

Interaction between Genotype and Family Structure in Adolescents' Perceptions of General Family Functioning and Family Conflict

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Introduction

In this study we investigate individual differences in the way adolescents perceive general family functioning (GFF) and level of family conflict (FC). Genetic effects have been found to substantially account for variation in perceptions of family functioning (Plomin & Bergeman, 1991) and the relative influence of genetic effects is likely to be different in males and females. Environmental factors, such as family structure, may lead to differences in the way adolescents perceive family functioning as well. For some adolescents living in a single-parent family may have a positive effect on their perception of GFF and FC, whereas for other this may have a negative effect. It is plausible that the effects of living in a single-parent family may trigger genetic predispositions towards positive or negative perceptions of GFF and FC.

Aims: (1) explore GxE interaction by making use of the data on MZ twins; (2) test whether genetic and environmental effects on adolescents' perceptions of GFF and FC differ as a function of sex and of family structure; (3) test whether the same genetic and environmental factors influence GFF and FC in males and females.

Method

Sample: All subjects were registered with the Netherlands Twin Registry (NTR). Data on GFF and FC were obtained from surveys and were available for 3,838 Dutch adolescent twins (44% male) and 662 of their non-twin siblings (45% male). There were 326 MZM, 281 DZM, 457 MZF, 356 DZF, and 610 DOS twin pairs.

GFF: Subscale from McMaster Family Assessment Device

FC: Subscale from Family Environment Scale

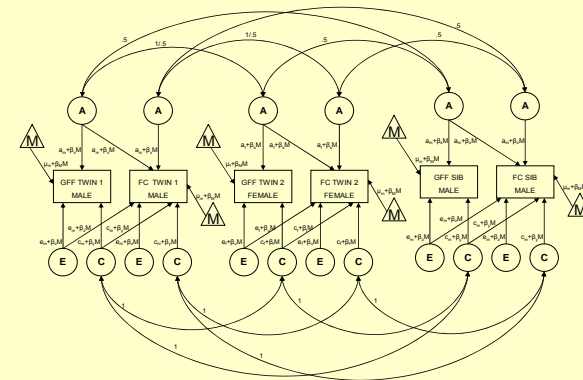
Family structure: two-parent vs. single-parent families

GxE interaction: correlation between intrapair sumscores and difference scores in MZ twin pairs (Jinks & Fulker, 1970).

Using structural equation modeling in Mx (Neale et al., 2006), a bivariate Cholesky decomposition (Figure 1) was fitted to the data to estimate additive genetic (A), shared environmental (C), and nonshared environmental (E) effects on variance in and covariance between GFF and FC. Family structure was modeled as a moderator (M) on the means and variance components to test for main and interaction effects respectively (Purcell, 2002).



Figure 1: Bivariate Cholesky decomposition for GFF and FC with family structure as moderator (M)



Results and Conclusions

Significant negative correlations were found between intrapair sumscores and difference scores for FC in MZM ($r = -.27$) and MZF ($r = -.16$). Genetic effects were relatively more important in adolescents perceiving low levels of family conflict compared to those perceiving higher levels.

The relative effects of genetic and environmental influences on variation in GFF and FC and the covariation between them were different between males and females. Genetic effects were relatively more important in female adolescents.

In female adolescents, family structure modified genetic and shared environmental effects on GFF. Genetic effects influencing perceptions of general family functioning were larger in female adolescents living in single-parent families compared to those living in two-parent families, whereas environmental effects shared by all siblings in the family were smaller.

In female adolescents, a substantial part of genetic effects influencing perceptions of GFF and FC were common, whereas in male adolescents there were no common genetic effects.

Table 1. Standardized parameter estimates of the variance and covariance in GFF and FC

	A		C		E	
	GFF	FC	GFF	FC	GFF	FC
Males: two- and one-parent families						
GFF	.26		.22		.52	
FC	--	.26	.71	.38	.29	.36
Females: two-parent families						
GFF	.43		.13		.44	
FC	.42	.46	.44	.29	.14	.25
Females: single-parent families						
GFF	.60		.03		.37	
FC	.60	.46	.24	.29	.16	.25