

Supplemental/Online-only Materials.

Supplemental Table 1. Twin-pair correlations (and 95% confidence intervals) for conduct disorder, nicotine dependence, alcohol dependence, and cannabis abuse/dependence, shown separately for all five zygosity groups.

Supplemental Table 2. Model fit statistics for twin models examining familial influences on conduct disorder, nicotine dependence, alcohol dependence, and cannabis abuse/dependence

Supplemental Figure 1. Full Cholesky (lower triangular) parameterization for familial influences on conduct disorder, nicotine dependence, alcohol dependence, and cannabis abuse/dependence.

Supplemental Table 1. Twin-pair correlations (and 95% confidence intervals) for conduct disorder, nicotine dependence, alcohol dependence, and cannabis abuse/dependence, shown separately for all five zygosity groups.

Group	Conduct Disorder	Nicotine Dependence	Alcohol Dependence	Cannabis Abuse/Dependence
Γ_{MZF}	0.60* (0.47 – 0.73)	0.63* (0.55 – 0.71)	0.51* (0.41 – 0.62)	0.57* (0.45 – 0.69)
Γ_{MZM}	0.46* (0.32 – 0.60)	0.62* (0.52 – 0.72)	0.48* (0.37 – 0.59)	0.67* (0.57 – 0.78)
Γ_{DZF}	0.47* (0.30 – 0.64)	0.40* (0.29 – 0.51)	0.22* (0.06 – 0.37)	0.45* (0.28 – 0.62)
Γ_{DZM}	0.48* (0.34 – 0.63)	0.30* (0.15 – 0.44)	0.28* (0.14 – 0.42)	0.44* (0.28 – 0.60)
Γ_{DZO}	0.25* (0.09 – 0.42)	0.24* (0.13 – 0.35)	0.11 (-0.02 – 0.24)	0.35* (0.20 – 0.51)
* significant at Data from n=9577 individuals; n=9501 individuals for conduct disorder, n=8470 for nicotine dependence, n=8544 for alcohol dependence, and n=6017 for cannabis abuse/dependence.				

Supplemental Table 2. Model fit statistics for twin models examining familial influences on conduct disorder, nicotine dependence, alcohol dependence, and cannabis abuse/dependence

	Model	-2 * Log-likelihood	# Est. Para.	Compared with Model			
1	Full Cholesky ACE parameterization ^a		42	---	---	---	---
2	Drop c43		41	1		1	
3	Drop c33 in addition to c43		40	2		1	
4	Drop c42 (and c43, c33) ^b		39	3 2		1 2	
5	Drop c32 (and c42, c33, c43)		38	4		1	
6	Drop c22 (and c32, c42, c33, c43)		37	5		1	
7	Drop c31 (and c22, c32, c42, c33, c43)		36	6		1	
8	Drop c21 (and c31, c22, c32, c42, c33, c43)		35	7		1	
9	Drop c41 (and c21, c31, c22, c32, c42, c33, c43)		34	8		1	
10	Drop a43 (and c41, c21, c31, c22, c32, c42, c33, c43)		33	9		1	
11	Drop a42 (and a43, c41, c21, c31, c22, c32, c42, c33, c43)		32	10		1	
12	Drop a32 (and a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		31	11		1	
13	Drop c44 (and a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43) ^c		30	12		1	
14	Drop a44 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
15	Drop a33 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
16	Drop a22 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
17	Drop a41 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
18	Drop a31 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
19	Drop a21 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
20	Drop e43 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
21	Drop e42 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
22	Drop e32 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
23	Drop e41 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
24	Drop e31 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	
25	Drop e21 (and c44, a32, a33, a43, c41, c21, c31, c22, c32, c42, c33, c43)		29	13		1	

NOTE: Cohort and gender included as covariates in all models. A=additive genetic influences, C=shared environmental influences, E=non-shared environmental influences. Models with **13** had a significantly poorer fit and were rejected.

^a See Supplemental Figure 1 for a diagram depicting the Cholesky parameterization for familial influences (A and C); the full model also included a similar parameterization for individual-specific influences (E).

^b model instability, in which fit had “improved” in the preceding model (Model 3) resulted in a significant decrement of fit

in Model 4 compared to Model 3 (1-df test), but a non-significant change in fit compared to Model 2. Given the lack of evidence for C on ND, this path was deleted, with C44 retained to account for the C on CAD.

^c Final model was ACE for conduct disorder and AE for nicotine dependence, alcohol dependence, and cannabis abuse/dependence. The lower bound of the confidence interval for C44 (based on Model 12) hit 0.00 and confirmed that path C44 was not significant.

Supplemental Figure 1. Full Cholesky (lower triangular) parameterization for familial influences on conduct disorder, nicotine dependence, alcohol dependence, and cannabis abuse/dependence.

