Targeted Interventions for Youth:

Individual- and population-level benefits of targeting personality risk in school-based interventions.

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Addiction from a developmental perspective:

- Adolescent onset substance misuse
 - Most substance use disorders have their symptom onset during adolescence
 - heightened risk of developing addictive disorders and other internalising/ externalising disorders (Grant & Dawson, 1998)
 - More severe, complex course of disorder with significant health and social consequences.
- Alcohol and drug toxicity and adolescent susceptibility
 - fronto-striatal and fronto-parietal pathways, important for higher level executive functions, develop late in adolescence (Levin, 1991).
 - Neuropsychological and neuroimaging findings with adolescent SUDs suggest these very brain circuits are abnormal in adolescents who recently misused alcohol (Tapert, 2002).

Costs of Substance Abuse to Canadian Society

attributable to substance abuse by cost category in Canada, 2002 Indirect costs: productivity losses \$24.3 (61%) Direct health care costs \$8.8 (22%) Direct law enforcement costs \$5.4 (14%) Other direct costs \$1.3 (3%) Total cost: \$39.8 billion Figure 2: Per capita costs of substance abuse in Canada, 2002

[Note: Numbers may not add up because of rounding]

			(in ı	nillions of dollars)	
		Tobacco	Alcohol	illegal drugs	TOTAL TAD
1.	Direct health care costs: total	4,360.2	3,306.2	1,134.6	8,800.9
	1.1 morbidity - acute care hospitalization	2,551.2	1,458.6	426.37	4,436.2
	 psychiatric hospitalization 	-	19.6	11.5	31.2
	1.2 inpatient specialized treatment	-	754.9	352.1	1,107.1
	1.3 outpatient specialized treatment	-	52.4	56.3	108.7
	1.4 ambulatory care: physician fees	142.2	80.2	22.6	245.0
	1.5 family physician visit	306.3	172.8	48.8	527.9
	1.6 prescription drugs	1,360.5	767.6	216.8	2,344.9
2.	Direct law enforcement costs	-	3,072.2	2,335.5	5,407.8
	2.1 police	-	1,898.8	1,432.0	3,330.7
	2.2 courts	-	513.1	330.6	843.7
	2.3 corrections (including probation)	-	660.4	573.0	1,233.4
3.	Direct costs for prevention and research	78.1	53.0	16.5	147.6
	3.1 research	9.0	17.3	8.6	34.9
	3.2 prevention programs	69.1	33.9	7.9	110.9
	3.3 salaries and operating funds	-	1.8	-	1.8
4.	Other direct costs	87.0	996.1	79.1	1,162.2
	4.1 fire damage	86.5	156.5	-	243.0
	4.2 traffic accident damage	-	756.9	67.0	823.9
	4.3 losses associated with the workplace	0.5	17.0	6.6	24.1
	4.3.1 EAP & health promotion programs	0.5	17.0	4.2	21.7
	4.3.2 drug testing in the workplace	N/A	-	2.4	2.4
	4.4 administrative costs for transfer payments	0.0	65.8	5.4	71.3
	4.4.1 social welfare and other programs	-	4.3	-	4.3
	4.4.2 workers' compensation	-	61.5	5.4	66.9
5.	Indirect costs: productivity losses	12,470.9	7,126.4	4,678.6	24,275.9
	5.1 due to long-term disability	10,536.8	6,163.9	4,408.4	21,109.1
	5.2 due to short-term disability (days in bed)	24.4	15.9	21.8	62.0
	5.3 due to short-term disability				
	(days with reduced activity)	36.2	23.6	-0.1	59.8
	5.4 due to premature mortality	1,873.5	923.0	248.5	3,045.0
Tot	al	16,996.2	14,554.0	8,244.3	39,794.4
Tot	al per capita (in \$)	541	463	262	1,267
Tot	al as % of all substance-related costs	42.7	36.6	20.7	100.0

Public Health Intervention Strategies



Age at onset of alcohol use and DSM-IV alcohol abuse and dependence: A 12-year follow-up

Bridget F. Grant^{a,*}, Frederick S. Stinson^a, Thomas C. Harford^b

Table 4

Logistic regression analysis of DSM-IV alcohol abuse and dependence in 1994 using the 1982 age at drinking onset baseline

	Alcohol a	abuse		Alcohol dependence		
Variable	β	S.E.	Odds ratio	β	S.E.	Odds ratio
Intercept	-0.94^{a}	0.46		-1.41^{a}	0.71	
Age at drinking onset (years)	-0.07^{b}	0.02	0.93	-0.09^{b}	0.03	0.91
Male	0.69 ^b	0.09	2.00	0.87^{b}	0.14	2.39
Black	-0.52^{b}	0.14	0.59	-0.15	0.17	0.86
Married	-0.66^{b}	0.08	0.52	-1.38^{b}	0.13	0.25
Age (years, 1982)	-0.06^{b}	0.02	0.94	-0.07^{b}	0.03	0.93
High school dropout	0.19	0.13	1.21	1.03 ^b	0.14	2.80
Parental education (less than high school)	0.07	0.13	1.07	-0.30^{a}	0.14	0.74
Antisocial behaviors (1 to 3 symptoms)	0.86^{b}	0.16	2.36	0.73 ^b	0.27	2.08
Antisocial behaviors (4+ symptoms)	1.16 ^b	0.16	3.19	1.48 ^b	0.27	4.40
Family history of alcoholism	0.18^{a}	0.08	1.20	0.15	0.12	1.17
Lifetime marijuana use (10+ times)	0.54 ^b	0.08	1.72	0.46^{b}	0.13	1.58

^a P < .05.

^b P<.01.

Personality Risk Factors for Substance Use Disorders

– Risk factor:

- Predicts vulnerability to alcohol dependence (Caspi, et al., 1997)
- Predicts vulnerability to other mental disorders (Caspi et al., 1997)
- Mediates relationship between genetic factors and substance misuse (Laucht, et al., 2002; Conrod et al., 1998; McGue et al., 1998)

Informs on motives for substance use, typology

- Risky motives for drinking (Comeau, et al., 2002; Cooper, et al., 1995)
- Drug of choice (Conrod, et al., 2000a)
- Different patterns of coping
- Sensitivity to drug effects and drug reinforcement (e.g., Conrod, Pihl & Vassileva, 1997; Leyton, et al., 2002).



Substance Use Risk Profile Scale:

23-item scale assessing impulsivity, sensation seeking, anxiety sensitivity and hopelessness

- Internal consistency (Woicik et al., 2009)
- Concurrent validity (Woicik et al., 2009)
- Incremental validity (Woicik et al., 2009)
- Predictive validity (Krank et al., 2010)
- Test-retest reliability (Woicik et al., 2009)
- Sensitivity/specificity (Castellanos-Ryan et al, 2013)
- Generalisability, applications in different cultural and clinical contexts (Jolin-Castonguay et al., submitted)
- Translated: French, German, Spanish, Czech, Dutch, Cantonese, Japanese, Sri Lankan

Table 5. Sensitivity and false positive rates (1-specificity) of the f baseline SURPS subscales in the prediction of substance use, emotional and behavioural symptoms within the next 18 months (by T4) in the overall sample (N = 1057).

	Hopelessness	Anxiety Sensitivity	Impulsivity	Sensation Seeking- R [‡]	Selecting HR adolescents based on ROC cut-offs	Selecting HR adolescents (1SD > mean cut-offs) [†]
%	S, FP	S, FP	S, FP	S, FP	S, FP	S, FP
Monthly binging (13%)	20, 12	27, 31	61, 32	48, 30	72, 49	70, 42
Drinking problems (17%)	49, 34	32, 31	55, 31	36, 30	84 63	75, 53
Smoking (9%)	61, 49	33, 30	55, 33	38, 30	81, 65	72, <mark>5</mark> 5
Drug use (21%)	60, 49	27, 22	54, 30	43, 28	91, 75	74, <mark>5</mark> 2
BSI depression (23%)	54, 31	42, 28	51, 30	34, 30	91, 70	73, <mark>4</mark> 7
Emotional problems (13%)	54, 34	59, 27	46, 34	32, 31	91, 72	80, <mark>5</mark> 3
Conduct problems (41%)	26, 13	33, 29	58, 20	35, 28	77 50	72, 46
Hyperactivity problems (32%)	26, 15	37, 28	58, 25	38, 28	78, 55	74, 49

DSM-IV Structure of Externalising Behaviours



One factor model: Krueger et al (2005)



Higher order two-subfactor model (2) Hierarchical two-subfactor model (3)



Hierarchical two-subfactor model (3)

Castellanos-Ryan & Conrod, Journal of Child Abnormal, 2011



Cognitive correlates of risk

(Castellanos-Ryan, Rubia & Conrod, ACER, 2010)

- Enriched sample of 100 adolescents followed longitudinally:
 - CD+, SM+, CDSM+, CTL
- IMP poor response inhibition (SSRT) mediates common and specific relationship between IMP and antisocial behaviour



Cognitive correlates of risk (Castellanos-Ryan, Rubia & Conrod, ACER, 2010)

SS – reward-dependent disinhibition mediates specific relationshp between SS and substance misuse latent factor.



 Project Title: Reinforcement-related behaviour in normal brain function and psychopathology
 Coordinator: Gunter Schumann
 Funding volume: European Commission



-First multicentre functional and structural geneticneuroimaging study of a cohort of **2000 14 year old adolescents**.

-Assessed on traits related to response inhibition, reward, punishment and emotional behaviour

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Figure 8: Whelan, Conrod, et al., Nature Neuroscience, in press. A graphical representation of substance misuse results. (a) The mean factor score for those who had never tried illicit substances, those with four or fewer lifetime uses, and those with five or more lifetime uses, with use of alcohol and nicotine as nuisance variables. (b-d) Mean factor scores for those who had never tried alcohol, nicotine or illicit substances, those who had tried either alcohol or nicotine, those who had tried alcohol and nicotine, and those who had tried alcohol, nicotine and at least one illicit substance (groups 0, 1, 2 and 3, respectively) for the pre-SMA/PCG, right frontal and stop success orbital networks. Error bars represent ± 1 s.e.m.



Factor loadings for the general-specific Model 3 at 16 years (follow-up; N=1210)

	Factor CD/	Factor CD/ADHD at		Factor SM at 16		Factor EXTGEN at		
	16	16						
	Load	р	load	р	load	р		
CD band	.19	.316			.39	< .001		
CD screen SR	15	.647			.82	< .001		
CD screen PR	.35	.001			.48	< .001		
ADHD band	.44	<.001			.35	.007		
ADHD screen SR	.09	.446			.52	< .001		
ADHD screen PR	.64	< .001			.49	.004		
Bullying	.03	.393			.18	< .001		
age of drinking onset			.36	< .001	.23	< .001		
Drugs use frequency			.51	< .001	.23	< .001		
Drunkenness			.85	< .001	.22	< .001		
Bingeing			.83	< .001	.26	< .001		
Drinking Q*F			.84	< .001	.24	< .001		
drinking-related problems			.56	< .001	.16	< .001		
Correlations between factors								
CD/ADHD at 14		<.001	01	.800	.21	.004		
SM at 14	.00	.814		< .001	03	.392		
EXTGEN at 14	09	.178	07	.062		<.001		

Standardized model parameter estimates for concurrent associations between covariates - personality, response inhibition, and reward sensitivity- - and ADHD/CD, SM and General Externalizing SEM factors as established in the general-specific Model 3 at 14 years (N=1778).

	CD/	ADHD	Substance I	Misuse	General Externalizir	ng
Predictor	Std		Std estimate		Std estimate	
	estimat	р		р		р
	e					
Intelligence Quotient:						
Verbal	17	.000	02	.376	.03	.756
Performance	16	.000	10	.023	04	.345
Personality measures						
SURPS Impulsivity	.27	.000	03	.549	.53	.000
SURPS Sensation-seeking	.01	.746	.11	.009	.06	.241
Behavioral Measures						
Delay-Discounting: K	.06	.000	.07	.006	.11	.001
Go No-Go: Commission Errors	.09	.007	.02	.410	.04	.230

Personality-Targeted Interventions:

Conrod et al., Psych Addictive Beh, 2000

Psychoeducational Component

- Motivational Component
 - Motivational interviewing techniques
 - Goal setting exercises
- Cognitive-Behavioral Component
 - Personality-specific cognitive distortions
 - Anxiety sensitivity:
 - decatastrophizing & exposure (Barlow & Craske, 1988)
 - Hopeless:
 - negative thought challenging (Beck & Young, 1985)
 - Impulsive:
 - Response inhibition "stop", "focus", "choose" (Kendall & Braswell, 1985)
 - Sensation seeking:
 - thought challenging for boredom & need for stimulation

introduction to impulsivity

An impulsive person acts on the spur of the moment without thinking much about the consequences of their actions. When you feel as if you are being treated unfairly, are frustrated or are angry, you might experience a lack of control and may say or do something that you later regret.

🖬 - strongly disagree 📓 - disagree 📓 - agree 🛍 - stron	ngly agree
often don't think things through before I speak. often involve myself in situations that I later regret.	
usually act without stopping to think.	H
Generally, I am an Impulsive person.	H
feel I have to be crafty and manipulative to get what I want.	
Add your total to determine your level of impulsivity.	
ander 9 = low 9-14 = medium 14 and above =	high

What does impulsivity mean to you?

CHARACTERISTICS OF

impulsivity

- 1 Strong-minded and easily frustrated.
- 2 Acting or speaking without thinking much about what could happen.
- 3 Sometimes getting involved in situations that you later regret.
- 4 Being or feeling angry or aggressive and sometimes acting on it.
- 5 Sometimes feeling as If you are being treated unfairly.
- 6 Difficulty resisting urges.



introduction to negative thinking

Some people experience negative thoughts and sadness more than others. For example, they might feel worthless and believe that they can never measure up to their friends' expectations, even though no one has ever said they come up short. They tend to experience ongoing despair and feel as though they will never accomplish anything. A person who often feels sad, worthless, guilty and irritable and finds him- or herself looking at the world in a negative, hopeless way is said to be susceptible to negative thinking.

how much do you agree with the following statements?	
1 - strongly agree 2 - agree 3 - disagree 4 - strongly disagree	

l am content.	Ц
l am happy.	Ц
I believe that my future holds great promise.	Ц
I feel proud of my achievements.	Ц
I feel cheerful.	
I am very enthusiastic about my future.	
Add your total to determine your level of negativity.	

under 8 = low 8-14 = medium 14 and above = high

What does negative thinking mean to you?	

CHARACTERISTICS OF

negative thinking

- 1 Evaluating everything as being discouraging or hopeless.
- 2 Seeing life as a series of "shoulds" or "musts", which you could never measure up to.
- 3 Blaming yourself for the negative outcome of a situation.

JOSH loves being with his friends. He depends on his friends Candice, Nick and Amy to make him feel better when he feels down. When his friends can't hang out with him, Josh feels like he did something wrong. He assumes nobody wants him around and ends up pulling away from his friends.

Personality-Targeted Interventions: The Evidence

Phase I: Proof of concept (Conrod et al., 2006).
Phase II: Efficacy (Conrod et al., 2008; 2010; 2011)
Phase III: Effectiveness (Conrod et al., 2013)
Phase IV: Process, secondary outcomes, pathways, delivery models (O'Leary-Barrett et al., 2013)
Phase V: Special populations (Stewart et al., 2012), contexts, generalisability (Lammers, et al., 2010), optimisation (Newton et al., 2012)

Drinking Outcomes



Conrod et al., Journal of Consulting and Clinical Psychology, 2011

UK Adventure Trial: Effectiveness when delivered by teachers

- Phase III trial funded by Action on Addiction, 2006-2010
- Hypotheses
 - Primary:
 - Effectiveness when delivered by schools and teachers
 - Secondary:
 - Mental health benefits?
 - 'Herd effects'?: secondary effects on general population?



UK Adventure Trial

NEW RESEARCH

JOURNAL OF THE AMERICAN ACADEMY OF CHILD & ADOLESCENT PSYCHIATRY VOLUME 49 NUMBER 9 SEPTEMBER 2010

Personality-Targeted Interventions Delay Uptake of Drinking and Decrease Risk of Alcohol-Related Problems When Delivered by Teachers

Maeve O'Leary-Barrett, B.A., Clare J. Mackie, Ph.D., Natalie Castellanos-Ryan, Ph.D., Nadia Al-Khudhairy, M.Sc., C.Psychol., Patricia J. Conrod, Ph.D., C.Psychol.

 TABLE 5
 Comparison of Effect Sizes across Personality-Targeted Intervention Trials: Full Intent-to-Treat Samples and Drinkers Only

	(Drinke	Full ITT Sample (Drinkers and Nondrinkers at Baseline)				Alcohol Users at Baseline				
	Binge-Drinking at Follow-up (%)			Binge-Drinking at Follow-up (%)						
	Control	Intervention	OR	NNT	Control	Intervention	OR	NNT		
Canadian trial ¹⁷ Preventure UK ¹⁵ Adventure (present trial)				13.9 30.3	60.0 64.6 63.2	42.0 41.4 47.9	0.40 0.41 0.50	5.5 4.3 6.5		

Note: ITT = intent to treat; NNT = number needed to treat; OR = odds ratio.

Two-Year Impact of Personality-Targeted, Teacher-Delivered Interventions on Youth Internalizing and Externalizing Problems: A Cluster-Randomized Trial

Maeve O'Leary-Barrett, B.A., Lauren Topper, Ph.D., Nadia Al-Khudhairy, M.Sc., Robert O. Pihl, Ph.D., Natalie Castellanos-Ryan, Ph.D., Clare J. Mackie, Ph.D., Patricia J. Conrod, Ph.D., C.Psychol.

TABLE 2 Intervention Effects on Internalizing and Externalizing Symptoms Over 2-Year Follow-Up (High Risk [HR] Sample, N=1,024)

		Main Effect of Intervention						
			Symptom Sever					
	Mean	n (SD)		Severe Symptom levels				
Outcome	Symptom Description	Control	Intervention	β (SE)	OR (95% CI)			
Internalizing symptoms ^a	Depression	13.15 (3.87)	12.71 (3.85)	0.09 (0.05)*	0.74 (0.58-0.96)*			
	Suicidal ideation	0.34 (0.31)	0.31 (0.31)	0.09 (0.04)*	_			
	Anxiety	8.60 (2.57)	8.22 (2.57)	0.12 (0.05)**	0.79 (0.59-1.05)			
	Panic attacks	1.20 (0.35)	1.23 (0.36)	-0.04 (0.04)	_			
Externalizing problems	Conduct problems	3.26 (1.17)	3.07 (1.16)	0.10 (0.03)***	0.79 (0.65-0.96)*			
Note: β = standardized beta; OR = odds ratio.								

^aAlthough analyses were carried out on log-transformed data, means (SDs) were provided for non–log-transformed variables for ease of interpretation. *p < .05, ** $p \le .01$, *** $p \le .001$.







Figure 1. Estimated probability of reporting drinking \times frequency of drinking in high-risk and low-risk youth attending intervention and control schools on the basis of 1217 respondents (53.1%) reporting nonuse at 6 months (T2), 1252 (54.6%) at 12 months (T3), 1020 (44.5%) at 18 months (T4), and 934 (40.7%) at 24 months (T5).



Figure 2. Estimated probability of reporting drinking \times quantity of drinking in high-risk (HR) and low-risk (LR) youth attending intervention and control schools. T2 indicates 6 months after intervention; T3,12 months after intervention; T4, 18 months after intervention; and T5, 24 months after intervention.



Figure 3. Estimated probability of reporting <u>binge drinking × frequency of</u> binge drinking in high-risk (HR) and low-risk (LR) youth attending intervention and control schools. T2 indicates 6 months after intervention; T3,12 months after intervention; T4, 18 months after intervention; and T5, 24 months after intervention.



Figure 4. Estimated probability of reporting problem drinking symptoms × severity of problem drinking symptoms in high-risk (HR) and low-risk (LR) youth attending intervention and control schools. T2 indicates 6 months after intervention; T3,12 months after intervention; T4,18 months after intervention; and T5, 24 months after intervention.

CIHR Co-Venture Trial



Thank you patricia.conrod@umontreal.ca

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