains) have been shown for reactions and structures within the hypothalamus (Garcia-Falgueras and Swaab, 2008), (Berglund et al. 2008), and volumes of grey matter and white matter (Luders et al. 2009), (Rametti et al. 2011; Rametti et al. 2010). However these differences were for adults, and the claims of some authors that they are presenting evidence for innateness are very flimsy, because there are no studies of the brains of children who then become adult transsexuals.

As usual there are many in the “wrong” class, i.e. male to female transsexuals who show brains just like their heterosexual male counterparts, even though a modest majority may have brains more like their heterosexual female counterparts.

However the results of studies on transsexuals may be better established than those on homosexual people showing somewhat more reproducible differences in the brains, though still with large overlap. This note argues these differences can be explained by preoccupied thinking and imagination alone.

Recently a paper by Savic and Arver (Savic and Arver, 2011) has appeared. Their innovation is to take a study group composed only of male-to-female gynephiles (i.e. those attracted sexually to women). Previous male-to-female studies mixed gynephiles and androphiles. The authors find that the brains in their study group were not feminised. There was no evidence for female brains in a male body; the brains were male-typical. This is contrary to many of the previous research studies on mixed groups, but the study is thorough. They also found that there were differences in the brains of their study groups which were not found in either heterosexual male or female brains. These regions have been identified as those possibly associated with bodily self-perception (they are also enlarged in those who do lots of meditation, focusing partly on body state).

The authors say this is a “highly speculative” interpretation, but it’s possible they are actually underestimating how much support it has. It is very clear that repeated patterns of mental exercise alone, as seen for example in navigation (London taxi drivers) and internet addiction (Maguire et al. 2006; Zhou et al. 2009) changes significantly the microstructure of the brain. Thinking, particularly repeated thinking, changes brain microstructure.

The possibility then, is that a very frequent rumination on body shape and a desire to be other than the birth sex has caused these structures, rather than innateness. One would presume that there might be a forthcoming paper from the same authors which would examine male-to-female transsexuals who are androphiles, to see what effects there might be on those brains.

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