**Supplemental Materials**

for

**Childhood Maltreatment and Disordered Gambling in Adulthood:**

**Disentangling Causal and Familial Influences**

by

Genevieve F. Dash1, Nicholas G. Martin2, & Wendy S. Slutske1

1 Department of Psychological Sciences, University of Missouri

2 Queensland Institute of Medical Research- Berghofer

**Author Note**

Correspondence concerning this article should be addressed to Genevieve F. Dash, Department of Psychological Sciences, University of Missouri, 210 McAlester Hall, Columbia, MO 65211. Email: [genevievedash@mail.missouri.edu](mailto:genevievedash@mail.missouri.edu).

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| Table S1  *Correlations Between Childhood Maltreatment Types and Other Study Variables* | | | | | |
| Variable | Rape | Sexual Molestation | Physical Abuse | Serious Neglect | Threatened/Held Captive/Kidnapped |
| Lifetime Disordered Gambling Symptoms | .03 | .01 | **.06** | .00 | **.05** |
| Past Year Disordered Gambling Symptoms | .01 | .01 | **.06** | .01 | **.04** |
| Childhood Socioeconomic Status | **.06** | **.07** | **.03** | **.11** | **.05** |
| Education | -.03 | .00 | -.02 | .00 | -.02 |
| Attention Deficit/Hyperactivity Symptoms | **.07** | **.06** | **.10** | **.12** | **.12** |
| Conduct Disorder Symptoms | **.10** | **.08** | **.13** | **.12** | **.17** |
| Childhood Depression | -.04 | -.02 | **-.06** | **-.05** | .00 |
| Adult Antisocial Behavior | **.05** | **.04** | **.36** | **.03** | **.14** |
| Lifetime Alcohol Use Disorder Symptoms | **.07** | **.06** | **.15** | .00 | **.08** |
| Past Year Alcohol Use Disorder Symptoms | .02 | .03 | **.11** | -.02 | .02 |
| *Note.* Pearson correlations are presented for continuous variables and Phi coefficients are presented for dichotomous variables; bold font indicates statistical significance (p<.05). | | | | | |

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| Table S2  *Twin Similarity for Childhood Maltreatment* | | | | | | | |
| Monozygotic Men (315 Pairs) | | | | | | | | | Monozygotic Women (494 Pairs) | | | | | | | | | | | | | |
|  |  | Twin 2 | | | | | | |  | | Twin 2 | | | | | | | | | | | |
|  |  | Maltreatment Score | | | | | | |  | | Maltreatment Score | | | | | | | | | | | |
| Twin 1 | | **0** | **1** | **2** | **3** | **4** | **5** | | Twin 1 | | **0** | **1** | | **2** | | **3** | | **4** | | | **5** | |
| Maltreatment Score | **0** | 232 | 27 | 3 | 1 | 0 | 0 | | Maltreatment Score | **0** | 240 | | 68 | | 2 | | 0 | | 0 | | | 0 |
| **1** | 31 | 13 | 0 | 0 | 0 | 0 | | **1** | 76 | | 53 | | 11 | | 0 | | 1 | | | 0 |
| **2** | 3 | 2 | 3 | 0 | 0 | 0 | | **2** | 11 | | 16 | | 5 | | 1 | | 1 | | | 0 |
| **3** | 0 | 0 | 0 | 0 | 0 | 0 | | **3** | 2 | | 0 | | 4 | | 2 | | 0 | | | 0 |
| **4** | 0 | 0 | 0 | 0 | 0 | 0 | | **4** | 0 | | 1 | | 0 | | 0 | | 0 | | | 0 |
| **5** | 0 | 0 | 0 | 0 | 0 | 0 | | **5** | 0 | | 0 | | 0 | | 0 | | 0 | | | 0 |
| Dizygotic Men (195 Pairs) | | | | | | | | | Dizygotic Women (328 Pairs) | | | | | | | | | | | | | |
|  |  | Twin 2 | | | | | | |  | | Twin 2 | | | | | | | | | | | |
|  |  | Maltreatment Score | | | | | | |  | | Maltreatment Score | | | | | | | | | | | |
| Twin 1 | | **0** | **1** | **2** | **3** | **4** | **5** | | Twin 1 | | **0** | **1** | | **2** | | **3** | | **4** | | | **5** | |
| Maltreatment Score | **0** | 144 | 22 | 3 | 0 | 0 | 0 | | Maltreatment Score | **0** | 152 | | 41 | | 9 | | 1 | | 0 | | | 0 |
| **1** | 17 | 5 | 0 | 0 | 0 | 0 | | **1** | 61 | | 24 | | 8 | | 1 | | 0 | | | 0 |
| **2** | 2 | 0 | 0 | 0 | 0 | 0 | | **2** | 9 | | 10 | | 2 | | 1 | | 0 | | | 1 |
| **3** | 1 | 1 | 0 | 0 | 0 | 0 | | **3** | 0 | | 3 | | 1 | | 0 | | 0 | | | 1 |
| **4** | 0 | 0 | 0 | 0 | 0 | 0 | | **4** | 0 | | 0 | | 1 | | 1 | | 0 | | | 0 |
| **5** | 0 | 0 | 0 | 0 | 0 | 0 | | **5** | 0 | | 1 | | 0 | | 0 | | 0 | | | 0 |
| Dizygotic Opposite Sex (372 Pairs) | | | | | | | | | Twin Similarity | | | | | | | | | | | | | |
|  |  | Male | | | | | | | Zygosity | | | | | Kappa (ⱪ) | | | | | | *p* | | |
|  |  | Maltreatment Score | | | | | | | Monozygotic Pairs | | | | | | | | | | | | | |
| Female | | **0** | **1** | **2** | **3** | **4** | **5** | | Men | | | | | .26 | | | | | | <.0001 | | |
| Maltreatment Score | **0** | 196 | 32 | 2 | 0 | 0 | 0 | | Women | | | | | .30 | | | | | | <.0001 | | |
| **1** | 83 | 26 | 4 | 0 | 0 | 0 | | Dizygotic Pairs | | | | | | | | | | | | | |
| **2** | 16 | 5 | 1 | 0 | 0 | 0 | | Men | | | | | .06 | | | | | | .13 | | |
| **3** | 7 | 0 | 0 | 0 | 0 | 0 | | Women | | | | | .20 | | | | | | .002 | | |
| **4** | 0 | 0 | 0 | 0 | 0 | 0 | | Opposite Sex | | | | | .10 | | | | | | .007 | | |
| **5** | 0 | 0 | 0 | 0 | 0 | 0 | |  | | | | |  | | | | | |  | | |
| *Note.* Shaded boxes represent concordant pairs. | | | | | | | | | | | | | | | | | | | | | | |

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| Table S3  *Variation in Childhood Maltreatment, Disordered Gambling, and Adult Antisocial Behavior Attributable to Additive Genetic (a2), Common Environmental (c2), and Unique Environmental (e2) Factors* | | | | | |
|  | Biometric Models | | | Twin Correlations | |
| Phenotype | *a2* [95% CI] | *c2* [95% CI] | *e2* [95% CI] | *r*MZ [95% CI] | *rDZ* [95% CI] |
| Childhood Maltreatment | .38 [.08, .54] | .07 [.00, .32] | .55 [.44, .64] | .46 [.36, .55] | .26 [.20, .36] |
| *p=*.002 | p=.46 | *p*<.001 | *p*<.001 | *p*<.001 |
| Lifetime Disordered Gambling | .56 [.49, .61] | .00 [.00, .00] | .44 [.39, .51] | .56 [.49, .61] | .28 [.24, .31] |
| *p*<.001 | *p*=.99 | *p*<.001 | *p*<.001 | *p*<.001 |
| Past Year Disordered Gambling | .34 [.02, .53] | .11 [.00, .33] | .56 [.38, .63] | .45 [.34, .56] | .28 [.20, .39] |
| *p=*.01 | *p*=.31 | *p*<.001 | *p*<.001 | *p*<.001 |
| Adult Antisocial Behavior | .81 [.65, .96] | .00 [.00, .48] | .19 [.04, .32] | .81 [.68, .96] | .41 [.34, .50] |
| *p*<.001 | *p*=.99 | *p*=.01 | *p*<.001 | *p*<.001 |
| *Note. r*MZ=monozygotic twin correlation, *r*DZ=dizygotic twin correlation. | | | | | |

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| Table S4  *Model Fit Statistics for Fully Adjusted Models* | | | | |
| Outcome Variables | Individual Models | | | |
|  | AIC | AICC | BIC | -2 Log Likelihood |
| Lifetime Disordered Gambling | 1448.28 | 1448.95 | 1496.61 | 1424.28 |
| Past Year Disordered Gambling | 762.98 | 763.78 | 809.71 | 738.98 |
| Adult Antisocial Behavior | 690.95 | 651.31 | 690.95 | 630.71 |
|  | MZ-DZ Models | | | |
|  | AIC | AICC | BIC | -2 Log Likelihood |
| Lifetime Disordered Gambling | 1370.66 | 1371.62 | 1426.44 | 1342.66 |
| Past Year Disordered Gambling | 131.81 | 143.68 | 164.82 | 93.81 |
| Adult Antisocial Behavior | 628.82 | 629.56 | 672.62 | 606.82 |
|  | MZ-Only Models | | | |
|  | AIC | AICC | BIC | -2 Log Likelihood |
| Lifetime Disordered Gambling | 638.57 | 640.05 | 677.41 | 614.57 |
| Past Year Disordered Gambling | 350.20 | 351.71 | 384.24 | 328.20 |
| Adult Antisocial Behavior | 299.38 | 300.99 | 334.92 | 277.38 |

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| Table S5  *Incidence Rate Ratios (IRRs) for Fully Adjusted Models of Rape Predicting Lifetime and Past Year Disordered Gambling Symptoms* | | | | | | | | | | | |
|  | Individual-Level | | | | MZ-DZ Co-Twin Control | | | MZ-Only Co-Twin Control | | | |
|  | Lifetime | | | | | | | | | | |
| Predictor | IRR | | 95% CI | *p* | IRR | 95% CI | *p* | IRR | | 95% CI | *p* |
| Rape | 0.96 | 0.64-1.45 | | .85\* | - | - | - | - | - | | - |
| BP Rape | - | - | | - | 1.00 | 0.55-1.83 | .99 | 1.33 | 0.57-3.08 | | .51 |
| WP Rape | - | - | | - | 0.82 | 0.36-1.88 | .64 | **0.37** | **0.15-0.92** | | **.03** |
| Interaction |  |  | |  |  |  |  |  |  | |  |
| Zygosity x Rape | - | - | | - | 0.50 | 0.13-1.93 | .31 | - | - | | - |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 0.85 | 0.70-1.03 | | .10 | 0.86 | 0.70-1.04 | .12 | - | - | | - |
| Sex | **1.25** | **1.02-1.52** | | **.03** | 1.22 | 0.99-1.49 | .06 | 1.31 | 0.96-1.79 | | .09 |
| Education | 0.97 | 0.94-1.00 | | .08 | 0.98 | 0.95-1.02 | .36 | **0.94** | **0.90-0.99** | | **.03** |
| ADHD Symptoms | **1.03** | **1.00-1.06** | | **.04** | 1.03 | 1.00-1.06 | .09 | 1.02 | 0.98-1.07 | | .23 |
| Conduct Disorder Symptoms | **1.12** | **1.04-.120** | | **.004** | **1.13** | **1.04-1.22** | **.003** | 1.09 | 0.99-1.21 | | .07 |
| Childhood Depression | 0.93 | 0.70-1.24 | | .62 | 0.89 | 0.66-1.20 | .44 | 0.76 | 0.49-1.18 | | .22 |
| Adult Antisocial Behavior | **1.18** | **1.11-1.26** | | **<.0001** | **1.19** | **1.12-1.27** | **<.0001** | **1.14** | **1.04-1.24** | | **.003** |
| Lifetime AUD Symptoms | **1.10** | **1.06-1.14** | | **<.0001** | **1.11** | **1.07-1.15** | **<.0001** | **1.17** | **1.10-1.24** | | **<.0001** |
|  | Past Year | | | | | | | | | | |
| Predictor | IRR | 95% CI | | *p* | IRR | 95% CI | *p* | IRR | 95% CI | | *p* |
| Rape | 0.69 | 0.35-1.33 | | .27 | - | - | - | - | - | | - |
| BP Rape | - | - | | - | 0.86 | 0.36-2.07 | .73\* | 1.05 | 0.27-4.16 | | .94 |
| WP Rape | - | - | | - | 0.48 | 0.16-1.43 | .19 | **0.20** | **0.05-0.91** | | **.04** |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 1.00 | 0.75-1.33 | | .98 | 0.95 | 0.71-1.28 | .75 | - | - | | - |
| Sex | 0.99 | 0.72-1.35 | | .93 | 0.90 | 0.65-1.24 | .50 | 0.83 | 0.49-1.42 | | .50 |
| Education | **0.91** | **0.86-0.96** | | **.0004** | **0.93** | **0.88-0.98** | **.009** | **0.87** | **0.80-0.94** | | **.001** |
| ADHD Symptoms | **1.07** | **1.02-1.13** | | **.003** | **1.08** | **1.03-1.13** | **.003** | 1.06 | 1.00-1.13 | | .07 |
| Conduct Disorder Symptoms | **1.14** | **1.01-1.29** | | **.03** | **1.15** | **1.02-1.31** | **.02** | **1.17** | **1.00-1.36** | | **.05** |
| Childhood Depression | **0.58** | **0.35-0.95** | | **.03** | **0.58** | **0.35-0.96** | **.03** | 0.56 | 0.25-1.29 | | .17 |
| Adult Antisocial Behavior | **1.25** | **1.14-1.37** | | **<.0001** | **1.26** | **1.15-1.38** | **<.0001** | **1.22** | **1.07-1.40** | | **.003** |
| Past Year AUD Symptoms | **1.24** | **1.12-1.38** | | **<.0001** | **1.24** | **1.12-1.38** | **<.0001** | **1.39** | **1.17-1.65** | | **.0003** |
| *Note.* Zygosity by predictor interaction included when significant in base model; CI=confidence interval; MZ=monozygotic twins, DZ=dizygotic twins, BP=between-pair, WP=within-pair, ADHD=attention deficit/hyperactivity disorder, AUD=alcohol use disorder; \*significant in base model, p<.05. | | | | | | | | | | | |

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| Table S6  *Incidence Rate Ratios (IRRs) for Fully Adjusted Models of Sexual Molestation Predicting Lifetime and Past Year Disordered Gambling Symptoms* | | | | | | | | | | | |
|  | Individual-Level | | | | MZ-DZ Co-Twin Control | | | MZ-Only Co-Twin Control | | | |
|  | Lifetime | | | | | | | | | | |
| Predictor | IRR | | 95% CI | *p* | IRR | 95% CI | *p* | IRR | | 95% CI | *p* |
| Sexual Molestation | 0.83 | 0.63-1.10 | | .20 | - | - | - | - | - | | - |
| BP Sexual Molestation | - | - | | - | **0.66** | **0.44-0.98** | **.04** | 0.61 | 0.34-1.08 | | .09 |
| WP Sexual Molestation | - | - | | - | 0.94 | 0.62-1.42 | .76 | 1.03 | 0.54-1.95 | | .93 |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 0.85 | 0.70-1.03 | | .09 | 0.87 | 0.71-1.06 | .16 | - | - | | - |
| Sex | 1.21 | 0.99-1.48 | | .06 | 1.17 | 0.95-1.44 | .14 | 1.22 | 0.89-1.68 | | .21 |
| Education | 0.97 | 0.94-1.00 | | .08 | 0.99 | 0.95-1.02 | .40 | **0.94** | **0.90-0.99** | | **.02** |
| ADHD Symptoms | **1.04** | **1.01-1.07** | | **.02** | **1.03** | **1.00-1.06** | **.05** | 1.03 | 0.99-1.08 | | .10 |
| Conduct Disorder Symptoms | **1.12** | **1.04-1.21** | | **.003** | **1.14** | **1.06-1.23** | **.001** | **1.11** | **1.00-1.22** | | **.05** |
| Childhood Depression | 0.93 | 0.70-1.24 | | .63 | 0.88 | 0.65-1.19 | .42 | 0.79 | 0.50-1.22 | | .29 |
| Adult Antisocial Behavior | **1.18** | **1.11-1.25** | | **<.0001** | **1.19** | **1.12-1.27** | **<.0001** | **1.14** | **1.05-1.24** | | **.003** |
| Lifetime AUD Symptoms | **1.10** | **1.06-1.15** | | **<.0001** | **1.11** | **1.07-1.16** | **<.0001** | **1.17** | **1.11-1.24** | | **<.0001** |
|  | Past Year | | | | | | | | | | |
| Predictor | IRR | 95% CI | | *p* | IRR | 95% CI | *p* | IRR | 95% CI | | *p* |
| Sexual Molestation | 0.66 | 0.42-1.06 | | .09 | - | - | - | - | - | | - |
| BP Sexual Molestation | - | - | | - | **0.47** | **0.25-0.87** | **.02** | 0.72 | 0.28-1.84 | | .49 |
| WP Sexual Molestation | - | - | | - | 1.11 | 0.51-2.41 | .80 | 0.93 | 0.29-2.98 | | .91 |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 0.99 | 0.74-1.32 | | .94 | 0.98 | 0.73-1.31 | .89 | - | - | | - |
| Sex | 0.99 | 0.74-1.32 | | .78 | 0.85 | 0.61-1.18 | .33 | 0.81 | 0.47-1.38 | | .43 |
| Education | **0.91** | **0.86-0.96** | | **.0004** | **0.93** | **0.88-0.98** | **.01** | **0.87** | **0.80-0.95** | | **.001** |
| ADHD Symptoms | **1.08** | **1.03-1.13** | | **.002** | **1.08** | **1.03-1.14** | **.002** | **1.08** | **1.01-1.15** | | **.03** |
| Conduct Disorder Symptoms | **1.15** | **1.01-1.30** | | **.03** | **1.18** | **1.04-1.34** | **.01** | 1.17 | 0.99-1.37 | | .06 |
| Childhood Depression | **0.58** | **0.36-0.96** | | **.03** | **0.58** | **0.35-0.96** | **.04** | 0.58 | 0.25-1.35 | | .21 |
| Adult Antisocial Behavior | **1.24** | **1.13-1.36** | | **<.0001** | **1.26** | **1.15-1.38** | **<.0001** | **1.23** | **1.08-1.41** | | **.002** |
| Past Year AUD Symptoms | **1.24** | **1.12-1.38** | | **<.0001** | **1.25** | **1.12-1.39** | **<.0001** | **1.40** | **1.18-1.68** | | **.0002** |
| *Note.* Sexual molestation nonsignificant in all base models; CI=confidence interval; MZ=monozygotic twins, DZ=dizygotic twins, BP=between-pair, WP=within-pair, ADHD=attention deficit/hyperactivity disorder, AUD=alcohol use disorder. | | | | | | | | | | | |

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| Table S7  *Incidence Rate Ratios (IRRs) for Fully Adjusted Models of Physical Abuse Predicting Lifetime and Past Year Disordered Gambling Symptoms* | | | | | | | | | | | |
|  | Individual-Level | | | | MZ-DZ Co-Twin Control | | | MZ-Only Co-Twin Control | | | |
|  | Lifetime | | | | | | | | | | |
| Predictor | IRR | | 95% CI | *p* | IRR | 95% CI | *p* | IRR | | 95% CI | *p* |
| Physical Abuse | 0.95 | 0.76-1.19 | | .66\*\* | - | - | - | - | - | | - |
| BP Physical Abuse | - | - | | - | 1.10 | 0.78-1.54 | .59\*\* | 1.23 | 0.75-2.01 | | .42\*\* |
| WP Physical Abuse | - | - | | - | 0.84 | 0.62-1.14 | .26\* | 1.09 | 0.73-1.64 | | .67 |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 0.85 | 0.70-1.02 | | .09 | 0.86 | 0.71-1.05 | .14 | - | - | | - |
| Sex | **1.24** | **1.01-1.52** | | **.04** | 1.22 | 0.98-1.51 | .07 | 1.35 | 0.97-1.90 | | .08 |
| Education | 0.97 | 0.94-1.00 | | .06 | 0.98 | 0.95-1.02 | .33 | **0.95** | **0.90-0.99** | | **.03** |
| ADHD Symptoms | **1.03** | **1.00-1.06** | | **.04** | 1.03 | 1.00-1.06 | .08 | 1.02 | 0.98-1.06 | | .25 |
| Conduct Disorder Symptoms | **1.12** | **1.04-1.20** | | **.004** | **1.12** | **1.04-1.21** | **.003** | 1.09 | 0.99-1.21 | | .08 |
| Childhood Depression | 0.93 | 0.70-1.23 | | .59 | 0.91 | 0.68-1.23 | .54 | 0.78 | 0.50-1.21 | | .27 |
| Adult Antisocial Behavior | **1.19** | **1.11-1.27** | | **<.0001** | **1.20** | **1.12-1.28** | **<.0001** | **1.13** | **1.03-1.24** | | **.01** |
| Lifetime AUD Symptoms | **1.10** | **1.06-1.14** | | **<.0001** | **1.10** | **1.06-1.15** | **<.0001** | **1.16** | **1.10-1.23** | | **<.0001** |
|  | Past Year | | | | | | | | | | |
| Predictor | IRR | 95% CI | | *p* | IRR | 95% CI | *p* | IRR | 95% CI | | *p* |
| Physical Abuse | 0.93 | 0.65-1.34 | | .69\*\* | - | - | - | - | - | | - |
| BP Physical Abuse | - | - | | - | 1.10 | 0.67-1.81 | .71\*\* | 1.44 | 0.65-3.18 | | .37\*\* |
| WP Physical Abuse | - | - | | - | 0.81 | 0.48-1.36 | .42 | 1.07 | 0.56-2.05 | | .83 |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 1.00 | 0.75-1.33 | | .99 | 0.97 | 0.73-1.31 | .86 | - | - | | - |
| Sex | 0.99 | 0.72-1.38 | | .97 | 0.90 | 0.64-1.27 | .56 | 0.93 | 0.52-1.66 | | .81 |
| Education | **0.91** | **0.86-0.96** | | **.0005** | **0.93** | **0.88-0.98** | **.01** | **0.87** | **0.80-0.95** | | **.002** |
| ADHD Symptoms | **1.08** | **1.03-1.13** | | **.003** | **1.08** | **1.03-1.14** | **.001** | 1.07 | 1.00-1.14 | | .06 |
| Conduct Disorder Symptoms | **1.14** | **1.01-1.29** | | **.03** | **1.15** | **1.01-1.30** | **.03** | 1.15 | 0.98-1.35 | | .08 |
| Childhood Depression | **0.58** | **0.35-0.95** | | **.03** | 0.61 | 0.37-1.01 | .06 | 0.59 | 0.26-1.36 | | .22 |
| Adult Antisocial Behavior | **1.25** | **1.13-1.38** | | **<.0001** | **1.26** | **1.14-1.40** | **<.0001** | **1.21** | **1.05-1.39** | | **.008** |
| Past Year AUD Symptoms | **1.24** | **1.12-1.37** | | **<.0001** | **1.24** | **1.11-1.38** | **<.0001** | **1.39** | **1.17-1.66** | | **.0003** |
| *Note.* CI=confidence interval; MZ=monozygotic twins, DZ=dizygotic twins, BP=between-pair, WP=within-pair, ADHD=attention deficit/hyperactivity disorder, AUD=alcohol use disorder; \*\*significant in base model, p<.0001, \*p<.05. | | | | | | | | | | | |

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| Table S8  *Incidence Rate Ratios (IRRs) for Fully Adjusted Models of Serious Neglect Predicting Lifetime and Past Year Disordered Gambling Symptoms* | | | | | | | | | | | |
|  | Individual-Level | | | | MZ-DZ Co-Twin Control | | | MZ-Only Co-Twin Control | | | |
|  | Lifetime | | | | | | | | | | |
| Predictor | IRR | | 95% CI | *p* | IRR | 95% CI | *p* | IRR | | 95% CI | *p* |
| Serious Neglect | 0.82 | 0.45-1.49 | | .51 | - | - | - | - | - | | - |
| BP Serious Neglect | - | - | | - | 0.91 | 0.35-2.38 | .85 | 0.79 | 0.19-3.26 | | .75 |
| WP Serious Neglect | - | - | | - | 0.82 | 0.33-2.03 | .67 | 1.66 | 0.45-6.10 | | .44 |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 0.85 | 0.70-1.02 | | .08 | 0.85 | 0.70-1.04 | .11 | - | - | | - |
| Sex | **1.25** | **1.03-1.52** | | **.02** | **1.23** | **1.01-1.50** | **.04** | 1.30 | 0.95-1.77 | | .10 |
| Education | 0.97 | 0.94-1.00 | | .07 | 0.98 | 0.95-1.02 | .32 | **0.95** | **0.90-1.00** | | **.03** |
| ADHD Symptoms | **1.03** | **1.00-1.06** | | **.03** | 1.03 | 1.00-1.06 | .08 | 1.03 | 0.99-1.07 | | .19 |
| Conduct Disorder Symptoms | **1.12** | **1.04-1.20** | | **.004** | **1.13** | **1.04-1.22** | **.003** | 1.10 | 0.99-1.21 | | .07 |
| Childhood Depression | 0.92 | 0.69-1.22 | | .57 | 0.89 | 0.66-1.19 | .43 | 0.77 | 0.50-1.20 | | .25 |
| Adult Antisocial Behavior | **1.18** | **1.11-1.26** | | **<.0001** | **1.19** | **1.12-1.27** | **<.0001** | **1.15** | **1.05-1.25** | | **.002** |
| Lifetime AUD Symptoms | **1.10** | **1.05-1.14** | | **<.0001** | **1.10** | **1.06-1.15** | **<.0001** | **1.16** | **1.10-1.23** | | **<.0001** |
|  | Past Year | | | | | | | | | | |
| Predictor | IRR | 95% CI | | *p* | IRR | 95% CI | *p* | IRR | 95% CI | | *p* |
| Serious Neglect | 1.41 | 0.58-3.45 | | .45 | - | - | - | - | - | | - |
| BP Serious Neglect | - | - | | - | 1.18 | 0.28-4.98 | .82 | 2.36 | 0.30-18.61 | | .41 |
| WP Serious Neglect | - | - | | - | 1.90 | 0.38-9.41 | .43 | 1.85 | 0.30-11.23 | | .50 |
| Covariate |  |  | |  |  |  |  |  |  | |  |
| Zygosity | 1.00 | 0.75-1.33 | | .99 | 0.97 | 0.72-1.30 | .84 | - | - | | - |
| Sex | 1.03 | 0.76-1.39 | | .87 | 0.92 | 0.67-1.27 | .62 | 0.85 | 0.50-1.44 | | .54 |
| Education | **0.91** | **0.86-0.96** | | **.0005** | **0.93** | **0.88-0.98** | **.01** | **0.87** | **0.80-0.95** | | **.002** |
| ADHD Symptoms | **1.07** | **1.03-1.13** | | **.003** | **1.08** | **1.03-1.13** | **.002** | **1.07** | **1.00-1.14** | | **.05** |
| Conduct Disorder Symptoms | **1.13** | **1.00-1.27** | | **.05** | **1.14** | **1.01-1.30** | **.04** | 1.14 | 0.97-1.34 | | .10 |
| Childhood Depression | **0.58** | **0.35-0.96** | | **.03** | **0.59** | **0.36-0.98** | **.04** | 0.58 | 0.25-1.33 | | .20 |
| Adult Antisocial Behavior | **1.24** | **1.13-1.36** | | **<.0001** | **1.25** | **1.14-1.37** | **<.0001** | **1.23** | **1.08-1.41** | | **.002** |
| Past Year AUD Symptoms | **1.24** | **1.12-1.38** | | **<.0001** | **1.25** | **1.12-1.39** | **<.0001** | **1.42** | **1.19-1.70** | | **.0001** |
| *Note.* Serious neglect nonsignificant in all base models; CI=confidence interval; MZ=monozygotic twins, DZ=dizygotic twins, BP=between-pair, WP=within-pair, ADHD=attention deficit/hyperactivity disorder, AUD=alcohol use disorder. | | | | | | | | | | | |

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| Table S9  *Incidence Rate Ratios (IRRs) for Fully Adjusted Models of Being Threatened with a Weapon, Held Captive, or Kidnapped Predicting Lifetime and Past Year Disordered Gambling Symptoms* | | | | | | | | | |
|  | Individual-Level | | | MZ-DZ Co-Twin Control | | | MZ-Only Co-Twin Control | | |
|  | Lifetime | | | | | | | | |
| Predictor | IRR | 95% CI | *p* | IRR | 95% CI | *p* | IRR | 95% CI | *p* |
| Threatened/Held Captive/Kidnapped | 1.07 | 0.69-1.65 | .77\* | - | - | - | - | - | - |
| BP Threatened/Held Captive/Kidnapped | - | - | - | 1.56 | 0.76-3.20 | .23\* | **2.80** | **1.06-7.43** | **.04\*** |
| WP Threatened/Held Captive/Kidnapped | - | - | - | 0.83 | 0.45-1.53 | .56 | 0.77 | 0.40-1.51 | .45 |
| Covariate |  |  |  |  |  |  |  |  |  |
| Zygosity | 0.85 | 0.70-1.02 | .08 | 0.85 | 0.70-1.03 | .10 | - | - | - |
| Sex | **1.26** | **1.03-1.52** | **.02** | **1.23** | **1.01-1.50** | **.04** | 1.26 | 0.92-1.72 | .14 |
| Education | 0.97 | 0.94-1.00 | .07 | 0.98 | 0.95-1.02 | .30 | **0.94** | **0.90-0.99** | **.03** |
| ADHD Symptoms | **1.03** | **1.00-1.06** | **.04** | 1.03 | 1.00-1.06 | .10 | 1.02 | 0.98-1.07 | .26 |
| Conduct Disorder Symptoms | **1.11** | **1.03-1.20** | **.005** | **1.12** | **1.04-1.21** | **.005** | 1.09 | 0.99-1.21 | .09 |
| Childhood Depression | 0.93 | 0.70-1.23 | .60 | 0.90 | 0.66-1.21 | .46 | 0.78 | 0.50-1.21 | .26 |
| Adult Antisocial Behavior | **1.18** | **1.11-1.26** | **<.0001** | **1.19** | **1.12-1.27** | **<.0001** | **1.14** | **1.04-1.24** | **.004** |
| Lifetime AUD Symptoms | **1.10** | **1.06-1.14** | **<.0001** | **1.10** | **1.06-1.15** | **<.0001** | **1.17** | **1.10-1.23** | **<.0001** |
|  | Past Year | | | | | | | | |
| Predictor | IRR | 95% CI | *p* | IRR | 95% CI | *p* | IRR | 95% CI | *p* |
| Threatened/Held Captive/Kidnapped | 0.95 | 0.46-1.95 | .89\* | - | - | - | - | - | - |
| BP Threatened/Held Captive/Kidnapped | - | - | - | 0.79 | 0.27-2.34 | .67\* | 1.72 | 0.34-8.62 | .51\* |
| WP Threatened/Held Captive/Kidnapped | - | - | - | 1.39 | 0.42-4.57 | .58 | 1.45 | 0.37-5.69 | .59 |
| Covariate |  |  |  |  |  |  |  |  |  |
| Zygosity | 1.00 | 0.75-1.33 | .98 | 0.97 | 0.72-1.30 | .82 | - | - | - |
| Sex | 1.02 | 0.75-1.38 | .92 | 0.91 | 0.66-1.25 | .55 | 0.81 | 0.48-1.38 | .44 |
| Education | **0.91** | **0.86-0.96** | **.0005** | **0.93** | **0.88-0.98** | **.01** | **0.87** | **0.80-0.95** | **.002** |
| ADHD Symptoms | **1.07** | **1.03-1.13** | **.003** | **1.08** | **1.03-1.14** | **.002** | 1.06 | 0.99-1.14 | .07 |
| Conduct Disorder Symptoms | **1.14** | **1.01-1.29** | **.04** | **1.15** | **1.02-1.31** | **.03** | 1.15 | 0.98-1.35 | .09 |
| Childhood Depression | **0.58** | **0.35-0.95** | **.03** | **0.58** | **0.35-0.97** | **.04** | 0.57 | 0.25-1.31 | .19 |
| Adult Antisocial Behavior | **1.24** | **1.13-1.36** | **<.0001** | **1.25** | **1.14-1.37** | **<.0001** | **1.23** | **1.08-1.41** | **.002** |
| Past Year AUD Symptoms | **1.24** | **1.12-1.38** | **<.0001** | **1.24** | **1.11-1.38** | **<.0001** | **1.42** | **1.19-1.69** | **.0001** |
| *Note.* CI=confidence interval; MZ=monozygotic twins, DZ=dizygotic twins, BP=between-pair, WP=within-pair, ADHD=attention deficit/hyperactivity disorder, AUD=alcohol use disorder; \*significant in base model, p<.05. | | | | | | | | | |