

## Background

Previous research suggests an association between the personality traits neuroticism and extraversion and the risk for major depression (MD). Twin studies showed that the covariation between neuroticism and MD was largely due to genetic effects.

→ strength: The authors argued that a study that included both longitudinal and genetic aspects would produce the most comprehensive results available. They then chose this design to analyse the relationship between neuroticism and extraversion and the risk for MD.

→ weakness: The authors don't provide any background information about relation between neuroticism & extraversion and the risk for MD.

## Research questions

1. Do the personality traits of neuroticism and extraversion predict the lifetime history of MD?
2. Do the personality traits of neuroticism and extraversion predict the first onset of MD?
3. Using twin modelling, to what extent is the correlation between neuroticism and extraversion and the risk to MD the result of shared genetic vs shared environmental risk factors?

## Methods

1972-1973: Conducted questionnaire with 18 items from short form Eysenck Personality Inventory. This was sent to all same sex twin pairs in Sweden born between 1926-1958.

1998-2003: telephone interview using computerized adapted version of the Composite International Diagnostic Interview-Short Form (74% response rate), to assess prevalence of MD.

- Statistical analysis

- Logistic regression analysis with standardized neuroticism and extraversion scores to analyse relationship between personality and risk for lifetime MD.
- Cox proportional hazard regression to analyse time that passes before the first onset of MD compared with levels of Neuroticism and Extraversion.
- Bivariate twin analysis to analyse how much of the correlation between personality and MD is due to genetic effects, common (shared) environment and individual specific environment → because of the same sex sample the authors only examined if there was a difference in the magnitude of genetic and environmental effects in men and women.

## Results

20,692 individuals with a mean age of 29.2 at the first questionnaire and a mean age of 56.1 at the telephone interview.

- Personality and lifetime MD:

Logistic regression showed that Neuroticism and Extraversion were both significantly related to the risk of lifetime MD with an OR of respectively 1.49 and 0.92. Analysis with both Neuroticism and Extraversion as predictors showed that the relation between Neuroticism and MD did not change, but the relationship between extraversion and MD disappeared.

- Personality and first onset of MD:

The level of neuroticism significantly predicts the risk for first onset of MD (HR 1.31,  $p < 0.001$ ), the level of extraversion also predicted the risk for first onset of MD, but this effect was much weaker (HR 0.96,  $p = 0.03$ ). Neuroticism was a stronger predictor of future MD in men than in women (HR 1.14,  $p = 0.002$ ).

- Twin analysis:

Most correlations are higher in MZ pairs than in DZ pairs, for both neuroticism, extraversion and MD, suggesting a stronger genetic correlation, because MZ pairs are genetically more identical than DZ pairs. The correlations for extraversion are much lower than the correlation for neuroticism.

- Model fitting:

Neuroticism: best model with genetic effects and individual specific effects. MD and neuroticism have a higher heritability in women than in men. Genetic factors explain 91% of the variation between neuroticism and risk of developing MD, only 9% is explained by environmental factors

Extraversion: best model with genetic effects and individual specific effects, the values of the environmental correlation were constrained to 0. Extraversion is more heritable in women than in men. The correlation between extraversion and risk to MD is very small(-0.046 in women & -0.056 in men), but 100% due to genetic factors.

Neuroticism and extraversion: the correlations for neuroticism remain the same and the correlations for extraversion are still small, but positive(0.07 in women & 0.04 in men)

### **Strengths and weaknesses**

The paper is clearly written and the authors often refer back to their research questions. The sample is very large and representative for the general population. The study has a longitudinal design and is therefore better than the Virginia study, in which all measurements were done at the same time. There are also some limitations with this study. Because there are only same sex twins in this study, no qualitative sex effects can be measured. Both the questionnaires and the diagnosis of MD were based on shorter versions of the original questionnaires, which in cases of MD diagnosis can cause an underrepresentation of several subtypes of MD. Only bivariate modelling was done, making it harder to understand the correlation between the personality traits and the risk for MD. If they authors had done a regression analysis with Neuroticism, Extraversion and MD as predictors and both sexes as groups it would be easier to understand the outcomes.

### **Contribution**

This is one of the few studies looking at the relationship between neuroticism and extraversion and the risk of MD with large sample and a longitudinal twin-design. For future research, the design should also include same sex dizygote twins, so qualitative sex effects can be measured.

### **Questions**

- In this study they assumed people using anti-depression medication have a history of MD and therefore included these people. Do you agree with this?
- Are twins representative for the risk of MD in the general population?

### **References**

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