

Supplemental Material

Supplemental Table 1. The association between cannabis and alcohol co-use (0-180 minutes) and momentary subjective intoxication, compared to cannabis-only use moments

	Subjective Intoxication Co-use 0-180			
	<i>B</i>	<i>SE</i>	95% <i>CI</i>	<i>p</i>
(Intercept)	33.57	3.17	(27.34, 39.79)	<.001
Level 1 (Moment):				
Co-use 0-180	4.36	1.36	(1.70, 7.03)	.001†
Hits	0.42	0.15	(0.12, 0.72)	.006†
Tobacco Use	-1.86	2.15	(-6.08, 2.36)	.387
^a Social Use	2.61	1.29	(0.08, 5.15)	.043†
Time Since	0.01	0.02	(-0.02, 0.04)	.535
Time Between	-0.01	0.02	(-0.01, -0.005)	<.001*
^b Joint	1.67	1.71	(-1.68, 5.03)	.328
^b Blunt	1.15	2.06	(-2.89, 5.19)	.577
^b Bong	7.40	1.62	(4.23, 10.58)	<.001*
^b Vape	-3.08	2.26	(-7.53, 1.36)	.173
^b Hashoil	5.28	3.25	(-1.10, 11.66)	.105
^b Edible	1.29	3.67	(-5.90, 8.48)	.724
Level 2 (Day):				
Weekend	2.44	1.07	(0.34, 4.55)	.023†
Avg Day Hits	-0.23	0.07	(-0.36, -0.09)	.001†
Level 3 (Person):				
Avg Hits	0.76	0.40	(-0.04, 1.55)	.063
Avg Drinks	0.27	0.64	(-0.99, 1.53)	.673
Avg Tob Prod	-0.71	0.72	(-2.12, 0.70)	.321
^c Sex	-1.76	2.07	(-5.85, 2.34)	.397

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; Co-use 0-180: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others;

^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 2. The association between cannabis and alcohol co-use (0-180 minutes) and momentary stimulation, compared to cannabis-only use moments

	<i>B</i>	<i>SE</i>	Stimulation Co-use 0-180 <i>95% CI</i>	<i>p</i>
(Intercept)	44.39	4.36	(35.83, 52.95)	<.001
Level 1 (Moment):				
Co-use 0-180	2.87	1.19	(0.53, 5.21)	.016†
Hits	0.11	0.13	(-0.15, 0.37)	.414
Tobacco Use	1.69	1.89	(-2.02, 5.40)	.373
^a Social Use	1.35	1.15	(-0.92, 3.61)	.243
Time Since	-0.02	0.01	(-0.04, 0.01)	.251
Time Between	-0.01	0.02	(-0.01, -0.02)	<.001*
^b Joint	0.40	1.55	(-2.65, 3.45)	.797
^b Blunt	4.16	1.85	(0.52, 7.79)	.025†
^b Bong	3.71	1.50	(0.77, 6.65)	.013†
^b Vape	-0.64	2.11	(-4.78, 3.49)	.760
^b Hashoil	6.87	2.97	(1.06, 12.69)	.021†
^b Edible	-3.42	3.20	(-9.69, 2.86)	.285
Level 2 (Day):				
Weekend	-0.22	0.95	(-2.08, 1.64)	.817
Avg Day Hits	0.17	0.06	(0.05, 0.29)	.006†
Level 3 (Person):				
Avg Hits	0.30	0.55	(-0.79, 1.39)	.584
Avg Drinks	-0.50	0.90	(-2.27, 1.28)	.582
Avg Tob Prod	-1.16	1.07	(-3.27, 0.95)	.279
^c Sex	-1.26	2.94	(-7.06, 4.55)	.670

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; Co-use 0-180: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others;

^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 3. The association between cannabis and alcohol co-use (0-180 minutes) and momentary sedation, compared to cannabis-only use moments

	Sedation Co-use 0-180			
	<i>B</i>	<i>SE</i>	<i>95% CI</i>	<i>p</i>
(Intercept)	37.07	4.36	(28.51, 45.62)	<.001
Level 1 (Moment):				
Co-use 0-180	1.98	1.20	(-0.37, 4.32)	.098
Hits	0.79	0.13	(0.52, 1.05)	<.001*
Tobacco Use	0.04	1.91	(-3.70, 3.79)	.981
^a Social Use	0.61	1.16	(-1.66, 2.89)	.597
Time Since	0.03	0.01	(0.01, 0.06)	.032
Time Between	-0.01	0.02	(-0.01, 0.03)	.085
^b Joint	-0.10	1.56	(-3.15, 2.96)	.951
^b Blunt	1.10	1.86	(-2.55, 4.74)	.555
^b Bong	4.03	1.51	(1.07, 6.98)	.008†
^b Vape	-2.47	2.12	(-6.63, 1.69)	.245
^b Hashoil	7.45	2.99	(1.59, 13.31)	.013†
^b Edible	0.81	3.21	(-5.49, 7.12)	.801
Level 2 (Day):				
Weekend	0.81	0.95	(-1.05, 2.68)	.391
Avg Day Hits	-0.09	0.06	(-0.22, 0.03)	.149
Level 3 (Person):				
Avg Hits	1.37	0.55	(0.29, 2.46)	.014†
Avg Drinks	-0.31	0.90	(-2.08, 1.47)	.733
Avg Tob Prod	-0.52	1.07	(-2.63, 1.58)	.624
^c Sex	-5.48	2.93	(-11.27, 0.32)	.064

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; Co-use 0-180: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others;

^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 4. The association between cannabis and alcohol co-use (0-180) and momentary bad effects, compared to cannabis-only use moments

	Co-use 0-180 Logistic				Bad Effects			
	OR	SE	95% CI	p	IRR	SE	95% CI	p
(Intercept)	1.08	0.15	(0.82, 1.41)	.595	10.09	0.90	(8.47, 12.03)	<.001
Level 1 (Moment):								
Co-use 0-180	0.84	0.08	(0.69, 1.02)	.083	1.27	0.08	(1.12, 1.43)	<.001*
Hits	1.01	0.01	(0.99, 1.04)	.226	1.01	0.01	(1.00, 1.02)	.202
Tobacco Use	0.72	0.11	(0.54, 0.97)	.030†	0.96	0.09	(0.80, 1.16)	.692
^a Social Use	1.52	0.14	(1.28, 1.82)	<.001*	1.21	0.07	(1.08, 1.36)	<.001*
Time Since	1.00	0.001	(1.00, 1.00)	.827	1.00	0.001	(1.00, 1.00)	.171
Time Between	1.00	0.001	(1.00, 1.00)	.070	1.00	0.001	(1.00, 1.00)	.274
^b Joint	1.11	0.13	(0.89, 1.40)	.351	0.92	0.07	(0.80, 1.05)	.224
^b Blunt	0.75	0.10	(0.57, 0.98)	.037†	1.19	0.10	(1.00, 1.41)	.047†
^b Bong	0.89	0.09	(0.73, 1.08)	.230	0.98	0.06	(0.86, 1.11)	.708
^b Vape	0.72	0.11	(0.54, 0.96)	.025†	0.95	0.09	(0.79, 1.15)	.618
^b Hashoil	4.99	1.42	(2.86, 8.72)	<.001*	1.24	0.14	(1.00, 1.54)	.047†
^b Edible	0.89	0.25	(0.51, 1.53)	.668	1.27	0.23	(0.89, 1.80)	.192
Level 2 (Day):								
Weekend	0.99	0.08	(0.84, 1.16)	.861	1.03	0.05	(0.93, 1.13)	.608
Avg Day Hits	1.00	0.005	(0.99, 1.01)	.226	0.99	0.003	(0.99, 1.00)	<.001*
Level 3 (Person):								
Avg Hits	1.00	0.02	(0.96, 1.04)	.991	1.01	0.01	(0.99, 1.03)	.402
Avg Drinks	1.09	0.03	(1.03, 1.15)	.003†	1.02	0.02	(0.99, 1.05)	.310
Avg Tob Prod	1.01	0.03	(0.95, 1.06)	.845	0.99	0.02	(0.96, 1.03)	.649
^c Sex	1.02	0.09	(0.87, 1.21)	.776	1.16	0.06	(1.04, 1.28)	.007†

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; or = odds ratio; IRR = incidence rate ratio; Co-use 0-180: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 5. The association between cannabis and alcohol co-use (0-180 minutes) and momentary good effects, compared to cannabis-only use moments

	Co-use 0-180 Logistic				Good Effects			
	OR	SE	95% CI	p	IRR	SE	95% CI	p
(Intercept)	8.31	1.70	(5.57, 12.40)	<.001	22.22	1.05	(20.47, 24.37)	<.001
Level 1 (Moment):								
Co-use 0-180	1.02	0.16	(0.76, 1.38)	.894	1.05	0.04	(0.98, 1.13)	.146
Hits	1.00	0.01	(0.97, 1.03)	.899	1.00	0.004	(0.99, 1.00)	.281
Tobacco Use	0.35	0.06	(0.25, 0.51)	<.001*	0.97	0.06	(0.87, 1.09)	.587
^a Social Use	1.53	0.20	(1.19, 1.97)	.001†	1.07	0.03	(1.01, 1.14)	.027†
Time Since	1.00	0.02	(0.99, 1.00)	.029†	1.00	0.004	(1.00, 1.00)	.126
Time Between	1.00	0.001	(1.00, 1.00)	.844	1.00	0.004	(1.00, 1.00)	.661
^b Joint	1.66	0.31	(1.15, 2.40)	.007†	0.99	0.04	(0.92, 1.07)	.793
^b Blunt	0.44	0.08	(0.31, 0.61)	<.001*	1.04	0.05	(0.94, 1.15)	.406
^b Bong	0.50	0.07	(0.38, 0.66)	<.001*	0.92	0.03	(0.86, 0.98)	.014†
^b Vape	1.01	0.23	(0.64, 1.59)	.969	0.94	0.05	(0.85, 1.03)	.198
^b Hashoil	4.84	2.87	(1.52, 15.46)	.008†	1.04	0.07	(0.91, 1.19)	.550
^b Edible	1.51	0.81	(0.53, 4.30)	.439	1.33	0.12	(1.11, 1.60)	.002†
Level 2 (Day):								
Weekend	1.11	0.13	(0.88, 1.41)	.358	1.04	0.03	(0.99, 1.10)	.138
Avg Day Hits	0.98	0.01	(0.97, 1.03)	.899	0.99	0.002	(0.99, 1.00)	<.001*
Level 3 (Person):								
Avg Hits	0.88	0.02	(0.84, 0.92)	<.001*	0.99	0.01	(0.98, 1.00)	.068
Avg Drinks	1.23	0.05	(1.14, 1.33)	<.001*	1.03	0.01	(1.01, 1.05)	<.001*
Avg Tob Prod	1.19	0.08	(1.04, 1.36)	.011†	0.99	0.01	(0.97, 1.01)	.349
^c Sex	0.92	0.12	(0.72, 1.18)	.512	0.96	0.03	(0.91, 1.02)	.153

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Supplemental Table 6. The association between cannabis and alcohol co-use (0-180 minutes) and momentary liking, compared to cannabis-only use moments

	Co-use 0-180 Logistic				Liking			
	OR	SE	95% CI	p	IRR	SE	95% CI	p
(Intercept)	6.05	1.20	(4.10, 8.93)	<.001	21.14	0.96	(19.33, 23.12)	<.001
Level 1 (Moment):								
Co-use 0-180	1.13	0.17	(0.84, 1.53)	.413	1.02	0.03	(0.96, 1.09)	.485
Hits	0.99	0.01	(0.97, 1.02)	.624	1.00	0.004	(0.99, 1.01)	.743
Tobacco Use	0.40	0.07	(0.28, 0.58)	<.001*	0.93	0.05	(0.84, 1.04)	.200
^a Social Use	1.43	0.18	(1.11, 1.83)	.005†	1.17	0.04	(1.10, 1.25)	<.001*
Time Since	1.00	0.002	(0.99, 1.00)	.029†	1.00	0.004	(1.00, 1.00)	.943
Time Between	1.00	0.001	(1.00, 1.00)	.258	1.00	0.001	(1.00, 1.00)	.019†
^b Joint	1.77	0.33	(1.23, 2.56)	.002†	0.99	0.04	(0.92, 1.07)	.854
^b Blunt	0.39	0.07	(0.28, 0.55)	<.001*	1.05	0.05	(0.95, 1.16)	.317
^b Bong	0.56	0.08	(0.42, 0.73)	<.001*	0.90	0.03	(0.85, 0.97)	.003†
^b Vape	0.88	0.19	(0.58, 1.33)	.533	0.97	0.05	(0.88, 1.07)	.559
^b Hashoil	4.03	2.08	(1.46, 11.10)	.007†	1.14	0.07	(1.01, 1.30)	.038†
^b Edible	1.28	0.62	(0.50, 3.29)	.612	1.43	0.13	(1.20, 1.71)	<.001*
Level 2 (Day):								
Weekend	1.15	0.13	(0.92, 1.44)	.226	1.04	0.03	(0.99, 1.10)	.151
Avg Day Hits	0.99	0.01	(0.98, 1.00)	.050	0.99	0.002	(0.99, 0.99)	<.001*
Level 3 (Person):								
Avg Hits	0.91	0.02	(0.87, 0.95)	<.001*	0.99	0.01	(0.97, 1.00)	.021†
Avg Drinks	1.24	0.05	(1.15, 1.35)	<.001*	1.02	0.01	(1.01, 1.04)	.007†
Avg Tob Prod	1.17	0.08	(1.03, 1.33)	.015†	0.99	0.01	(0.97, 1.01)	.434
^c Sex	1.00	0.12	(0.79, 1.27)	.999	0.97	0.03	(0.92, 1.02)	.256

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

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Supplemental Table 7. The association between cannabis and alcohol co-use (0-180 minutes) and momentary willingness to take cannabis again, compared to cannabis-only use moments

	Co-use 0-180 Logistic				Take Again			
	OR	SE	95% CI	p	IRR	SE	95% CI	p
(Intercept)	1.91	(1.37, 2.65)	(1.37, 2.65)	<.001	18.12	0.96	(16.33, 20.10)	<.001
Level 1 (Moment):								
Co-use 0-180	0.99	0.13	(0.76, 1.28)	.921	1.04	0.04	(0.97, 1.12)	.302
Hits	1.01	0.01	(0.98, 1.03)	.656	1.00	0.004	(0.99, 1.01)	.587
Tobacco Use	0.37	0.06	(0.27, 0.52)	<.001*	1.01	0.06	(0.89, 1.14)	.888
^a Social Use	1.76	0.19	(1.42, 2.18)	<.001*	1.11	0.04	(1.04, 1.19)	.003†
Time Since	1.00	0.001	(1.00, 1.00)	.510	1.00	0.004	(1.00, 1.00)	.610
Time Between	1.00	0.01	(1.00, 1.00)	.135	1.00	0.001	(1.00, 1.00)	.121
^b Joint	1.83	0.30	(1.33, 2.53)	<.001*	1.02	0.04	(0.94, 1.11)	.664
^b Blunt	0.51	0.08	(0.38, 0.70)	<.001*	1.14	0.06	(1.02, 1.27)	.017†
^b Bong	0.77	0.10	(0.61, 0.98)	.037†	0.97	0.04	(0.90, 1.05)	.475
^b Vape	0.88	0.16	(0.62, 1.25)	.473	1.03	0.06	(0.92, 1.14)	.631
^b Hashoil	5.22	2.43	(2.10, 12.98)	<.001*	1.09	0.08	(0.94, 1.25)	.245
^b Edible	1.25	0.50	(0.57, 2.73)	.573	1.55	0.16	(1.27, 1.90)	<.001*
Level 2 (Day):								
Weekend	1.16	0.12	(0.95, 1.41)	.153	1.07	0.03	(1.01, 1.14)	.029†
Avg Day Hits	0.98	0.01	(0.97, 0.99)	.003†	0.99	0.001	(0.99, 0.99)	<.001*
Level 3 (Person):								
Avg Hits	0.96	0.02	(0.92, 1.00)	.082	0.99	0.01	(0.98, 1.00)	.171
Avg Drinks	1.24	0.05	(1.15, 1.33)	<.001*	1.02	0.01	(1.00, 1.04)	.080
Avg Tob Prod	1.17	0.06	(1.22, 1.86)	<.001*	0.99	0.01	(0.97, 1.01)	.183
^c Sex	1.50	0.16	(1.22, 1.86)	<.001*	1.03	0.03	(0.97, 1.10)	.298

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Supplemental Table 8. The association between timing intervals of cannabis and alcohol co-use and momentary subjective intoxication, compared to cannabis-only use moments

	Subjective Intoxication			
	<i>B</i>	<i>SE</i>	<i>95% CI</i>	<i>p</i>
(Intercept)	42.00	3.09	(35.98, 48.07)	<.001
Level 1 (Moment):				
Co-use 0-30	8.47	1.70	(5.13, 11.81)	<.001*
Co-use 31-60	5.26	2.24	(0.87, 9.56)	.019†
Co-use 61-90	6.67	2.90	(0.96, 12.36)	.022†
Co-use 91-120	-12.14	4.02	(-20.02, -4.26)	.003†
Co-use 121-150	-18.81	4.53	(-27.69, -9.93)	<.001*
Co-use 151-180	2.69	4.56	(-6.26, 11.63)	.556
Hits	0.10	0.14	(-0.17, 0.37)	.453
Tobacco Use	0.25	2.00	(-3.68, 4.18)	.899
^a Social Use	2.44	1.20	(0.09, 4.80)	.042†
Time Since	-0.14	0.01	(-0.16, -0.11)	<.001*
Time Between	-0.01	-0.001	(-0.01, -0.002)	<.001*
^b Joint	0.02	1.60	(-3.12, 3.15)	.992
^b Blunt	-1.54	1.92	(-5.31, 2.23)	.424
^b Bong	5.76	1.51	(2.80, 8.72)	<.001*
^b Vape	-5.19	2.15	(-9.41, -0.97)	.016†
^b Hashoil	3.50	2.96	(-2.31, 9.31)	.238
^b Edible	0.49	3.43	(-6.24, 7.22)	.886
Level 2 (Day):				
Weekend	1.46	0.97	(-0.45, 3.36)	.133
Avg Day Hits	-0.04	0.06	(-0.16, 0.08)	.541
Level 3 (Person):				
Avg Hits	0.53	0.39	(-0.25, 1.31)	.182
Avg Drinks	0.59	0.63	(-0.65, 1.83)	.347
Avg Tob Prod	-0.64	0.71	(-2.03, 0.76)	.368
^c Sex	-0.15	2.03	(-4.17, 3.86)	.939

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

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Supplemental Table 9. The association between timing intervals of cannabis and alcohol co-use and momentary stimulation, compared to cannabis-only use moments

	<i>B</i>	<i>SE</i>	Stimulation <i>95% CI</i>	<i>p</i>
(Intercept)	43.99	4.40	(35.35, 52.62)	<.001
Level 1 (Moment):				
Co-use 0-30	4.80	1.60	(1.66, 7.95)	.003†
Co-use 31-60	3.12	2.10	(1.00, 7.24)	.137
Co-use 61-90	2.28	2.72	(-3.05, 7.60)	.402
Co-use 91-120	0.46	3.74	(-6.86, 7.79)	.901
Co-use 121-150	2.31	4.20	(-5.93, 10.55)	.583
Co-use 151-180	-1.85	4.23	(-10.15, 6.45)	.662
Hits	-0.03	0.13	(-0.28, 0.21)	.785
Tobacco Use	1.72	1.89	(-1.99, 5.43)	.364
^a Social Use	1.13	1.15	(-1.12, 3.39)	.324
Time Since	-0.02	0.01	(-0.05, 0.003)	.083
Time Between	-0.01	0.001	(-0.01, -0.003)	<.001*
^b Joint	0.46	1.56	(-2.59, 3.52)	.765
^b Blunt	4.95	1.86	(1.31, 8.59)	.008†
^b Bong	4.83	1.49	(1.91, 7.76)	.001†
^b Vape	1.43	2.15	(-2.79, 5.65)	.507
^b Hashoil	4.68	2.89	(-0.99, 10.35)	.106
^b Edible	-0.49	3.22	(-6.81, 5.82)	.878
Level 2 (Day):				
Weekend	0.01	0.94	(-1.84, 1.86)	.994
Avg Day Hits	0.20	0.06	(0.08, 0.32)	.001†
Level 3 (Person):				
Avg Hits	0.30	0.55	(-0.79, 1.40)	.586
Avg Drinks	-0.65	0.91	(-2.44, 1.14)	.474
Avg Tob Prod	-1.21	1.08	(-3.34, 0.92)	.264
^c Sex	-0.74	2.97	(-6.60, 5.12)	.803

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; Co-use: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 10. The association between timing intervals of cannabis and alcohol co-use and momentary sedation, compared to cannabis-only use moments

	Sedation			
	<i>B</i>	<i>SE</i>	<i>95% CI</i>	<i>p</i>
(Intercept)	37.34	4.34	(29.82, 45.85)	<.001
Level 1 (Moment):				
Co-use 0-30	1.91	1.63	(-1.28, 5.11)	.240
Co-use 31-60	3.79	2.13	(-0.39, 7.98)	.076
Co-use 61-90	5.34	2.79	(-0.08, 10.75)	.053
Co-use 91-120	-0.76	3.82	(-8.25, 6.73)	.842
Co-use 121-150	-3.75	4.30	(-12.19, 4.69)	.383
Co-use 151-180	2.10	4.31	(-6.35, 10.56)	.626
Hits	0.64	0.13	(0.39, 0.90)	<.001*
Tobacco Use	0.49	1.93	(-3.29, 4.28)	.799
^a Social Use	0.88	1.17	(-1.41, 3.17)	.452
Time Since	0.03	0.01	(0.005, 0.06)	.046†
Time Between	-0.01	0.001	(-0.005, 0.01)	.167
^b Joint	-1.92	1.58	(-5.03, 1.18)	.225
^b Blunt	-0.28	1.89	(-3.98, 3.43)	.884
^b Bong	3.86	1.52	(0.88, 6.84)	.011†
^b Vape	-2.53	2.19	(-6.82, 1.77)	.249
^b Hashoil	3.12	2.94	(-2.65, 8.88)	.289
^b Edible	1.49	3.28	(-4.96, 7.93)	.651
Level 2 (Day):				
Weekend	0.54	0.96	(-1.36, 2.43)	.578
Avg Day Hits	-0.02	0.06	(-0.14, 0.11)	.815
Level 3 (Person):				
Avg Hits	1.36	0.55	(0.27, 2.44)	.014†
Avg Drinks	-0.43	0.89	(-2.19, 1.34)	.633
Avg Tob Prod	-0.57	1.06	(-2.66, 1.52)	.592

^c Sex	-4.75	2.92	(-10.52, 1.02)	.106
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Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction
 * indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; Co-use: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 11. The association between timing intervals of cannabis and alcohol co-use and momentary bad effects, compared to cannabis-only use moments

	Logistic				Bad Effects		Count	
	OR	SE	95% CI	p	IRR	SE	95% CI	p
(Intercept)	1.10	0.15	(0.84, 1.44)	.473	11.01	1.00	(9.21, 13.17)	<.001
Level 1 (Moment):								
Co-use 0-30	0.82	0.11	(0.63, 1.08)	.153	1.42	0.12	(1.19, 1.68)	<.001*
Co-use 31-60	1.02	0.19	(0.71, 1.47)	.921	1.03	0.12	(0.82, 1.29)	.814
Co-use 61-90	0.59	0.14	(0.37, 0.95)	.029†	1.11	0.18	(0.80, 1.54)	.524
Co-use 91-120	1.36	0.50	(0.66, 2.78)	.404	1.15	0.22	(0.78, 1.68)	.485
Co-use 121-150	0.41	0.16	(0.19, 0.86)	.018†	1.59	0.45	(0.91, 2.77)	.103
Co-use 151-180	0.97	0.37	(0.46, 2.04)	.932	0.85	0.21	(0.53, 1.39)	.523
Hits	1.02	0.01	(0.99, 1.04)	.124	1.01	0.01	(1.00, 1.03)	.066
Tobacco Use	0.71	0.11	(0.53, 0.95)	.020†	0.90	0.09	(0.74, 1.10)	.299
^a Social Use	1.49	0.13	(1.24, 1.77)	<.001*	1.10	0.06	(0.98, 1.23)	.111
Time Since	1.00	0.001	(1.00, 1.00)	.578	1.00	0.01	(1.00, 1.00)	.258
Time Between	1.00	0.001	(1.00, 1.00)	.054	1.00	0.001	(1.00, 1.00)	.089
^b Joint	1.19	0.14	(0.95, 1.50)	.130	1.02	0.07	(0.88, 1.17)	.831
^b Blunt	0.76	0.11	(0.58, 1.01)	.054	1.24	0.11	(1.04, 1.48)	.017†
^b Bong	0.94	0.10	(0.77, 1.15)	.554	1.07	0.07	(0.94, 1.21)	.283
^b Vape	0.72	0.11	(0.54, 0.96)	.025†	0.99	0.09	(0.82, 1.19)	.886
^b Hashoil	5.96	1.80	(3.30, 10.77)	<.001*	1.25	0.14	(1.01, 1.55)	.038†
^b Edible	0.86	0.25	(0.49, 1.51)	.602	1.35	0.25	(0.94, 1.93)	.100
Level 2 (Day):								
Weekend	0.98	0.08	(0.84, 1.15)	.817	1.02	0.05	(0.92, 1.12)	.754
Avg Day Hits	1.00	0.01	(0.99, 1.01)	.522	0.99	0.003	(0.98, 0.99)	<.001*
Level 3 (Person):								
Avg Hits	1.00	0.02	(0.96, 1.04)	.996	1.00	0.01	(0.98, 1.02)	.815
Avg Drinks	1.09	0.03	(1.03, 1.15)	.003†	1.03	0.02	(0.99, 1.06)	.118
Avg Tob Prod	1.01	0.03	(0.95, 1.06)	.790	0.99	0.02	(0.95, 1.03)	.574
^c Sex	1.02	0.09	(0.87, 1.21)	.784	1.16	0.06	(1.05, 1.29)	.005†

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; OR = odds ratio; IRR = incidence rate ratio; Co-use: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 12. The association between timing intervals of cannabis and alcohol co-use and momentary good effects, compared to cannabis-only use moments

	Logistic				Good Effects			
	OR	SE	95% CI	p	IRR	SE	95% CI	p
(Intercept)	8.45	1.71	(5.68, 12.57)	<.001	22.48	1.04	(20.53, 24.60)	<.001
Level 1 (Moment):								
Co-use 0-30	1.29	0.29	(0.83, 1.99)	.252	1.07	0.05	(0.98, 1.17)	.139
Co-use 31-60	0.90	0.24	(0.52, 1.53)	.685	0.95	0.06	(0.84, 1.08)	.456
Co-use 61-90	0.71	0.23	(0.38, 1.34)	.291	1.02	0.09	(0.86, 1.20)	.855
Co-use 91-120	1.34	0.83	(0.40, 4.53)	.640	1.09	0.12	(0.88, 1.36)	.433
Co-use 121-150	0.70	0.33	(0.28, 1.77)	.454	1.44	0.20	(1.10, 1.88)	.007†
Co-use 151-180	1.55	0.97	(0.46, 5.27)	.480	0.94	0.12	(0.73, 1.21)	.616
Hits	1.00	0.01	(0.97, 1.02)	.738	1.00	0.004	(0.99, 1.00)	<.001*
Tobacco Use	0.37	0.07	(0.26, 0.53)	<.001*	0.97	0.06	(0.87, 1.09)	.614
^a Social Use	1.60	0.20	(1.25, 2.06)	<.001*	1.12	0.03	(0.98, 1.10)	.192
Time Since	1.00	0.002	(0.99, 1.00)	.025†	1.00	0.004	(1.00, 1.00)	.060
Time Between	1.00	0.01	(1.00, 1.00)	.958	1.00	0.01	(1.00, 1.00)	.470
^b Joint	1.51	0.28	(1.06, 2.17)	.023†	1.00	0.04	(0.93, 1.08)	.989
^b Blunt	0.39	0.07	(0.36, 0.62)	<.001*	1.03	0.05	(0.93, 1.14)	.553
^b Bong	0.47	0.07	(0.36, 0.62)	<.001*	0.87	0.03	(0.81, 0.93)	<.001*
^b Vape	0.90	0.20	(0.57, 1.40)	.627	0.91	0.05	(0.82, 1.00)	.051
^b Hashoil	3.49	1.65	(1.38, 8.81)	.008†	1.12	0.07	(0.99, 1.28)	.073
^b Edible	1.02	0.49	(0.39, 2.63)	.970	1.20	0.11	(1.00, 1.44)	.052
Level 2 (Day):								
Weekend	1.08	0.13	(0.86, 1.36)	.497	1.04	0.03	(0.98, 1.10)	.192
Avg Day Hits	0.99	0.01	(0.97, 1.00)	.009†	0.99	0.002	(0.99, 1.00)	<.001*
Level 3 (Person):								
Avg Hits	0.89	0.02	(0.85, 0.93)	<.001*	0.99	0.01	(0.98, 1.00)	.053
Avg Drinks	1.21	0.05	(1.12, 1.31)	<.001*	1.03	0.01	(1.02, 1.05)	<.001*
Avg Tob Prod	1.19	0.08	(1.04, 1.36)	.012†	0.99	0.01	(0.97, 1.01)	.424

^c Sex	0.09	0.11	(0.70, 1.15)	.391	0.92	0.03	(0.87, 0.98)	.006†
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Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; OR = odds ratio; IRR = incidence rate ratio; Co-use: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women. Outcome reverse scaled

Supplemental Table 13. The association between timing intervals of cannabis and alcohol co-use and momentary liking the effects of cannabis, compared to cannabis-only use moments

	Logistic				Liking			
	OR	SE	95% CI	p	IRR	SE	95% CI	p
(Intercept)	5.88	1.17	(3.98, 8.68)	<.001	21.48	1.01	(19.60, 23.55)	<.001
Level 1 (Moment):								
Co-use 0-30	1.32	0.29	(0.85, 2.03)	.214	1.03	0.05	(0.94, 1.13)	.508
Co-use 31-60	0.82	0.21	(0.49, 1.37)	.454	0.91	0.06	(0.81, 1.04)	.162
Co-use 61-90	0.89	0.31	(0.46, 1.75)	.741	1.05	0.09	(0.89, 1.24)	.566
Co-use 91-120	4.76	4.88	(0.64, 35.44)	.128	1.03	0.11	(0.83, 1.27)	.796
Co-use 121-150	0.81	0.40	(0.31, 2.15)	.678	1.19	0.16	(0.92, 1.55)	.185
Co-use 151-180	1.61	1.00	(0.47, 5.47)	.444	0.95	0.12	(0.74, 1.23)	.712
Hits	1.00	0.01	(0.97, 1.03)	.944	1.01	0.003	(1.00, 1.02)	.008†
Tobacco Use	0.41	0.08	(0.28, 0.59)	<.001*	0.91	0.05	(0.82, 1.02)	.106
^a Social Use	1.42	0.18	(1.10, 1.81)	.006†	1.15	0.04	(1.08, 1.23)	<.001*
Time Since	1.00	0.002	(0.99, 1.00)	.046†	1.00	0.001	(1.00, 1.00)	.876
Time Between	1.00	0.002	(1.00, 1.00)	.176	1.00	0.01	(1.00, 1.00)	.007†
^b Joint	1.90	0.36	(1.30, 2.76)	<.001*	1.00	0.04	(0.93, 1.08)	.902
^b Blunt	0.40	0.07	(0.28, 0.56)	<.001*	1.04	0.05	(0.94, 1.16)	.399
^b Bong	0.57	0.08	(0.44, 0.75)	<.001*	0.94	0.03	(0.88, 1.01)	.071
^b Vape	0.87	0.19	(0.57, 1.33)	.518	0.95	0.05	(0.94, 1.16)	.399
^b Hashoil	9.32	6.71	(2.27, 38.19)	.002†	1.25	0.08	(1.10, 1.42)	<.001*
^b Edible	1.11	0.54	(0.43, 2.88)	.828	1.36	0.13	(1.13, 1.63)	.001†
Level 2 (Day):								
Weekend	1.17	0.14	(0.93, 1.47)	.178	1.03	0.03	(0.97, 1.09)	.299
Avg Day Hits	0.99	0.01	(0.98, 1.00)	.023†	0.99	0.002	(0.99, 0.99)	<.001*
Level 3 (Person):								
Avg Hits	0.92	0.02	(0.87, 0.96)	<.001*	1.03	0.03	(0.97, 1.00)	.043†

Avg Drinks	1.24	0.05	(1.15, 1.35)	<.001*	1.03	0.01	(1.01, 1.04)	.006†
Avg Tob Prod	1.17	0.08	(1.03, 1.33)	.016†	0.99	0.01	(0.98, 1.01)	.587
^c Sex	0.97	0.12	(0.76, 1.23)	.783	0.98	0.03	(0.92, 1.04)	.454

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; OR = odds ratio; IRR = incidence rate ratio; Co-use: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women. Outcome reverse scaled

Supplemental Table 14. The association between timing intervals of cannabis and alcohol co-use and momentary willingness to take cannabis again, compared to cannabis-only use moments

	Logistic				Take Again		Count	
	<i>OR</i>	<i>SE</i>	<i>95% CI</i>	<i>p</i>	<i>IRR</i>	<i>SE</i>	<i>95% CI</i>	<i>p</i>
(Intercept)	2.00	0.34	(1.44, 2.77)	<.001	18.67	0.99	(16.82, 20.72)	<.001
Level 1 (Moment):								
Co-use 0-30	1.14	0.21	(0.79, 1.65)	.476	1.11	0.06	(1.00, 1.22)	.050
Co-use 31-60	0.74	0.17	(0.48, 1.15)	.184	0.92	0.07	(0.80, 1.06)	.244
Co-use 61-90	0.72	0.21	(0.41, 1.26)	.249	0.96	0.09	(0.80, 1.16)	.670
Co-use 91-120	2.13	1.31	(0.64, 7.09)	.218	0.88	0.11	(0.69, 1.11)	.281
Co-use 121-150	0.72	.032	(0.30, 1.72)	.463	1.29	0.19	(0.96, 1.72)	.091
Co-use 151-180	2.63	1.64	(0.78, 8.91)	.120	0.99	0.14	(0.76, 1.30)	.968
Hits	1.00	0.01	(0.97, 1.02)	.729	1.00	0.004	(0.99, 1.01)	.705
Tobacco Use	0.40	0.07	(0.29, 0.56)	<.001*	1.01	0.06	(0.90, 1.15)	.841
^a Social Use	1.82	0.20	(1.47, 2.26)	<.001*	1.15	0.04	(1.07, 1.23)	<.001*
Time Since	1.00	0.002	(0.99, 1.00)	.105	1.00	0.004	(1.00, 1.00)	.840
Time Between	1.00	0.002	(1.00, 1.00)	.156	1.00	0.001	(1.00, 1.00)	.087
^b Joint	1.69	0.27	(1.23, 2.32)	.001†	1.02	0.04	(0.94, 1.10)	.686
^b Blunt	0.49	0.08	(0.36, 0.68)	<.001*	1.10	0.06	(0.99, 1.23)	.086
^b Bong	0.71	0.09	(0.55, 0.90)	.005†	0.92	0.04	(0.85, 0.99)	.028†
^b Vape	0.90	0.16	(0.63, 1.28)	.550	0.99	0.06	(0.89, 1.10)	.849
^b Hashoil	3.46	1.30	(1.66, 7.22)	<.001*	1.15	0.08	(1.00, 1.32)	.051
^b Edible	0.92	0.35	(0.44, 1.95)	.830	1.39	0.15	(1.13, 1.71)	.002†
Level 2 (Day):								
Weekend	1.16	0.12	(0.95, 1.41)	.152	1.06	0.03	(1.00, 1.13)	.056
Avg Day Hits	0.99	0.01	(0.98, 1.00)	.010†	0.99	0.002	(0.99, 0.99)	<.001*
Level 3 (Person):								
Avg Hits	0.96	0.02	(0.92, 1.00)	.055	0.99	0.01	(0.97, 1.00)	.091
Avg Drinks	1.24	0.05	(1.16, 1.33)	<.001*	1.02	0.01	(1.00, 1.04)	.039†
Avg Tob Prod	1.17	0.06	(1.06, 1.30)	.002†	0.99	0.01	(0.97, 1.01)	.276
^c Sex	1.46	0.16	(1.18, 1.80)	<.001*	1.00	0.03	(0.94, 1.07)	.959

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 2752 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; OR = odds ratio; IRR = incidence rate ratio; Co-use: 0 = cannabis-only, ^aSocial use: 0 = cannabis alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women. Outcome reverse scale

Supplemental Table 15. The association between cannabis and alcohol co-use (0-180 minutes) and momentary subjective intoxication, compared to alcohol-only use moments

	Subjective Intoxication Co-use 0-180			
	<i>B</i>	<i>SE</i>	<i>95% CI</i>	<i>p</i>
(Intercept)	41.92	22.82	(36.35, 47.50)	<.001
Level 1 (Moment):				
Co-use 0-180	14.17	1.50	(11.22, 17.11)	<.001*
Drinks	5.21	0.57	(4.10, 6.33)	<.001*
Tobacco Use	-6.06	2.35	(-10.68, -1.45)	.010*
^a Social Use	-6.22	2.05	(-10.26, -2.19)	.003*
Time Since	-0.08	0.02	(-0.11, -0.05)	<.001*
Time Between	-0.01	0.02	(-0.01, -0.05)	<.001*
^b Joint	4.45	2.14	(0.23, 8.66)	.039†
^b Blunt	4.82	2.86	(-0.81, 10.45)	.093
^b Bong	5.69	2.19	(1.39, 9.99)	.010*
^b Vape	-7.26	3.96	(-15.04, 0.53)	.068
^b Hashoil	7.21	5.47	(-3.55, 17.97)	.188
^b Edible	12.36	6.36	(-0.15, 24.87)	.053
Level 2 (Day):				
Weekend	0.23	1.27	(-2.27, 2.72)	.859
Avg Day Drinks	-0.69	0.67	(-2.00, 0.62)	.300
Level 3 (Person):				
Avg Hits	-0.15	0.25	(-0.65, 0.34)	.540
Avg Drinks	4.11	0.92	(2.28, 5.93)	<.001*
Avg Tob Prod	-0.47	0.54	(-1.53, 0.59)	.383
^c Sex	-1.19	1.71	(-4.54, 2.17)	.487

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 1409 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; Co-use 0-180: 0 = alcohol-only, ^aSocial use: 0 = alcohol alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women

Supplemental Table 16. The association between timing intervals of cannabis and alcohol co-use and momentary subjective intoxication, compared to alcohol-only use moments

	Subjective Intoxication			
	<i>B</i>	<i>SE</i>	<i>95% CI</i>	<i>p</i>
(Intercept)	42.26	2.84	(36.70, 47.83)	<.001
Level 1 (Moment):				
Co-use 0-30	14.80	1.80	(11.27, 18.33)	<.001*
Co-use 31-60	18.65	2.42	(13.90, 23.40)	<.001*
Co-use 61-90	18.58	3.13	(12.42, 24.74)	<.001*
Co-use 91-120	12.16	4.56	(3.20, 21.12)	.008*
Co-use 121-150	-2.08	5.34	(-12.58, 8.43)	.698
Co-use 151-180	-4.83	5.30	(-15.26, 5.60)	.363
Drinks	5.33	0.56	(4.22, 6.44)	<.001*
Tobacco Use	-5.60	2.34	(-10.19, -1.00)	.017*
^a Social Use	-6.69	2.04	(-10.70, -2.68)	.001*
Time Since	-0.08	0.02	(-0.11, -0.05)	<.001*
Time Between	-0.01	0.02	(-0.01, -0.003)	<.001*
^b Joint	3.96	2.13	(-0.23, 8.14)	.064
^b Blunt	4.06	2.84	(-1.53, 9.65)	.154
^b Bong	4.35	2.19	(0.05, 8.65)	.047†
^b Vape	-6.75	3.94	(-14.50, 1.00)	.087
^b Hashoil	5.88	5.44	(-4.81, 16.58)	.280
^b Edible	11.66	6.31	(-0.74, 24.07)	.065
Level 2 (Day):				
Weekend	0.41	1.26	(-2.07, 2.89)	.745
Avg Day Drinks	-0.88	0.66	(-2.18, 0.41)	.182
Level 3 (Person):				
Avg Hits	-0.10	0.25	(-0.60, 0.40)	.685
Avg Drinks	4.36	0.92	(2.53, 6.19)	<.001*
Avg Tob Prod	-0.58	0.54	(-1.65, 0.49)	.284
^c Sex	-1.09	1.73	(-4.48, 2.30)	.528

Values in bold are significant at $p < .05$ (blue of primary interest) before false discovery rate (FDR) correction

* indicates statistical significance with FDR at .05, † indicates statistical significance with FDR at .20. Note. N= 1409 moments nested within 155 individuals; SE = standard error; CI = confidence intervals; Co-use: 0 = cannabis-only, ^aSocial use: 0 = alcohol alone, 1 = with others; ^bModes of use: 0 = bowl use; ^cSex: 0 = men, 1 = women