There was no sex difference in genetic correlations between neuroticism and major depression

Fanous A, Gardner CO, Prescott CA *et al.* *Neuroticism, major depression and gender: a population-based twin study.* *Psychological Medicine* 2002 May; **32**: 719–28.

QUESTION: Are neuroticism and major depression more highly genetically correlated in females compared to males?

Design

Cross-sectional twin study.

Setting

Virginia, USA.

Participants

White twins born 1934–1974: 863 male-male monozygotic; 649 male-male dizygotic; 506 female-female monozygotic; 345 dizygotic, and 1408 opposite sex pairs.

Main outcome measures

Major depression was assessed using structured interviews with DSM-III-R criteria. Neuroticism was assessed using the short-form Eysenck Personality Questionnaire. Statistical models accounted for additive genetic, common environmental and individual-specific environmental components.

Main results

Additive genetic and individual-specific environmental factors were the best predictors of both neuroticism and major depression. Within-sex correlations between neuroticism and major depression were 0.68 for men and 0.49 for women. There was no significant sex difference in genetic correlations.

Conclusions

Neuroticism and major depression are more common among women than men, leading some to believe these traits are more genetically correlated in women. This study found no sex difference in the genetic correlation between neuroticism and major depression.

COMMENTARY

Neuroticism, or a person's tendency to experience negative emotions and cope poorly, is strongly associated with anxiety and depressive disorders. Many studies have examined the relationship between neuroticism and major depression. There is evidence that high neuroticism is a predisposing factor for major depression, a complication of major depression, a pathoplastic factor affecting the course of major depression and a result of genetic and environmental factors in common with major depression (at least in women).^{1–4}

Fanous *et al* extend previous work using the Virginia Twin Registry,⁴ adding male and opposite-sex twin pairs. They found that neuroticism and major depression share genetic and environmental correlates in men and women, although the genetic determinants do not seem to be identical in men and women. The authors hypothesised that neuroticism and major depression would be related more indirectly in men than in women, but this hypothesis could not be tested fully with a cross-sectional analysis and without including possible intermediate variables (such as substance use disorders). The cross-sectional design also makes it difficult to account for the effect of current or recent major depression on measured neuroticism (currently depressed persons report higher neuroticism than they do before or after a depressive episode). This issue was partly addressed with additional analyses, but a longitudinal analysis in male twins, similar to that done previously in women,⁴ would be more definitive.

Limitations aside, this study suggests that if genes affecting neuroticism are identified, some of these will also affect the risk of major depression. It may be that such genes differ, to some extent, in men and women. This work will therefore be informative for researchers using molecular methods to search for genes for major depression. It will also be of interest to clinicians who grapple with the issue of temperament versus disorder on a regular basis.

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