

Homosexual behavior due to genetics and environmental factors

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Homosexual behaviour is largely shaped by genetics and random environmental factors, according to findings from the world's largest study of twins.

Writing in the scientific journal *Archives of Sexual Behavior*, researchers from Queen Mary's School of Biological and Chemical Sciences, and Karolinska Institutet in Stockholm report that genetics and environmental factors (which are specific to an individual, and may include biological processes such as different hormone exposure in the womb), are important determinants of homosexual behaviour.

Dr Qazi Rahman, study co-author and a leading scientist on human sexual orientation, explains: "This study puts cold water on any concerns that we are looking for a single 'gay gene' or a single environmental variable which could be used to 'select out' homosexuality - the factors which influence sexual orientation are complex. And we are not simply talking about homosexuality here - heterosexual behaviour is also influenced by a mixture of genetic and environmental factors.

The team led by Dr Niklas Långström at Karolinska Institutet conducted the first truly population-based survey of all adult (20-47 years old) twins in Sweden. Studies of identical twins and non-identical, or fraternal, twins are often used to untangle the genetic and environmental factors responsible for a trait. While identical twins share all of their genes and their entire environment, fraternal twins share only half of their genes and their entire environment. Therefore, greater similarity in a trait

between identical twins compared to fraternal twins shows that genetic factors are partly responsible for the trait.

This study looked at 3,826 same-gender twin pairs (7,652 individuals), who were asked about the total numbers of opposite sex and same sex partners they had ever had. The findings showed that 35 per cent of the differences between men in same-sex behaviour (that is, that some men have no same sex partners, and some have one or more) is accounted for by genetics. Rahman explains:

"Overall, genetics accounted for around 35 per cent of the differences between men in homosexual behaviour and other individual-specific environmental factors (that is, not societal attitudes, family or parenting which are shared by twins) accounted for around 64 per cent. In other words, men become gay or straight because of different developmental pathways, not just one pathway."

For women, genetics explained roughly 18 per cent of the variation in same-sex behaviour, non-shared environment roughly 64 per cent and shared factors, or the family environment, explained 16 per cent.

The study shows that genetic influences are important but modest, and that non-shared environmental factors, which may include factors operating during foetal development, dominate. Importantly, heredity had roughly the same influence as shared environmental factors in women, whereas the latter had no impact on sexual behaviour in men.

Dr Rahman adds: "The study is not without its limitations - we used a behavioural measure of sexual orientation which might be ok to use for men (men's psychological orientation, sexual behaviour, and sexual responses are highly related) but less so for women (who show a clearer separation between these elements of sexuality). Despite this, our study provides the most unbiased estimates presented so far of genetic and non-

genetic contributions to sexual orientation."

Source: Queen Mary, University of London

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