GENETIC AND ENVIRONMENTAL INFLUENCES ON FREQUENCY OF TRUANCY AT HIGH-SCHOOL

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Introduction

13% of Dutch High-School students indicate that they skipped school at least once during the last two months (CBS, 2004).

Truancy can be linked to negative outcomes, e.g. substance use (Miller & Plant, 1999), and poor school performance (Bosworth, 1994).

Aim: to investigate causes of individual differences in frequency of truancy. In a broad context, frequency of truancy belongs to the non-aggressive subtype of antisocial behavior (ASB) (Achenbach, 1991). We expect influences of genes and shared environment because truancy, like other types of non-aggressive ASB, is often performed with peers and twins are likely to share the same peer group (Loehlin, 1997; Harris, 1995).

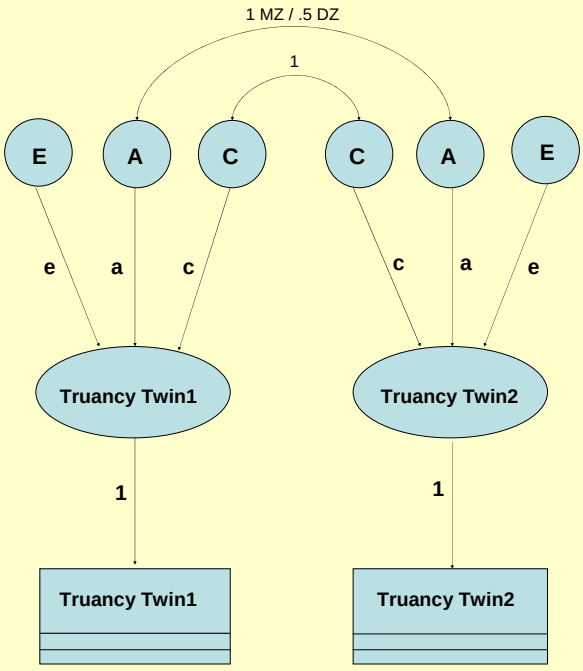
Methods

Sample: All subjects were registered with the Netherlands Twin Registry (NTR). Data were obtained from surveys. Data on frequency of truancy were available for 1,725 Dutch adolescent and young adult twin pairs (mean age: 19.80 years). There were 721 MZ and 1,004 DZ pairs.

Frequency of truancy: Subjects were asked how often they skipped lessons during a whole day while in High-School. Answers were on a 6-point scale ranging from 1 = *never* to 6 = *more than 20 times*. Scores were classified into three distinct categories: 0 = *never* (**66%**), 1 = *sometimes* (1-4 times) (**22%**), 2 = *often (> 4 times)* (**12%**).

Structural equation modeling in Mx (Neale et al., 2006) was used to estimate polychoric twin correlations and to estimate genetic and environmental effects. Threshold models with two thresholds were fitted to the raw ordinal truancy data. The threshold model assumes that an ordinal variable has an underlying liability with a continuous and normal distribution. The thresholds represent the values that discriminate between categories.

Figure 1: Univariate threshold model for frequency of truancy which is an ordinal variable with 3 categories indicated by the rectangle with two horizontal lines.



First, the two thresholds and the polychoric twin correlations were estimated. In this model we tested for zygosity effects on thresholds. Second, an ACE model was fitted, which is depicted in figure 1. Third, the significance of the variance components A and C was assessed by testing whether dropping them from the model resulted in a deterioration of fit by the log-likelihood ratio test (LRT).

Results

Polychoric twin correlations for frequency of truancy were higher for MZ twins (r = .70) than for DZ twins (r = .54), indicating that additive genetic effects explain individual differences in frequency of truancy. However, the rather high DZ correlations indicate influence of shared environmental factors. No zygosity effects on thresholds were found.

Genetic analysis showed that an ACE-model fitted the data on frequency of truancy best. Individual differences in frequency of truancy are accounted for by:

- **Additive genetic effects: 34%**
- **Shared environmental effects: 36%**
- **Unique environmental effects: 30%**

Conclusions

Our results indicated that individual differences in frequency of truancy can be explained by additive genetic effects, shared environmental effects, and unique environmental effects.

The substantial influence of shared environmental factors on frequency of truancy is interesting because for most human traits no effects are found with regard to shared environmental factors (Moffitt, 2005). Non-aggressive ASB seems to be an exception. Our results are in line with other research findings regarding non-aggressive ASB: shared environmental factors play an important role in explaining individual differences. An explanation could be that non-aggressive ASB is performed together with peers who have an important influence on adolescents' lives.

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