

Supplemental Online Content

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- eTable 1.** Substance use outcomes at all measurement occasions
- eTable 2.** Baseline differences between those who missed any follow ups and those present for all follow ups adjusting for school-level variance using multilevel logistic regression models
- eTable 3.** Baseline differences between those who missed all follow ups and those present for at least one follow up adjusting for school-level variance using multilevel logistic regression models
- eTable 4.** Model comparison of substance use trajectories: LOO-CV fit indices with linear and quadratic effects
- eTable 5.** Bayesian estimates, standard errors, credible intervals and odds ratios for the effect of the intervention on the count of illicit substances used

This supplemental material has been provided by the authors to give readers additional information about their work.

Software
Analyses were conducted in R (version 4.4.1; R Core Team, 2024) on macOS 15.3.1, using the brms (version 2.22.0; Bürkner P, 2017) and loo (version 2.8.0; Vehtari A et al., 2024) packages.

Substance use outcomes at all measurement occasions

Table S1. Substance use outcomes at all measurement occasions

	Year 1 (Baseline)		Year 2		Year 3		Year 4		Year 5	
	Control	Interventi on	Control	Interventio n	Control	Interventio n	Control	Interventi on	Control	Interventi on
Alcohol										
Never	558 / 964	392 / 705	365 / 818	238 / 554	262 / 733	166 / 504	174 / 708	115 / 465	125 / 658	82 / 421
	(58%)	(56%)	(45%)	(43%)	(36%)	(33%)	(25%)	(25%)	(19%)	(19%)
Occasionally	335 / 964	259 / 705	350 / 818	242 / 554	312 / 733	244 / 504	283 / 708	218 / 465	267 / 658	181 / 421
	(35%)	(37%)	(43%)	(44%)	(43%)	(48%)	(40%)	(47%)	(41%)	(43%)
Approx. Once a month	44 / 964	35 / 705	75 / 818	55 / 554	97 / 733	63 / 504	135 / 708	75 / 465	125 / 658	80 / 421
	(4.6%)	(5.0%)	(9.2%)	(9.9%)	(13%)	(13%)	(19%)	(16%)	(19%)	(19%)
1-2 times / week OR weekends	21 / 964	16 / 705	25 / 818	17 / 554	60 / 733	25 / 504	103 / 708	51 / 465	132 / 658	70 / 421
	(2.2%)	(2.3%)	(3.1%)	(3.1%)	(8.2%)	(5.0%)	(15%)	(11%)	(20%)	(17%)
3+ times / week	4 / 964	0 / 705	3 / 818	2 / 554	2 / 733	4 / 504	10 / 708	2 / 465	7 / 658	7 / 421
	(0.4%)	(0%)	(0.4%)	(0.4%)	(0.3%)	(0.8%)	(1.4%)	(0.4%)	(1.1%)	(1.7%)
Everyday	2 / 964	3 / 705	0 / 818	0 / 554	0 / 733	2 / 504	3 / 708	4 / 465	2 / 658	1 / 421
	(0.2%)	(0.4%)	(0%)	(0%)	(0%)	(0.4%)	(0.4%)	(0.9%)	(0.3%)	(0.2%)
(Missing)			146	151	231	201	256	240	306	284
Cannabis										
Never	909 / 964	641 / 705	722 / 818	470 / 554	554 / 733	368 / 504	456 / 708	301 / 465	373 / 658	254 / 421
	(94%)	(91%)	(88%)	(85%)	(76%)	(73%)	(64%)	(65%)	(57%)	(60%)
Occasionally	33 / 964	33 / 705	60 / 818	53 / 554	107 / 733	78 / 504	143 / 708	101 / 465	143 / 658	88 / 421
	(3.4%)	(4.7%)	(7.3%)	(9.6%)	(15%)	(15%)	(20%)	(22%)	(22%)	(21%)
Approx. Once a month	8 / 964	11 / 705	15 / 818	15 / 554	16 / 733	17 / 504	30 / 708	21 / 465	43 / 658	31 / 421
	(0.8%)	(1.6%)	(1.8%)	(2.7%)	(2.2%)	(3.4%)	(4.2%)	(4.5%)	(6.5%)	(7.4%)
1-2 times / week OR weekends	4 / 964	9 / 705	15 / 818	10 / 554	40 / 733	24 / 504	38 / 708	15 / 465	45 / 658	22 / 421
	(0.4%)	(1.3%)	(1.8%)	(1.8%)	(5.5%)	(4.8%)	(5.4%)	(3.2%)	(6.8%)	(5.2%)
3+ times / week	3 / 964	8 / 705	3 / 818	4 / 554	5 / 733	10 / 504	15 / 708	14 / 465	19 / 658	19 / 421
	(0.3%)	(1.1%)	(0.4%)	(0.7%)	(0.7%)	(2.0%)	(2.1%)	(3.0%)	(2.9%)	(4.5%)
Everyday	7 / 964	3 / 705	3 / 818	2 / 554	11 / 733	7 / 504	26 / 708	13 / 465	35 / 658	7 / 421
	(0.7%)	(0.4%)	(0.4%)	(0.4%)	(1.5%)	(1.4%)	(3.7%)	(2.8%)	(5.3%)	(1.7%)
(Missing)			146	151	231	201	256	240	306	284
Smoking (Past 12 months)										
Never	22 / 70	15 / 63	19 / 94	11 / 77	27 / 142	16 / 101	27 / 180	28 / 113	36 / 202	25 / 115
	(31%)	(24%)	(20%)	(14%)	(19%)	(16%)	(15%)	(25%)	(18%)	(22%)
Occasionally	32 / 70	29 / 63	49 / 94	42 / 77	69 / 142	53 / 101	90 / 180	46 / 113	99 / 202	59 / 115
	(46%)	(46%)	(52%)	(55%)	(49%)	(52%)	(50%)	(41%)	(49%)	(51%)
Approx. Once a month	9 / 70	4 / 63	12 / 94	6 / 77	16 / 142	13 / 101	12 / 180	7 / 113	14 / 202	5 / 115
	(13%)	(6.3%)	(13%)	(7.8%)	(11%)	(13%)	(6.7%)	(6.2%)	(6.9%)	(4.3%)
1-2 times / week OR weekends	1 / 70	3 / 63	8 / 94	4 / 77	11 / 142	10 / 101	18 / 180	10 / 113	17 / 202	8 / 115
	(1.4%)	(4.8%)	(8.5%)	(5.2%)	(7.7%)	(9.9%)	(10%)	(8.8%)	(8.4%)	(7.0%)
3+ times / week		4 / 63	2 / 94	4 / 77	12 / 142	3 / 101	11 / 180	8 / 113	17 / 202	5 / 115
	0 / 70 (0%)	(6.3%)	(2.1%)	(5.2%)	(8.5%)	(3.0%)	(6.1%)	(7.1%)	(8.4%)	(4.3%)
Everyday	6 / 70	8 / 63	4 / 94	10 / 77	7 / 142	6 / 101	22 / 180	14 / 113	19 / 202	13 / 115
	(8.6%)	(13%)	(4.3%)	(13%)	(4.9%)	(5.9%)	(12%)	(12%)	(9.4%)	(11%)
(Missing)	894	642	870	628	822	604	784	592	762	590
Opioids										
Never	961 / 964	701 / 705	805 / 818	547 / 554	718 / 733	490 / 504	675 / 708	446 / 465	628 / 658	403 / 421
	(100%)	(99%)	(98%)	(99%)	(98%)	(97%)	(95%)	(96%)	(95%)	(96%)
Occasionally	2 / 964	2 / 705	11 / 818	6 / 554	12 / 733	11 / 504	27 / 708	14 / 465	25 / 658	16 / 421
	(0.2%)	(0.3%)	(1.3%)	(1.1%)	(1.6%)	(2.2%)	(3.8%)	(3.0%)	(3.8%)	(3.8%)
Approx. Once a month	1 / 964	0 / 705	1 / 818	1 / 554	3 / 733	2 / 504	1 / 708	1 / 465	1 / 658	2 / 421
	(0.1%)	(0%)	(0.1%)	(0.2%)	(0.4%)	(0.4%)	(0.1%)	(0.2%)	(0.2%)	(0.5%)
1-2 times / week OR weekends	0 / 964	0 / 705	0 / 818	0 / 554	0 / 733	1 / 504	2 / 708	0 / 465	2 / 658	0 / 421
	(0%)	(0%)	(0%)	(0%)	(0%)	(0.2%)	(0.3%)	(0%)	(0.3%)	(0%)
3+ times / week	0 / 964	0 / 705	1 / 818	0 / 554	0 / 733	0 / 504	0 / 708	0 / 465	2 / 658	0 / 421
	(0%)	(0%)	(0.1%)	(0%)	(0%)	(0%)	(0%)	(0%)	(0.3%)	(0%)
Everyday	0 / 964	2 / 705	0 / 818	0 / 554	0 / 733	0 / 504	3 / 708	4 / 465	0 / 658	0 / 421
	(0%)	(0.3%)	(0%)	(0%)	(0%)	(0%)	(0.4%)	(0.9%)	(0%)	(0%)
(Missing)			146	151	231	201	256	240	306	284
Illicit Polysubstance Use										
0	963 / 964	697 / 705	813 / 818	552 / 554	731 / 733	502 / 504	701 / 708	460 / 465	649 / 658	418 / 421
	(100%)	(99%)	(99%)	(100%)	(100%)	(100%)	(99%)	(99%)	(99%)	(99%)
1	1 / 964	8 / 705	5 / 818	2 / 554	2 / 733	2 / 504	7 / 708	5 / 465	9 / 658	3 / 421
	(0.1%)	(1.1%)	(0.6%)	(0.4%)	(0.3%)	(0.4%)	(1.0%)	(1.1%)	(1.4%)	(0.7%)
(Missing)			146	151	231	201	256	240	306	284

Attrition Analysis

Missing any of the follow ups (vs. completing all follow ups) was associated with higher levels of hopelessness. Missing all follow ups (vs. completing any follow up) was associated with higher levels of all four SURPS personality traits. Attrition differed between intervention and control conditions, but this was not significant after adjusting for school-level variance. No other baseline predictors (substance use, anxiety, depression, language, sex) were associated with attrition after adjusting for school-level variance. As school-level variance is accounted for in all analyses, it was not necessary to include additional covariates to analyses.

Table S2. Baseline Differences Between Those Who Missed Any Follow Ups and Those Present for all follow ups adjusting for school-level variance using multilevel logistic regression models

Baseline Characteristic	Beta	SE	p	95% CI	
				Lower	Upper
Cannabis (Frequency)	0.23	0.17	0.18	-0.11	0.56
Cannabis (Any use)	0.20	0.38	0.59	-0.54	0.95
Prescription drugs (Any use)	-0.11	0.32	0.73	-0.72	0.51
Illicit substances (Any use)	0.03	0.24	0.91	-0.44	0.50
BSI Anxiety	-0.03	0.02	0.12	-0.06	0.01
BSI Depression	0.01	0.01	0.44	-0.02	0.04
SURPS Negative Thinking	0.04	0.02	0.01	0.01	0.08
SURPS Impulsivity	0.03	0.02	0.06	0.00	0.07
SURPS Sensation Seeking	0.02	0.02	0.30	-0.01	0.05
SURPS Anxiety Sensitivity	-0.01	0.02	0.63	-0.04	0.03
Sex (Female)	-0.11	0.12	0.34	-0.34	0.12
Language (French)	-0.37	0.22	0.09	-0.81	0.06
Trial Group (Intervention)	0.15	0.22	0.48	-0.27	0.58

Table S3. Baseline Differences Between Those Who Missed All Follow Ups and Those Present for at least one follow up adjusting for school-level variance using multilevel logistic regression models

Baseline Characteristic	Beta	SE	p	95% CI	
				Lower	Upper
Cannabis (Frequency)	0.12	0.17	0.49	-0.22	0.46
Cannabis (Any use)	0.56	0.45	0.22	-0.33	1.45
Prescription drugs (Any use)	-0.26	0.50	0.60	-1.23	0.71
Illicit substances (Any use)	0.06	0.39	0.88	-0.70	0.82
BSI Anxiety	-0.04	0.03	0.19	-0.10	0.02
BSI Depression	0.00	0.02	0.91	-0.04	0.05
SURPS Negative Thinking	0.08	0.03	0.00	0.03	0.13
SURPS Impulsivity	0.07	0.03	0.04	0.00	0.13
SURPS Sensation Seeking	0.07	0.03	0.01	0.02	0.12

SURPS Anxiety Sensitivity	0.06	0.03	0.07	0.00	0.11
Sex (Female)	0.04	0.20	0.84	-0.34	0.42
Language (French)	0.21	0.34	0.53	-0.45	0.87
Trial Group (Intervention)	0.40	0.33	0.22	-0.24	1.04

Linear vs Quadratic Growth: leave-one-out cross-validation (LOO-CV)

Linear and quadratic growth were compared based on leave-one-out cross-validation (LOO), with lower expected log predictive density (ELPD) indicating better predictive accuracy. Where there was evidence of quadratic growth, additional analyses comparing models with and without a Year^2 x group interaction term were conducting. Results from these comparisons are presented below in Table S4.

Table S4. Model Comparison of Substance Use Trajectories: LOO-CV Fit Indices with Linear and Quadratic Effects

Model	ELPD _{diff}	SE ELPD _{diff}	ELPD LOO	SE ELPD LOO	p LOO	SE p LOO	LOOIC	SE LOOIC
Frequency Outcomes								
Alcohol (Linear)	0.000	0.000	-5875.270	69.482	1222.401	20.070	11750.530	138.964
Alcohol (Quadratic, with Year^2 x group interaction)	-0.322	2.464	-5875.590	69.520	1225.236	20.131	11751.180	139.040
Cannabis (Quadratic, with Year^2 x group interaction)	0.000	0.000	-3655.710	78.205	926.448	26.374	7311.418	156.411
Cannabis (Linear)	-24.345	7.665	-3680.050	77.681	920.795	25.593	7360.108	155.363
Cannabis (Quadratic, no Year^2 x group interaction)	0.000	0.000	-3653.860	78.197	924.409	26.304	7307.719	156.394
Cannabis (Quadratic, with Year^2 x group interaction)	-1.850	2.458	-3655.710	78.205	926.448	26.374	7311.418	156.411
Smoking Past 12m (Quadratic, with Year^2 x group interaction)	0.000	0.000	-1632.930	28.571	268.670	8.165	3265.865	57.141
Smoking Past 12m (Linear)	-0.506	2.286	-1633.440	28.445	264.885	8.018	3266.876	56.889
Smoking Past 12m (Quadratic, no Year^2 x group interaction)	0.000	0.000	-1632.270	28.526	266.428	8.073	3264.537	57.053
Smoking Past 12m (Quadratic, with Year^2 x group interaction)	-0.664	0.766	-1632.930	28.571	268.670	8.165	3265.865	57.141
Opioids (Quadratic, with Year^2 x group interaction)	0.000	0.000	-709.377	50.018	217.535	17.940	1418.754	100.035
Opioids (Linear)	-1.869	3.171	-711.246	49.842	214.182	17.614	1422.492	99.684
Opioids (Quadratic, no Year^2 x group interaction)	0.000	0.000	-707.275	49.808	215.672	17.752	1414.551	99.616
Opioids (Quadratic, with Year^2 x group interaction)	-2.101	0.897	-709.377	50.018	217.535	17.940	1418.754	100.035
Binary Outcomes								
Polysubstance Use (Linear)	0.000	0.000	-257.140	32.413	87.048	12.809	514.280	64.827
Polysubstance Use (Quadratic, with Year^2 x group interaction)	-2.013	1.373	-259.153	32.682	89.318	13.101	518.306	65.364

Note. **ELPD_{diff}** = Difference in expected log pointwise predictive density (ELPD) between the current model and the best-performing model; **SE ELPD_{diff}** = Standard error of the ELPD difference; **ELPD LOO** = Expected log pointwise predictive density from leave-one-out cross-validation (LOO-CV); **SE ELPD LOO** = Standard error of the ELPD from LOO-CV; **p LOO** = Effective number of parameters in the model; **SE p LOO** = Standard error of the effective number of parameters; **LOOIC** = Leave-one-out information criterion; **SE LOOIC** = Standard error of the LOOIC.

Sensitivity Analysis: Illicit Polysubstance Use

Table S5. Bayesian estimates, standard errors, credible intervals and odds ratios for the effect of the intervention on the count of illicit substances used

	B	SE	95% CI (Lower)	95% CI (Upper)
(Intercept)	-3.480	0.468	-4.429	-2.580
Trial Group (Intervention)	0.443	0.386	-0.326	1.211
Year	-0.070	0.210	-0.473	0.353
Year^2	0.059	0.050	-0.039	0.154
Sex (Female)	-0.391	0.216	-0.807	0.038
Language (French)	-0.190	0.322	-0.827	0.451
Intervention x Year	-0.340	0.125	-0.584	-0.088