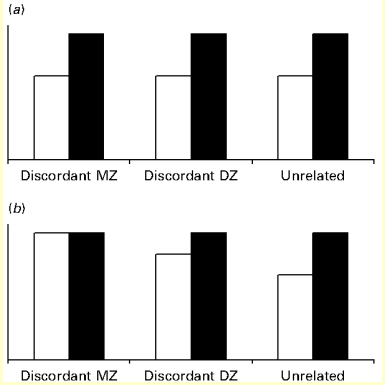
Life events and borderline personality disorder: The influence of gene-environment correlation and gene-environment interaction

Marijn A. Distel[1], Christel M. Middeldorp[1,2], Gonneke Willemsen[1], Timothy J. Trull[3], Catherine A. Derom[4], Dorret I. Boomsma[1]

Table 1. Prevalence of having experienced a life event and the mean PAI-BOR score in exposed and unexposed individuals.

	Unexposed		Exposed	
	N (%)	BPD	N (%)	BPD
Divorce	4225 (72%)	15.4	1655 (28%)	19.4
Traffic accident	5451 (90%)	16.1	617 (10%)	18.4
Violent assault	5622 (93%)	16.0	409 (7%)	20.3
Sexual assault	5595 (93%)	15.9	433 (7%)	21.6
Robbery	4346 (71%)	16.2	1762 (29%)	16.7
Job-loss	5051 (82%)	15.8	1079 (19%)	19.2

Gene-environment correlation (*r*GE)



*r*GE absent for:
Traffic accident
Sexual assault
Robbery

*r*GE present for:
Divorce
Violent assault
Job-loss

Fig 1. Scores of the non-exposed (□) and exposed (■) subjects in discordant monozygotic (MZ) and dizygotic (DZ) twins and unrelated individuals in the absence (a) and presence (b) of rGE.

❖ *Aim*

The current study aims to test whether genes that influence borderline personality disorder (BPD) features increase the likelihood of exposure to life events and to test for moderation effects of exposure to life events on the genetic and environmental architecture of BPD features.

❖ *Participants*

Data were available for 5,083 twins and 1,285 non-twin siblings registered with the Netherlands Twin Register and the East Flanders Prospective Twin Survey.

❖ *Measure*

The extent to which an individual is at risk to develop BPD was assessed with the Personality Assessment Inventory-Borderline Features scale. Life events under study were divorce/break-up, traffic accident, violent assault, sexual assault, robbery and job-loss.

❖ *Analysis*

Gene-environment correlation and interaction were assessed with the co-twin control design and structural equation modeling.

Gene-environment interaction (G×E)

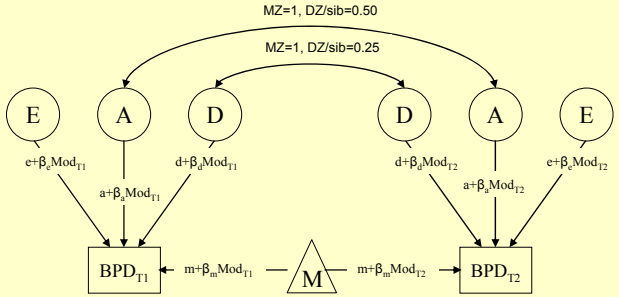
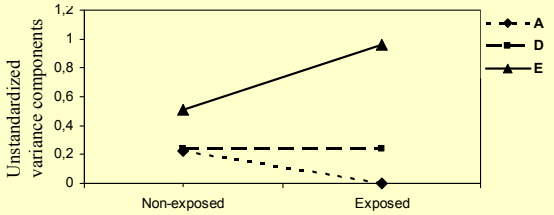


Fig 2. G×E model for borderline personality with the exposure to a life event included as a moderator in a pair of relatives.

Pattern for sexual assault



Pattern for divorce, violent assault and job-loss

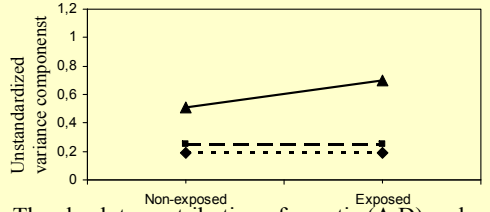


Fig 3. The absolute contribution of genetic (A,D) and environmental (E) factors to variation in BPD features for non-exposed and exposed indiv.

❖ *Results*

The genes that influence BPD features also increase the likelihood of being exposed to divorce, violent assault or job-loss. Additive genetic influences on BPD features interact with the exposure to sexual assault leading to a lower heritability of BPD features in exposed individuals. In individuals who experienced a divorce, violent assault, sexual assault, or job-loss, environmental variance for BPD features was higher, leading to a lower heritability of BPD features in exposed individuals.

[1]Department of Biological Psychology, VU University Amsterdam, Amsterdam, The Netherlands. [2]De Bascule, academic hospital for children and adolescent psychiatry, Amsterdam, the Netherlands. [3]Department of Psychological Sciences, University of Missouri-Columbia, Columbia, MO, USA. [4]Department of Human Genetics, Katholieke Universiteit Leuven, Belgium.