

**Online Supplement (Meier et al.)**

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Supplemental Table 1. Relative risk of persistent alcohol dependence given each childhood and adolescent risk factor (n=961).

Childhood and Adolescent Predictors	RR	95% CI	p	AUC
Low Family SES	2.13	1.13, 4.00	.019	0.58
Family History of Substance Dependence	3.34	1.82, 6.12	<.001	0.63
Childhood Conduct Disorder	3.47	1.89, 6.37	<.001	0.64
Childhood Depression	2.79	1.49, 5.20	.001	0.61
Early Exposure to Substances	2.68	1.34, 5.39	.006	0.58
Adolescent Frequent Alcohol Use	2.35	0.76, 7.33	.14	0.53
Adolescent Frequent Tobacco Use	2.65	1.38, 5.07	.003	0.62
Adolescent Frequent Cannabis Use	2.03	0.51, 8.03	.31	0.52
Male	3.37	1.62, 6.99	.001	0.64
Cumulative Risk Index				0.77

Supplemental Table 2. Relative risk of persistent tobacco dependence given each childhood and adolescent risk factor (n=964).

Childhood and Adolescent Predictors	RR	95% CI	p	AUC
Low Family SES	1.61	1.07, 2.43	.023	0.55
Family History of Substance Dependence	3.10	2.14, 4.51	<.001	0.63
Childhood Conduct Disorder	2.85	1.96, 4.14	<.001	0.62
Childhood Depression	2.49	1.71, 3.64	<.001	0.60
Early Exposure to Substances	2.53	1.66, 3.86	<.001	0.58
Adolescent Frequent Alcohol Use	2.43	1.28, 4.63	.007	0.53
Adolescent Frequent Tobacco Use	8.17	5.02, 13.31	<.001	0.76
Adolescent Frequent Cannabis Use	3.96	2.31, 6.79	<.001	0.55
Male	0.94	0.64, 1.37	.73	0.51
Cumulative Risk Index				0.77

Supplemental Table 3. Relative risk of persistent cannabis dependence given each childhood and adolescent risk factor (n=962).

Childhood and Adolescent Predictors	RR	95% CI	p	AUC
Low Family SES	1.66	0.74, 3.73	.223	0.55
Family History of Substance Dependence	3.09	1.46, 6.54	.003	0.62
Childhood Conduct Disorder	7.26	3.31, 15.92	<.001	0.73
Childhood Depression	1.91	0.87, 4.18	.11	0.56
Early Exposure to Substances	4.94	2.35, 10.36	<.001	0.65
Adolescent Frequent Alcohol Use	3.32	1.04, 10.57	.042	0.54
Adolescent Frequent Tobacco Use	8.88	3.37, 23.42	<.001	0.75
Adolescent Frequent Cannabis Use	17.60	8.52, 36.33	<.001	0.67
Male	5.61	1.95, 16.09	.001	0.68
Cumulative Risk Index				0.83

Supplemental Table 4. Relative risk of lifetime hard-drug dependence given each childhood and adolescent risk factor (n=986).<sup>a</sup>

Childhood and Adolescent Predictors	RR	95% CI	p	AUC
Low Family SES	2.12	1.31, 3.46	.002	0.58
Family History of Substance Dependence	2.64	1.63, 4.26	<.001	0.60
Childhood Conduct Disorder	7.40	4.49, 12.19	<.001	0.74
Childhood Depression	2.44	1.52, 3.94	<.001	0.60
Early Exposure to Substances	3.68	2.26, 6.00	<.001	0.62
Adolescent Frequent Alcohol Use	2.68	1.23, 5.85	.013	0.53
Adolescent Frequent Tobacco Use	3.43	2.07, 5.68	<.001	0.66
Adolescent Frequent Cannabis Use	7.31	4.27, 12.50	<.001	0.58
Male	2.11	1.26, 3.52	.004	0.59
Cumulative Risk Index				0.80

Note. a. Persistent hard-drug dependence was too rare for accurate prediction (1.07%).

Supplemental Table 5. Low self-control and childhood maltreatment predict persistent substance dependence.

Risk Factor	Description	RR	95% CI	p	AUC
Low Self-Control	Children's self-control was measured using a multi-occasion/multi-informant strategy (Moffitt <i>et al.</i> , 2011). Nine measures of childhood self-control were aggregated into a single composite measure. The composite measure included observational ratings of children's lack of control, parent and teacher reports of impulsive aggression, and parent, teacher, and self-reports of hyperactivity, lack of persistence, inattention, and impulsivity. At ages 3 and 5, each study child participated in a testing session involving cognitive and motor tasks. The children were tested by examiners who had no knowledge of their behavioral history. Following the testing, each examiner rated the child's lack of control in the testing session. At ages 5, 7, 9, and 11, parents and teachers completed the Rutter Child Scale (RCS; Elander & Rutter, 1996), which included items indexing impulsive aggression and hyperactivity. At ages 9 and 11, the RCS was supplemented with additional questions about the children's lack of persistence, inattention, and impulsivity (McGee <i>et al.</i> , 1992). At age 11, children were interviewed by a psychiatrist and reported about their symptoms of hyperactivity, inattention, and impulsivity (Anderson <i>et al.</i> , 1987). The nine measures of self-control in childhood were all similarly positively and significantly correlated. Based on principal components analyses, the standardized components were averaged into a single composite score (M=0, SD=1) with excellent internal reliability ( $\alpha=0.86$ ); the first component accounted for 51% of the variance. For this article, children scoring in the top 20% of the sample-wide distribution were scored as having low self-control.	1.62	1.22, 2.15	<.001	0.55
Childhood Maltreatment	Evidence of childhood maltreatment during the first decade of life (ages 3-11) was ascertained by using behavioral observations, parental reports, and retrospective reports by study members once they reached adulthood (Danese <i>et al.</i> , 2007). First, exposure to maternal rejection (reported for 14% of study participants) was assessed at age 3 by observational ratings of mothers' interaction with the study children. Second, exposure to harsh discipline was assessed at ages 7 and 9 according to parental reports of disciplinary behaviors. Parents scoring in the top decile of the sample-wide distribution were classified as unusually harsh. Third, exposure to disruptive caregiver changes was assessed through	1.62	1.25, 2.10	<.001	0.57

age 11 and defined by two or more changes of the child's primary caregiver (6% of participants). Fourth, exposure to physical abuse (4% of participants) was assessed retrospectively at age 26 on the basis of reports of multiple episodes of severe physical punishment resulting in lasting bruising or physical injury through age 11. Fifth, exposure to sexual abuse (12% of participants) was assessed retrospectively at age 26 on the basis of reports of unwanted sexual contact before age 11. We derived a cumulative exposure index for each child by counting the number of maltreatment experiences during the first decade of life (Caspi *et al.*, 2002). For this article, children who experienced one indicator of maltreatment (27%) or two or more indicators (9%) were scored as experiencing maltreatment.

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Note. RR=relative risk. AUC=area-under-the-curve. Low self-control and childhood maltreatment were not initially selected for inclusion in the cumulative risk index because of the difficulty assessing them briefly and accurately in community-based settings.

Supplemental Table 6. Brief screen for use in community settings.

## Mother Checklist. Check all that apply.

	Mother	Father	Maternal Grandmother	Maternal Grandfather	Paternal Grandmother	Paternal Grandfather
Ever had any treatment or been in hospital for drinking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ever had alcoholism?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ever had a drinking problem or did other people think he/she had a drinking problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IF 1 OR MORE BOXES ARE CHECKED, MOTHER CHECKLIST SCORE = 1. IF NOT, SCORE = 0.

## Adolescent Brief Screen. Have you...

	Yes	No
Broken into someone else's house, building, or car in the past year?	<input type="checkbox"/>	<input type="checkbox"/>
Felt fatigue or loss of energy nearly every day for a period of two weeks or more in the past year?	<input type="checkbox"/>	<input type="checkbox"/>
Used drugs (e.g., inhalants, cannabis) or used or purchased alcohol on multiple occasions before age 16?	<input type="checkbox"/>	<input type="checkbox"/>
Used alcohol five or more days per week in the past year?	<input type="checkbox"/>	<input type="checkbox"/>
Used tobacco every day in the past year?	<input type="checkbox"/>	<input type="checkbox"/>
Used cannabis five or more days per week in the past year?	<input type="checkbox"/>	<input type="checkbox"/>

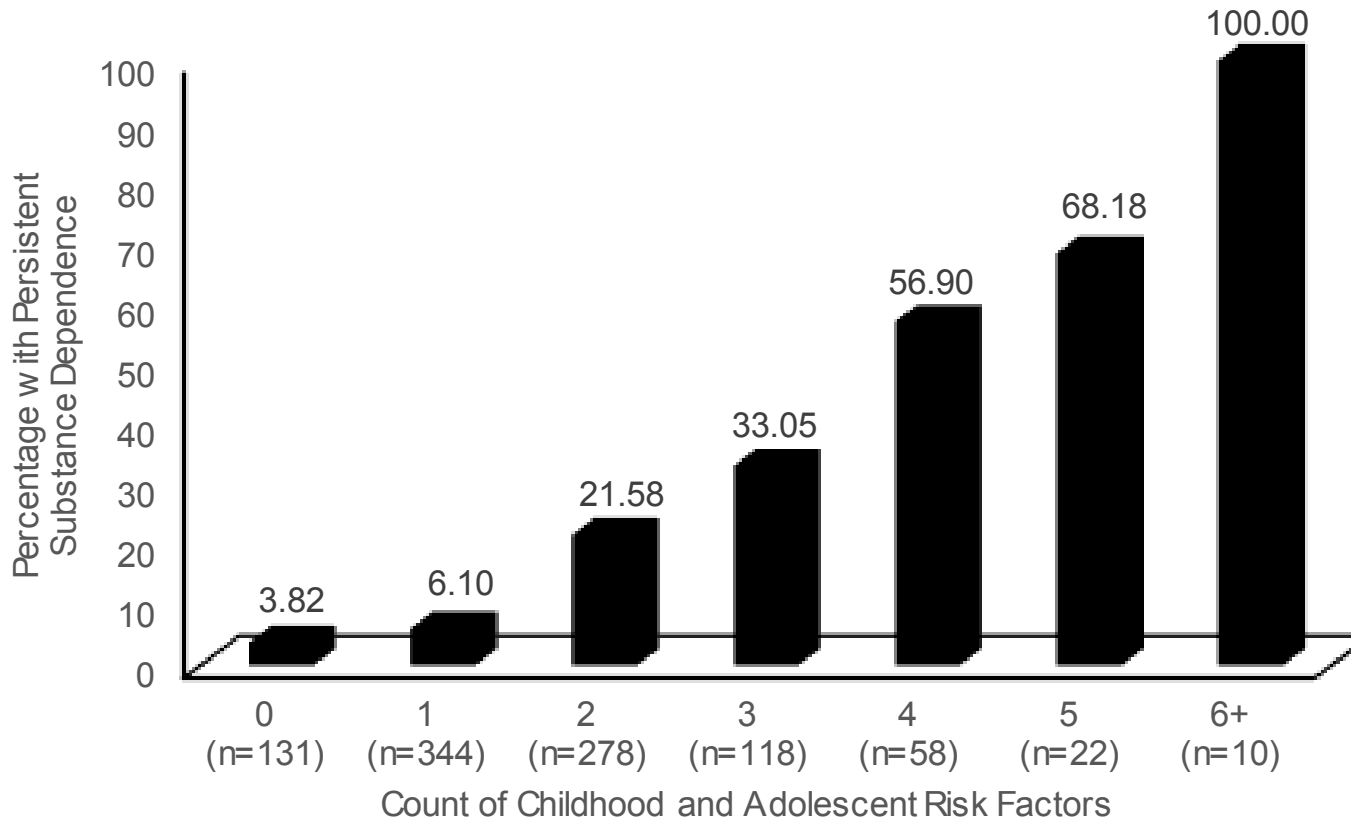
**BRIEF SCREEN CUMULATIVE RISK SCORE = SCORE FROM MOTHER CHECKLIST (0 OR 1) PLUS # OF BOXES CHECKED ON ADOLESCENT BREIF SCREEN PLUS '1' IF MALE.** The Brief Screen score represents the sum of 8 indicators: family history, breaking into someone's house, fatigue/loss of energy, early exposure to substances, frequent use of alcohol, frequent use of tobacco, frequent use of cannabis, and male sex.



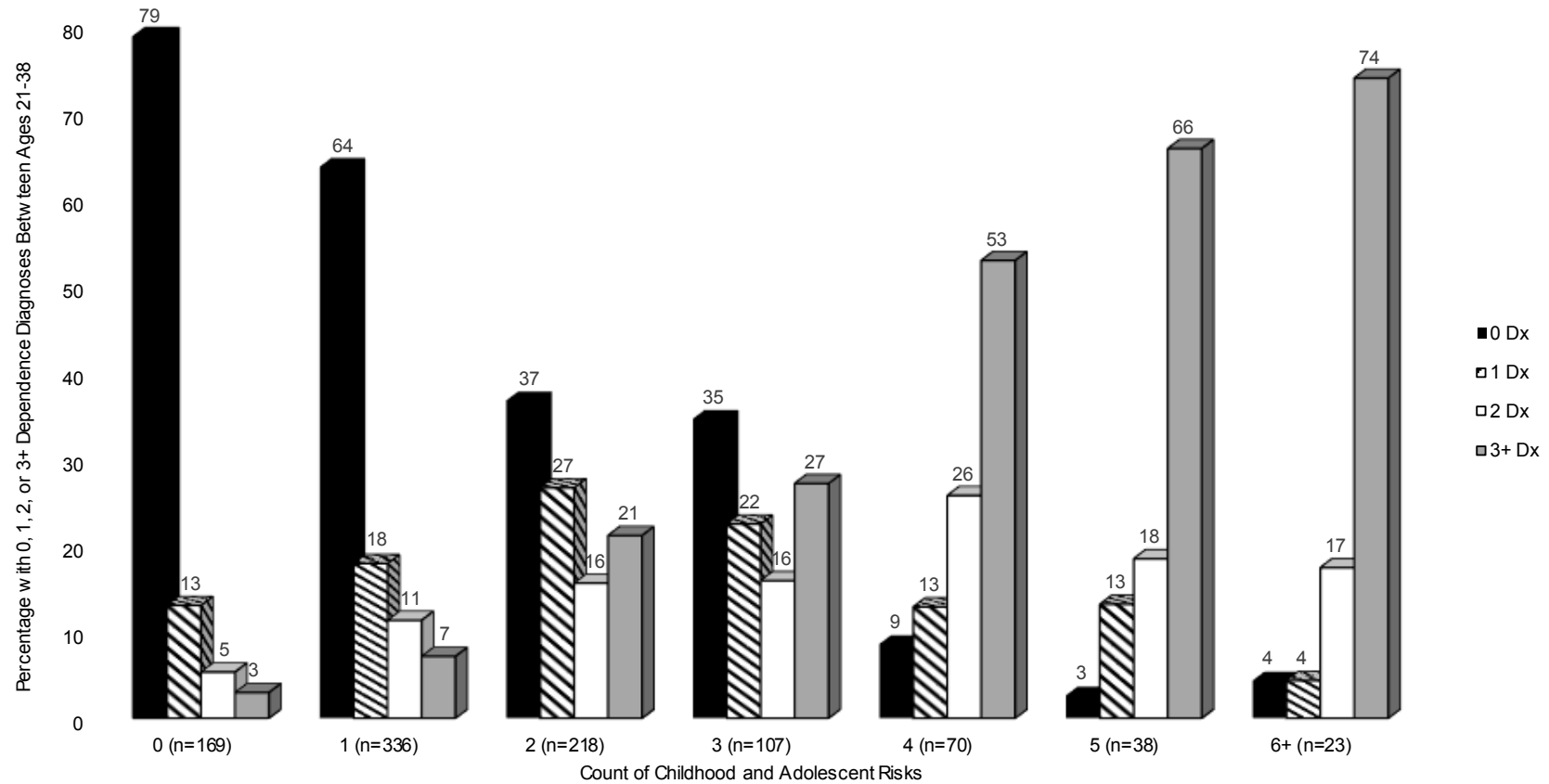


Supplemental Table 7. Sensitivity, specificity, positive predictive value, negative predictive value, and overall prediction accuracy of the brief-screen-adapted cumulative risk index as a function of number of risk factors (n=961).

# of Risk Factors	Sensitivity	Specificity	PPV	NPV	Overall Accuracy (%)	Proportion of the Population with # of Risk Factors
1+	0.97	0.16	0.21	0.96	32	86.37
2+	0.86	0.58	0.32	0.95	63	50.57
3+	0.53	0.86	0.47	0.89	80	21.64
4+	0.32	0.96	0.64	0.86	84	9.37
5+	0.13	0.99	0.78	0.83	83	3.33
6+	0.06	1.00	1.00	0.81	82	1.04



Supplemental Figure 1. Percentage of population-representative cohort who had persistent substance dependence in adulthood as a function of number of brief-screen-adapted childhood and adolescent risks. Note. Percentages (shown above each bar) can be used to calculate an adolescent's relative risk for persistent substance dependence in adulthood. For example, adolescents with 2 risks were 5.65 times more likely to develop persistent substance dependence in adulthood than their peers with zero risks ( $21.58/3.82=5.65$ ).



Supplemental Figure 2. Percentage of population-representative cohort with 0, 1, 2, or 3+ dependence diagnoses as a function of number of childhood and adolescent risks. For example, 79% of those with 0 risks never diagnosed with substance dependence between ages 21 and 38, whereas only 4% of those with 6+ risks never diagnosed. As another example, of those with 4 risks, 79% diagnosed 2 or 3+ times with substance dependence (79%=26%+53%).

## References for Supplemental Material

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