# A Preliminary Test of the EBE Model

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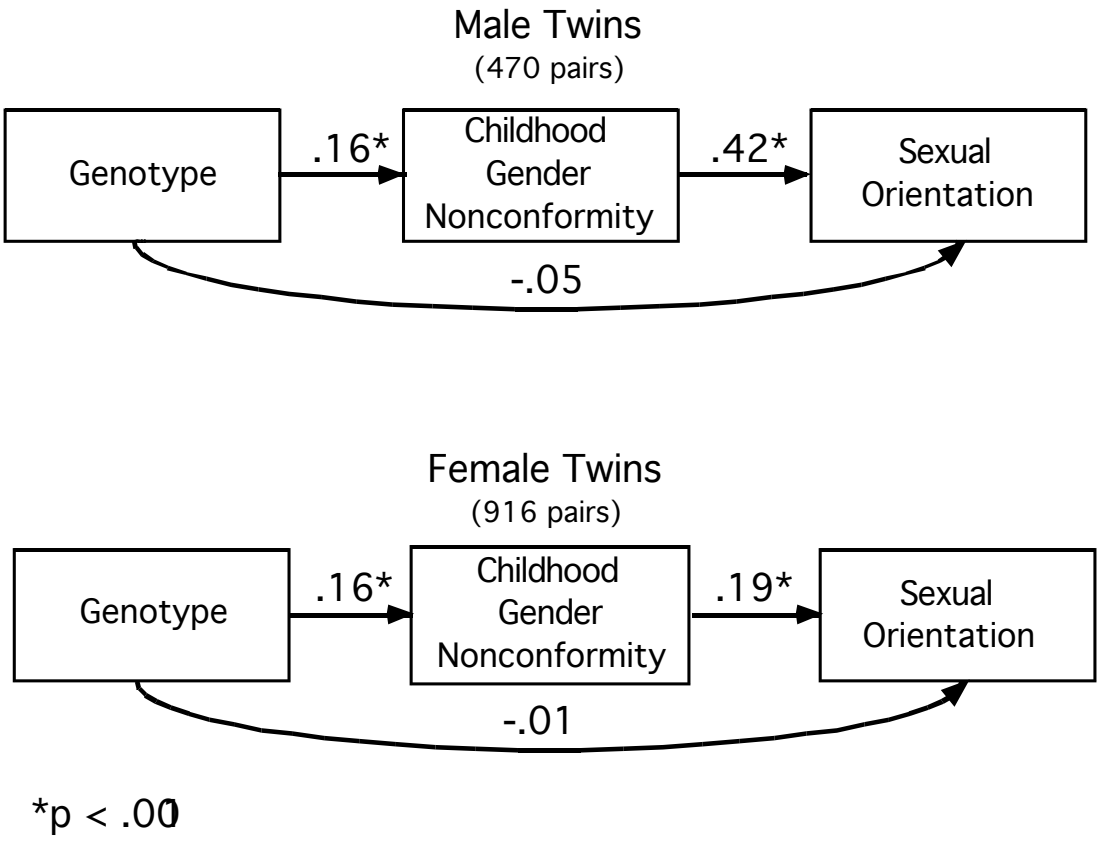
There have now been several studies showing a correlation between an individual's sexual orientation and his or her genotype. In one, a sample of 115 gay men who had male twins, 52% of identical twin brothers were also gay compared with only 22% of fraternal twin brothers and 11% of adopted brothers (Bailey & Pillard, 1991). In a comparable sample of 115 lesbians, 48% of identical twin sisters were also lesbians compared with only 16% of fraternal twin sisters and 6% of adopted sisters (Bailey, Pillard, Neale, & Agyei, 1993). A subsequent study of nearly 5,000 twins who had been systematically drawn from a twin registry confirmed the significant heritability of sexual orientation for men but not for women (Bailey & Martin, 1995). Finally, an analysis of families in which there were two gay brothers suggested a correlation between a homosexual orientation and the inheritance of genetic markers on the X chromosome (Hamer & Copeland, 1994; Hamer, Hu, Magnuson, Hu, & Pattatucci, 1993).

But these same studies also provided evidence for the link proposed by EBE theory between an individual's genotype and his or her childhood gender nonconformity. For example, in the 1991 study of male twins, the correlation on gender nonconformity between gay identical twins was as high as the reliability of the nonconformity measure would permit, .76, ($p < .0001$), compared with a nonsignificant correlation of only .43 between gay fraternal twins (Bailey & Pillard, 1991). This implies that even when sexual orientation is held constant, there is a significant correlation between the genotype and gender nonconformity. Similarly, the 1993 family study, found that gay brothers who shared the same genetic markers on the X chromosome were more alike on gender nonconformity than were gay brothers who did not (Hamer & Copeland, 1994; Hamer et al., 1993). Finally, childhood gender nonconformity was significantly heritable for both men and women in the large twin registry study—even though sexual orientation itself was not significantly heritable for the women (Bailey & Martin, 1995).

Because this twin registry study is based on a very large sample and includes heterosexual as well as bisexual and homosexual individuals, the data can be used in a path analysis to test the EBE model against the competing default model that the genotype is more directly linked to sexual orientation or is linked via some alternative but unspecified path. In particular, the EBE model predicts that any correlation between the genotype and sexual orientation is mediated by gender nonconformity and,

hence, should vanish when gender nonconformity is entered into the path model. In contrast, the default model predicts that the correlation between the genotype and sexual orientation should remain unaffected when gender nonconformity is entered into the path model.

The path analysis presented here is based on the fact that monozygotic twins will be more similar than dizygotic twins on any trait with non-zero heritability. This is equivalent to saying that zygosity is itself correlated with trait similarity across pairs of twins; the higher the heritability of the trait, the higher the correlation. Accordingly, the unit of analysis here is the twin pair, and each variable is a measure of the pair's similarity on the three variables at issue. (The variables are actually all coded in the direction of dissimilarity.) Genetic similarity (zygosity) is coded as 0 for monozygotic twin pairs and as 1 for dizygotic pairs. The similarity of a pair's childhood gender nonconformity is the absolute value of the difference between their scores on a multi-item scale of childhood gender nonconformity; and, the similarity of their sexual orientations is the absolute value of the difference between their scores on the 7-point Kinsey scale of sexual orientation, which ranges from 0 = *exclusively heterosexual* to 6 = *exclusively homosexual*. A full description of the twin sample and the methodology of the study can be found in Dunne, Bailey, Kirk, and Martin (1999).



As shown in the figure, the pattern of path coefficients is consistent with the EBE model for both male and female twin pairs: For both sexes, there is a significant path between the genotype and childhood gender nonconformity and a further significant path between childhood gender nonconformity and sexual orientation, but there is no remaining, direct link between the genotype and sexual orientation.

## References

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