

## Supplementary Online Content

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**eReferences**

**eTable 1. Diagnostic classification of mental disorders according to the ICD-10-DCR and equivalent ICD-8 <sup>a</sup>**

<b>Diagnosis</b>	<b>ICD-10-DCR codes <sup>b</sup></b>	<b>Equivalent ICD-8 codes</b>
Any mental disorders	F00-F99	290-315
Organic mental disorders	F00-F09	290.09, 290.10, 290.11, 290.18, 290.19, 292.x9, 293.x9, 294.x9, 309.x9
Dementia in Alzheimer disease	F00	290.09, 290.10, 290.19
Vascular dementia	F01	293.09, 293.19
Any substance use disorders	F10-F19	291.x9, 294.39, 303.x9, 303.20, 303.28, 303.90, 304.x9
Alcohol misuse	F10	291.x9, 303.x9, 303.20, 303.28, 303.90
Cannabis misuse	F12	304.59
Broadly-defined schizophrenia	F20-F29	295.x9, 296.89, 297.x9, 298.29-298.99, 299.04, 299.05, 299.09, 301.83
Narrowly-defined schizophrenia	F20	295.x9 (excluding 295.79)
Schizoaffective disorder	F25	295.79, 296.89
Mood disorders	F30-F39	296.x9 (excluding 296.89), 298.09, 298.19, 300.49, 301.19
Bipolar disorder	F30-F31	296.19, 296.39, 298.19
Recurrent depressive disorder	F33	296.09, 296.29, 298.09, 300.49 <sup>c</sup>
Single and recurrent depressive disorders	F32-F33	296.09, 296.29, 298.09, 300.49
Anxiety and somatoform disorders	F40-F48	300.x9 (excluding 300.49), 305.x9, 305.68, 307.99

Obsessive-compulsive disorder	F42	300.39
Specific personality disorders	F60	301.x9 (excluding 301.19), 301.80, 301.81, 301.82, 301.84
Antisocial personality disorder	F60.2	301.79, 301.82
Borderline-type personality disorder	F60.31	301.84

<sup>a</sup> Between 1969 and 1993 the diagnostic system used was the Danish modification of the International Classification of Diseases, 8th revision (ICD-8)<sup>1</sup> and, from 1994, the International Classification of Diseases, 10th revision, Diagnostic Criteria for Research (ICD-10-DCR).<sup>2</sup>

<sup>b</sup> Inclusive of diagnostic categories for which a valid conversion to the ICD-8 code was possible.

<sup>c</sup> For recurrent depressive disorder, onset was defined as the second admission that occurred at least 8 weeks after last discharge with these ICD-8 codes.

**eTable 2. Incidence rate ratios (and 95% CIs) for offspring suicide attempt and violent offending in relation to at least one parent affected by a specific psychiatric diagnosis, with additional adjustment for parental SES <sup>a,b</sup>**

Parental psychiatric diagnosis or suicide attempt	Offspring suicide attempt	Offspring violent offending
Any mental disorders	1.85 (1.81-1.90)	1.56 (1.53-1.59)
Organic mental disorders	1.44 (1.34-1.54)	1.18 (1.10-1.26)
Dementia in Alzheimer disease	1.29 (1.05-1.57)	0.81 (0.63-1.01)
Vascular dementia	0.99 (0.72-1.32)	1.11 (0.83-1.45)
Any substance use disorders	1.91 (1.85-1.97)	1.75 (1.71-1.80)
Alcohol misuse	1.86 (1.81-1.92)	1.69 (1.64-1.74)
Cannabis misuse	1.77 (1.61-1.95)	1.90 (1.74-2.06)
Broadly-defined schizophrenia	1.37 (1.30-1.44)	1.19 (1.13-1.25)
Narrowly-defined schizophrenia	1.32 (1.21-1.43)	1.11 (1.02-1.20)
Schizoaffective disorder	1.35 (1.16-1.55)	1.01 (0.86-1.17)
Mood disorders	1.58 (1.53-1.63)	1.25 (1.21-1.29)
Bipolar disorder	1.25 (1.15-1.36)	1.09 (1.00-1.19)
Recurrent depressive disorder	1.48 (1.40-1.57)	1.19 (1.12-1.26)
Single and recurrent depressive disorders	1.56 (1.50-1.61)	1.24 (1.20-1.29)
Anxiety and somatoform disorders	1.88 (1.83-1.93)	1.60 (1.55-1.64)
Obsessive-compulsive disorder	1.39 (1.13-1.69)	0.97 (0.76-1.20)
Specific personality disorders	1.75 (1.70-1.81)	1.48 (1.44-1.53)
Borderline type personality disorder	1.74 (1.57-1.92)	1.44 (1.30-1.60)
Antisocial personality disorder	2.06 (1.94-2.20)	1.76 (1.66-1.87)
Attempted suicide	2.10 (2.02-2.19)	1.92 (1.85-1.99)

<sup>a</sup> IRRs adjusted for offspring sex and age, calendar year, and the interactions between these variables, and additionally for parental SES [maternal and paternal income (annual quintiles), highest level of education (primary school, high school/vocational training, higher education), and employment status (employed, unemployed, outside workforce for other reasons)].

<sup>b</sup> Reference group: neither parent had the particular exposure of interest.

## **eResults 1. Interactions between parental socio-economic status and parental mental disorder**

We found significant interactions between any parental mental disorders and parental socio-economic status (SES) for the risk of both adverse offspring outcomes [ $\chi^2(22)=120.8$ ,  $p<0.001$  for suicide attempt;  $\chi^2(22)=170.4$ ,  $p<0.001$  for violent offending]. To examine the interaction effects further, we stratified SES as 'lower', 'middle', and 'higher', applying the classifications as described previously.<sup>3</sup> These results, in relation to having at least one parent affected by a mental disorder, are shown in eTable 3. The reference group for IRR estimation within each SES stratum was the group with no parental history of mental illness. For both offspring suicide attempt and violent offending, a stronger association between parental mental illness and offspring adverse outcomes was found in the 'lower' SES than in the 'higher' SES stratum.

**eTable 3. Incidence rate ratios of suicide attempt and violent offending in relation to having at least one parent affected by a mental disorder, stratified by parental SES <sup>a</sup>**

<b>Parental SES</b>	<b>Suicide attempt</b>	<b>Violent offending</b>
Lower	2.31 (2.23-2.39)	1.97 (1.91-2.03)
Middle	2.20 (2.13-2.27)	1.87 (1.82-1.93)
Higher	1.85 (1.65-2.05)	1.62 (1.43-1.82)

<sup>a</sup> Adjusted for offspring sex and age, calendar year, and the interactions between these variables.

## **eResults 2. Risks of offspring suicide attempt and violent offending by gender of affected parent and gender of offspring**

The Figure in the main manuscript shows the IRRs for offspring suicide attempt and violent offending in relation to whether the mother only, father only, or both parents had a history of any psychiatric diagnosis or suicide attempt, stratified by offspring gender. Compared with having only one affected parent, a history of psychiatric disease in both parents was associated with doubled risks of attempted suicide and violent offending in offspring. There was, however, little variability in relative risk between exposure to maternal illness only versus exposure to paternal illness only. There was also little heterogeneity in effect size estimates for attempted suicide between male and female offspring in relation to whether both parents, or the father only, were affected. However, there was evidence of a slightly higher relative risk for female versus male offspring if exposed to maternal illness only [IRRs for female offspring 2.51 (95% CI 2.42-2.61), for male offspring 2.35 (95% CI 2.25-2.44),  $p = 0.015$ ]. On the contrary, associations between parental psychiatric disease and offspring violent offending were much stronger for female than for male offspring ( $p < 0.001$ ), particularly when both parents were affected.

**eTable 4. Incidence rate ratios (and 95% CIs) for suicide attempt stratified by offspring gender in relation to having at least one parent affected by a specific psychiatric diagnosis or a history of suicide attempt <sup>a</sup>**

Parental psychiatric diagnosis or suicide attempt	Male offspring	Female offspring	P value for gender interaction <sup>b</sup>
Any mental disorders	2.48 (2.41-2.56)	2.57 (2.49-2.64)	0.12
Organic mental disorders	2.18 (1.97-2.40)	2.21 (2.00-2.44)	0.81
Dementia in Alzheimer disease	1.64 (1.22-2.15)	1.96 (1.45-2.58)	0.39
Vascular dementia	1.36 (0.86-2.02)	1.50 (0.94-2.27)	0.74
Any substance use disorders	2.98 (2.86-3.10)	2.88 (2.77-2.99)	0.23
Alcohol misuse	2.92 (2.80-3.05)	2.78 (2.66-2.90)	0.10
Cannabis misuse	3.64 (3.15-4.17)	3.52 (3.09-3.98)	0.73
Broadly-defined schizophrenia	2.05 (1.91-2.20)	2.17 (2.03-2.32)	0.27
Narrowly-defined schizophrenia	2.45 (2.17-2.74)	2.26 (2.01-2.54)	0.36
Schizoaffective disorder	2.04 (1.64-2.48)	2.16 (1.76-2.62)	0.68
Mood disorders	1.91 (1.82-2.00)	2.16 (2.07-2.25)	<b>&lt;.001</b>
Bipolar disorder	1.43 (1.26-1.62)	1.74 (1.55-1.94)	0.025
Recurrent depressive disorder	1.72 (1.58-1.87)	2.04 (1.89-2.19)	0.003
Single and recurrent depressive disorders	1.87 (1.77-1.96)	2.12 (2.03-2.22)	<b>&lt;.001</b>
Anxiety and somatoform disorders	2.62 (2.52-2.72)	2.63 (2.53-2.72)	0.92
Obsessive-compulsive disorder	1.83 (1.32-2.45)	1.94 (1.47-2.52)	0.77
Specific personality disorders	2.54 (2.43-2.65)	2.70 (2.59-2.82)	0.038
Borderline type personality disorder	2.74 (2.34-3.18)	2.96 (2.59-3.37)	0.45
Antisocial personality disorder	3.99 (3.65-4.35)	3.94 (3.61-4.29)	0.85
Attempted suicide	3.50 (3.30-3.71)	3.35 (3.18-3.53)	0.28

<sup>a</sup> Adjusted for offspring sex and age, calendar year, and the interactions between these variables. <sup>b</sup> Statistically significant at  $p < 0.0025$  (Bonferroni-corrected <sup>4</sup> significance level: 0.05/20). Bold type indicates significant gender interaction at this corrected level.



**eTable 5. Incidence rate ratios (and 95% CI) for violent offending stratified by offspring gender in relation to having at least one parent affected by a specific psychiatric diagnosis or a history of suicide attempt <sup>a</sup>**

Parental psychiatric diagnosis or suicide attempt	Male offspring	Female offspring	P value for gender interaction <sup>b</sup>
Any mental disorders	2.15 (2.11-2.20)	3.25 (3.07-3.44)	<b>&lt;.001</b>
Organic mental disorders	1.87 (1.74-2.02)	2.20 (1.78-2.67)	0.15
Dementia in Alzheimer disease	1.24 (0.96-1.56)	0.67 (0.21-1.55)	0.19
Vascular dementia	1.73 (1.27-2.30)	1.49 (0.53-3.21)	0.75
Any substance use disorders	2.73 (2.66-2.81)	4.13 (3.85-4.43)	<b>&lt;.001</b>
Alcohol misuse	2.65 (2.57-2.73)	3.79 (3.50-4.09)	<b>&lt;.001</b>
Cannabis misuse	3.72 (3.39-4.07)	6.49 (5.32-7.81)	<b>&lt;.001</b>
Broadly-defined schizophrenia	1.77 (1.68-1.86)	2.70 (2.37-3.05)	<b>&lt;.001</b>
Narrowly-defined schizophrenia	1.87 (1.71-2.05)	3.25 (2.64-3.95)	<b>&lt;.001</b>
Schizoaffective disorder	1.45 (1.23-1.70)	2.45 (1.62-3.51)	0.021
Mood disorders	1.60 (1.54-1.65)	2.03 (1.85-2.22)	<b>&lt;.001</b>
Bipolar disorder	1.33 (1.22-1.46)	1.47 (1.14-1.88)	0.46
Recurrent depressive disorder	1.50 (1.41-1.59)	1.75 (1.48-2.04)	0.084
Single and recurrent depressive disorders	1.58 (1.52-1.64)	1.99 (1.80-2.19)	<b>&lt;.001</b>
Anxiety and somatoform disorders	2.25 (2.19-2.31)	3.14 (2.93-3.36)	<b>&lt;.001</b>
Obsessive-compulsive disorder	1.34 (1.04-1.69)	1.18 (0.54-2.20)	0.73
Specific personality disorders	2.20 (2.14-2.27)	3.34 (3.09-3.61)	<b>&lt;.001</b>
Borderline type personality disorder	2.26 (2.01-2.52)	3.15 (2.40-4.04)	0.026
Antisocial personality disorder	3.41 (3.20-3.63)	5.55 (4.75-6.43)	<b>&lt;.001</b>
Attempted suicide	3.14 (3.01-3.26)	4.64 (4.23-5.08)	<b>&lt;.001</b>

<sup>a</sup> Adjusted for offspring sex and age, calendar year, and the interactions between these variables. <sup>b</sup> Statistically significant at  $p < 0.0025$  (Bonferroni-corrected <sup>4</sup> significance level: 0.05/20). Bold type indicates significant gender interaction at this corrected level.

## eReferences

1. World Health Organization (WHO). *Classification of Diseases: Extended Danish-Latin Version of the World Health Organization International Classification of Diseases, 8th Revision, 1965*. Copenhagen: Danish National Board of Health; 1971.
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3. Webb RT, Antonsen S, Mok PLH, Agerbo E, Pedersen CB. National cohort study of suicidality and violent criminality among Danish immigrants. *PLoS One*. 2015 Jun 29;10(6):e0131915.
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