Supplementary Materials

The who and how of attentional bias in cannabis users: associations with use severity, craving, and interference control

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Study 1 (N = 106)

This study included individuals that used cannabis on a near-daily basis but were not in treatment for CUD (Regular users) and a matched control group that used little or no cannabis and had not used recently (Never-sporadic and Occasional users) and was conducted over multiple years between 2019 and 2021. Craving was assessed using a visual analogue scale (VAS) at the start and the end of the session. Total session length was approximately 4 hours, including MRI procedures. Stroop data collected in this study was not published before due to recent completion of the study.

Study 2 (N = 68)

This study included individuals that used cannabis multiple times a week but were not in treatment for CUD (Regular users) and a matched control group that used little or no cannabis and had not used recently (Never-sporadic and Occasional users). Craving was assessed using the Marijuana Craving Questionnaire (MCQ; Heishman et al., 2001) at the start and the end of the session. Total session length was approximately 3 hours, including MRI procedures. Stroop data collected in this study was not published before due to the small sample size of the individual dataset.

Study 3 (N = 58, N = 55 included)

This study included individuals that used cannabis multiple times a week but were not in treatment for CUD (Regular users) and a matched control group that used little or no cannabis and had not used recently (Never-sporadic and Occasional users). Craving was assessed using the MCQ at the start and the end of the session. Total session length was approximately 3 hours, including MRI procedures. Stroop data collected in this study was published before (Cousijn, Watson, et al., 2013).

Study 4 (N = 40)

This study included individuals in treatment for CUD (CUD users). Craving was assessed using a VAS at the start and the end of the session. Total session length was approximately 45 minutes. Stroop data collected in this study was published before (van Kampen et al., 2020).

Study 5 (N = 57)

This study included individuals in treatment for CUD (CUD users) and was conducted over multiple years between 2012 and 2014. Craving was assessed using a VAS at the start and the end of the session. Total session length was less than 1 hour and took place in the addiction care facility. Stroop data collected in this study was published before (Cousijn et al., 2015).

Study 6 (N = 90, N = 86 included)

This study included individuals that used cannabis multiple times a week (some exceptions included, see Table S1) but were not in treatment for CUD (Regular users). Session induced craving was assessed using the MCQ at the start and the end of the session. Total session length was approximately 30 minutes and conducted within a Dutch cannabis dispensary. Stroop data collected in this study was published before (Cousijn, Snoek, et al., 2013).

Study 7 (N = 93, N = 90 included)

This study included individuals that used cannabis multiple times a week but were not in treatment for CUD (Regular users). Craving was assessed using the MCQ at the start and the end of the session. Total session length was approximately 45 minutes. Stroop data collected in this study was published before (Cousijn & van Duijvenvoorde, 2018).

Study 8 (N = 48)

This study included individuals that used cannabis multiple times a week but were not in treatment for CUD (Regular users) and a matched control group that used little to no cannabis (Never-sporadic users). Craving was assessed using a VAS at the start and the end of the session. Total session length was approximately 2 hours. Stroop data collected in this study was not published before due to the small sample size of the individual dataset. No AUDIT scores were recorded in this study.

Figure S1. Overview of included studies

Deviations from the pre-registration

All deviations from the pre-registration are referred to as exploratory analysis in the manuscript. Details on the deviations are provided below.

Additional Variables
In addition to the pre-registered session induced craving variable (the change between start of session and end of session craving), we have added a measure of average session craving (the average of start of session and end of session craving). While the session induced craving measure reflects the craving that builds over the time of the test session, potentially affected by drug cue exposure during the session, this increase or decrease does not reflect the absolute level of craving one experiences. Hence, we included a measure that better reflects the extent to which one craves cannabis at the moment of testing.

Additional Analyses
All correlational, simple regression, moderation, mediation, and moderated mediation models that included session induced craving (as pre-registered) were re-ran using average session craving instead.

Multiple comparison corrections
Unlike pre-registered, Bonferroni corrections for multiple comparison corrections were applied to the correlation and simple regression analyses. For these analyses, uncorrected and corrected p-values are provided in the manuscript.

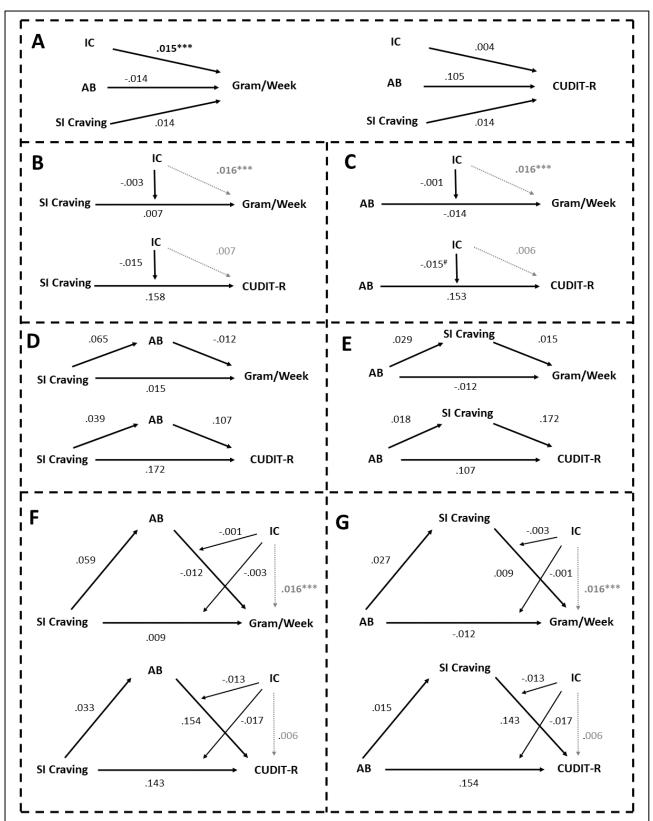**Figure S2. Overview of deviations from the pre-registration**

Figure S3. Regression, moderation, mediation, and moderated-mediation analysis results. The associations between session induced (SI) craving, attentional bias (AB), and interference control (IC) in their relationship with heaviness (gram/week) and severity of cannabis use (CUDIT-R). *** *p* < .001, see Table S2-S5 for exact p-values.
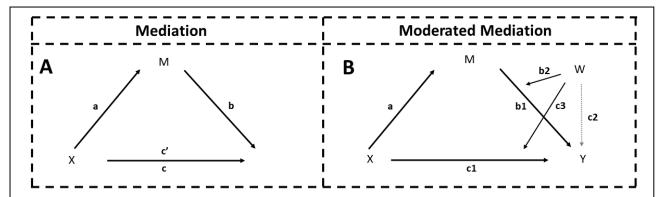
Figure S4. Overview of statistical models used to assess mediation and moderated mediation. A) direct effect: c'; indirect effect: ab; total effect: direct + indirect, **B)** direct effect: c1 + c3W; indirect effect: a(b1+b2W); total effect: direct + indirect; index of moderated mediation: ab2

Table S1. Overview of participants per included study						
	Never-Sporadic	Occasional	In between	Regular	CUD	Total
Study 1	22	21	x	63	X	106
Study 2	28	5	x	35	X	68
Study 3	24	7	3	24	X	55 (58)
Study 4	x	x	x	x	40	40
Study 5	x	x	x	x	57	57
Study 6	x	2	4	84	X	86 (90)
Study 7	x	x	1	92	X	92 (93)
Study 8	23	x	x	25	X	48
Total	97	35	8	323	97	552 (560)
Note: all excluded participants and totals including those participants presented in grey, all included participants presented in black.						

Table S2. Correlation table displaying within person (N = 40) correlation of different standardized measures of craving and their association with included measures of cannabis use						
	MCQ craving average	MCQ craving change	VAS craving average	VAS craving change	CUDIT-R	Gram/Week
MCQ craving average	-	-	-	-	-	-
MCQ craving change	$r = .436$ $p = .005$	-	-	-	-	-
VAS craving average	$r = .806$ $p < .001$	$r = .452$ $p = .003$	-	-	-	-
VAS craving change	$r = .149$ $p = .358$	$r = .500$ $p = .001$	$r = .257$ $p = .109$	-	-	-
CUDIT-R	$r = .364$ $p = .021$	$r = .131$ $p = .422$	$r = .293$ $p = .067$	$r = .122$ $p = .452$	-	-
Gram/Week	$r = .455$ $p = .003$	$r = .184$ $p = .255$	$r = .540$ $p < .001$	$r = -.119$ $p = .463$	$r = .420$ $p = .007$	-
Note: CUDIT-R; cannabis use disorder identification tests – revised; MCQ: marijuana craving questionnaire, VAS: visual analogue scale						

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Table S3. Simple regression results							
Model	**Results**						
CUDIT-R	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p**$_{bonf}$	**F-test**
Intercept	-.057	.346	-.737 - .624	.164	.870	1.0	$F(1,338) = 1.301$, $R^2 <$
SI Craving	.171	.150	-.124 - .467	1.141	.255	.765	$.001$, $p = .255$, $p_{bonf} = .765$
CUDIT-R	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p**$_{bonf}$	**F-test**
Intercept	-.013	.341	-.684 - .659	.037	.970	1.0	$F(1,350) = .023$, $R^2 = -.003$,
Interference control	.004	.027	-.050 - .058	.150	.881	1.0	$p = .881$, $p_{bonf} = 1.0$
CUDIT-R	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p**$_{bonf}$	**F-test**
Intercept	.015	.341	-.656 -0.685	.043	.966	1.0	$F(1,352) = 1.082$, $R^2 <$
Attentional bias	.104	.101	-.093 - .303	1.04	.299	.897	$.001$, $p = .299$, $p_{bonf} = .897$
Grams per week	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p**$_{bonf}$	**F-test**
Intercept	.994	.052	.891 - 1.096	19.064	<.001	<.001	$F(1,330) = .383$, $R^2 = -.002$,
SI Craving	.014	.023	.031 - .060	.619	.536	1.0	$p = .536$, $p_{bonf} = 1.0$
Grams per week	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p**$_{bonf}$	**F-test**
Intercept	1.004	.050	.905 - 1.103	20.025	<.001	<.001	$F(1,343 = 14.23$, $R^2 = .037$,
Interference control	.015	.004	.007 - .023	3.772	**<.001**	**<.001**	$p < .001$, $p_{bonf} < .001$
Grams per week	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p**$_{bonf}$	**F-test**
Intercept	.999	.051	.899 - 1.098	19.710	<.001	<.001	$F(1,347) = .807$, $R^2 < .001$,
Attentional bias	-.014	.015	-.043 - .016	-.899	.370	1.0	$p = .370$, $p_{bonf} = 1.0$

Note: CUDIT-R: cannabis use disorder identification test; p$_{bonf}$: Bonferroni corrected p-values; SI craving: session induced craving; SE: standard error; R^2: adjusted R-squared

Table S4. Moderation results						
Model	**Results**					
CUDIT-R	*B*	*SE* (B)	**95%CI**	*z*	*p*	*p_bonf*
Intercept	-.055	.347	-.735 - .625	.158	.874	1.0
SI Craving	.158	.151	-.138 - .455	1.046	.295	.591
Interference control	.007	.028	-.048 - .061	.241	.810	1.0
SI Craving * Interference control	-.015	.013	-.041 - .011	1.137	.255	.511
CUDIT-R	*B*	*SE* (B)	**95%CI**	*z*	*p*	*p_bonf*
Intercept	.040	.341	-.629 - .709	.117	.907	1.0
Attentional bias	.153	.104	.000 - .023	1.470	.141	.282
Interference control	.006	.027	-.103 - .143	.211	.833	1.0
Attentional bias * Interference control	-.015	.008	-.018 - .001	1.964	.050	.099
Grams per week	*B*	*SE* (B)	**95%CI**	*z*	*p*	*p_bonf*
Intercept	.999	.051	.899 - 1.100	19.470	<.001	<.001
SI Craving	.007	.024	-.018 - .130	.296	.767	1.0
Interference control	.016	.004	.294 - .803	3.826	**<.001**	**<.001**
SI Craving * Interference control	-.003	.002	-.129 - .025	1.240	.215	.430
Grams per week	*B*	*SE* (B)	**95%CI**	*z*	*P*	*p_bonf*
Intercept	1.005	.050	.907 - 1.104	20.084	<.001	<.001
Attentional bias	-.014	.015	-.044 - .016	.904	.366	.732
Interference control	.016	.004	.008 - .024	3.936	**<.001**	**<.001**
Attentional bias * Interference control	-.001	.001	-.003 - .001	.810	.418	.836

Note: CUDIT-R: cannabis use disorder identification test; p_{bonf} : Bonferroni corrected p-values; SI craving: session induced craving; SE: standard error; Maximum likelihood estimation used in all models.

Table S5. Mediation results						
Model	**Results**					
CUDIT-R	**B**	**SE (B)**	**95%CI**	**z**	**p**	**p*bonf***
CUDIT-R ~ SI Craving (c)	.172	.153	-.127 - .471	1.128	.259	.519
Attentional Bias ~ SI Craving (a)	.039	.081	-.120 - .199	.483	.629	1.0
CUDIT-R ~ Attentional Bias (b)	.107	.102	-.093 - .307	1.047	.295	.591
Indirect (ab)	.004	.010	-.015 - .023	.438	.661	1.0
Direct (c`)	.172	.153	-.127 - .471	1.128	.259	.519
Total (ab + c`)	.176	.153	-.123 - .476	1.154	.248	.497
CUDIT-R	**B**	**SE (B)**	**95%CI**	**z**	**p**	**p*bonf***
CUDIT-R ~ Attentional bias (c)	.107	.102	-.002 - .006	1.047	.295	.591
SI Craving ~ Attentional bias (a)	.018	.036	-.028 - .042	.483	.629	1.0
CUDIT-R ~ SI Craving (b)	.172	.153	-.005 - .020	1.128	.259	.519
Indirect (ab)	.003	.007	.000 - .000	.444	.657	1.0
Direct (c`)	.107	.102	-.002 - .006	1.047	.295	.591
Total (ab + c`)	.110	.102	-.002 - .006	1.075	.283	.565
Grams per week	**B**	**SE (B)**	**95%CI**	**z**	**p**	**p*bonf***
Grams/Week ~ SI Craving (c)	.015	.023	-.030 - .061	.656	.512	1.0
Attentional Bias ~ SI Craving (a)	.065	.083	-.096 - .227	.793	.428	.856
Grams/Week ~ Attentional Bias (b)	-.012	.015	-.043 - .018	.806	.420	.841
Indirect (ab)	-.001	.001	-.004 - .002	.565	.572	1.0
Direct (c`)	.015	.023	-.030 - .061	.656	.512	1.0
Total (ab + c`)	.014	.023	-.032 - .060	.621	.535	1.0
Grams per week	**B**	**SE (B)**	**95%CI**	**z**	**p**	**p*bonf***
Grams/Week ~ Attentional bias (c)	-.012	.015	-.043 - .018	.806	.420	.841
SI Craving ~ Attentional bias (a)	.029	.036	-.043 - .100	.793	.428	.856
Grams/Week ~ SI Craving (b)	.015	.023	-.030 - .061	.656	.512	1.0
Indirect (ab)	.000	.001	-.001 - .002	.505	.613	1.0
Direct (c`)	-.012	.015	-.043 - .018	.806	.420	.840
Total (ab + c`)	-.012	.015	-.042 - .018	.778	.437	.874

Note: CUDIT-R: cannabis use disorder identification test; **p*bonf*** : Bonferroni corrected p-values; SI craving: session induced craving; SE: standard error; Maximum likelihood estimation used in all models.

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Table S6. Moderated-Mediation results						
Model	**Results**					
CUDIT-R	**B**	**SE (B)**	**95%CI**	**z**	**p**	**p_bonf**
CUDIT-R ~ SI Craving (c1)	.143	.158	-.167 - .452	.904	.366	.732
Attentional Bias ~ SI Craving (a)	.033	.081	-.126 - .192	.407	.684	1.0
CUDIT-R ~ Attentional bias (b1)	.154	.103	-.048 - .355	1.496	.135	.269
CUDIT-R ~ Interference control (c2)	.006	.028	-.049 - .061	.219	.826	1.0
CUDIT-R ~ Attentional bias * Interference control (b2)	-.013	.008	-.029 - .002	1.732	.083	.167
CUDIT-R ~ SI Craving * Interference control (c3)	-.017	.015	-.047 - .013	1.111	.267	.533
Indirect (a(b + b2W))	.005	.013	-.021 - .031	.393	.694	1.0
Direct (c1+c3W)	.146	.158	-.163 - .455	.924	.356	.711
Total (direct+indirect)	.151	.158	-.159 - .461	.954	.340	.681
Index of moderated mediation (ab2)	-.000	.001	-.003 - .002	.397	.692	1.0
CUDIT-R	**B**	**SE (B)**	**95%CI**	**z**	**p**	**p_bonf**
CUDIT-R ~ Attentional bias (c1)	.154	.106	-.054 - .361	1.453	.146	.292
SI Craving ~ Attentional bias (a)	.015	.037	-.057 - .088	.407	.684	1.0
CUDIT-R ~ SI Craving (b1)	.143	.152	-.155 - .441	.939	.348	.695
CUDIT-R ~ Interference control (c2)	.006	.028	-.049 - .062	.219	.826	1.0
CUDIT-R ~ SI Craving * Interference control (b2)	-.017	.015	-.046 - .012	1.153	.249	.498
CUDIT-R ~ Attentional bias * Interference control (c3)	-.013	.008	-.029 - .002	1.683	.092	.185
Indirect (a(b + b2W))	.002	.006	-.009 - .014	.375	.708	1.0
Direct (c1+c3W)	.156	.106	-.053 - .364	1.465	.143	.286
Total (direct+indirect)	.158	.107	-.051 - .367	1.483	.138	.276
Index of moderated mediation (ab2)	-.000	.001	-.002 - .001	.384	.701	1.0
Grams per week	**B**	**SE (B)**	**95%CI**	**z**	**P**	**p_bonf**
Gram/Week ~ SI Craving (c1)	.009	.024	-.038 - .055	.366	.715	1.0
Attentional Bias ~ SI Craving (a)	.059	.082	-.102 - .221	.720	.471	.943
Gram/Week ~ Attentional bias (b1)	-.012	.015	-.042 - .017	.814	.416	.832
Gram/Week ~ Interference control (c2)	.016	.004	.008 - .024	3.963	**<.001**	**<.001**
Gram/Week ~ Attentional bias * Interference control (b2)	-.001	.001	-.003 - .001	.774	.439	.878
Gram/Week ~ SI Craving * Interference control (c3)	-.003	.002	-.007 - .002	1.169	.242	.485
Indirect (a(b + b2W))	-.001	.001	-.003 - .002	.535	.593	1.0
Direct (c1+c3W)	.009	.024	-.037 - .056	.394	.694	1.0
Total (direct+indirect)	.009	.024	-.038 - .055	.363	.716	1.0
Index of moderated mediation (ab2)	-.000	.000	.000 - .000	.527	.598	1.0
Grams per week	**B**	**SE (B)**	**95%CI**	**z**	**p**	**p_bonf**
Gram/Week ~ Attentional bias (c1)	-.012	.016	-.043 – .018	.792	.428	.857
SI Craving ~ Attentional bias (a)	.027	.037	-.046 - .099	.720	.471	.943
Gram/Week ~ SI Craving (b1)	.009	.023	-.036 - .053	.384	.701	1.0
Gram/Week ~ Interference control (c2)	.016	.004	.008 - .024	3.963	**<.001**	**<.001**
Gram/Week ~ SI Craving * Interference control (b2)	-.003	.002	-.007 - .002	1.226	.220	.440
Gram/Week ~ Attentional bias * Interference control (c3)	-.001	.001	-.003 - .001	.754	.451	.901
Indirect (a(b + b2W))	.000	.001	-.001 - .002	.357	.721	1.0
Direct (c1+c3W)	-.012	.016	-.043 - .019	.775	.438	.877
Total (direct+indirect)	-.012	.016	-.043 - .019	.759	.448	.896
Index of moderated mediation (ab2)	-.000	.000	.000 - .000	.621	.535	1.0

Note: CUDIT-R: cannabis use disorder identification test; p_bonf: Bonferroni corrected p-values; SI craving: session induced craving; SE: standard error; Maximum likelihood estimation used in all models; See Figure S2 & Figure S3 for additional information on the included models.

Table S7. Results of exploratory simple regression analyses including average session (AS) craving instead of session induced (SI) craving							
Model			Results				
CUDIT-R	***B***	***SE* (B)**	**95%CI**	***t***	***p***	***p_{bonf}***	**F-test**
Intercept	-.056	.333	-.711 - .599	.169	.866	1.0	$F(1,338) = 28.19$, $R^2 = .074$, p
AS Craving	1.755	.330	1.11 - 2.41	5.309	**<.001**	**<.001**	$< .001$, $p_{bonf} < .001$
Grams per week	***B***	***SE* (B)**	**95%CI**	***t***	***p***	***p_{bonf}***	**F-test**
Intercept	-.019	.214	-.440 - .401	.090	.928	1.0	$F(1,330) = 20.93$, $R^2 = .057$, p
AS Craving	.977	.214	.557 - 1.40	4.575	**<.001**	**<.001**	$< .001$, $p_{bonf} < .001$
*Note: AS craving: average session craving; CUDIT-R: cannabis use disorder identification test; **p_{bonf}** : Bonferroni corrected p-values; SE: standard error; R²: adjusted R-squared*							

Table S8. Results of exploratory moderation & mediation analyses including average session (AS) craving instead of session induced (SI) craving						
Moderation						
Model	**Results**					
CUDIT-R	*B*	*SE* (B)	95%CI	*z*	*p*	*p*$_{bonf}$
Intercept	-.059	.336	-.717 - .599	-.175	.850	1.0
AS Craving	1.844	.330	1.197 – 2.490	5.595	**<.001**	**<.001**
Interference control	-.016	.027	-.068 - .037	.589	.556	1.0
AS Craving * Interference control	-.004	.024	-.051 - .042	.183	.855	1.0
Grams per week	*B*	*SE* (B)	95%CI	*z*	*p*	*p*$_{bonf}$
Intercept	.023	.213	-.394 - .440	.107	.915	1.0
AS Craving	.919	.211	.507 - 1.332	4.367	**<.001**	**<.001**
Interference control	.056	.017	.023-.089	3.313	**.001**	**.002**
AS Craving * Interference control	-.010	.015	-.040 - .019	.679	.497	.994
Mediation						
CUDIT-R	*B*	*SE* (B)	95%CI	*z*	*p*	*p*$_{bonf}$
CUDIT-R ~ AS Craving (c)	1.733	.336	1.075 - 2.392	5.160	**<.001**	**<.001**
Attentional Bias ~ AS Craving (a)	.545	.181	.191 - .900	3.013	**.003**	**.005**
CUDIT-R ~ Attentional Bias (b)	.027	.100	-.169 - .222	.267	.790	1.0
Indirect (ab)	.014	.055	-.092 - .121	.266	.790	1.0
Direct (c`)	1.733	.336	1.075 - 2.392	5.160	**<.001**	**<.001**
Total (ab + c`)	1.748	.332	1.098 - 2.398	5.272	**<.001**	**<.001**
CUDIT-R	*B*	*SE* (B)	95%CI	*z*	*p*	*p*$_{bonf}$
CUDIT-R ~ Attentional bias (c)	.027	.100	-.169 - .222	.267	.790	1.0
AS Craving ~ Attentional bias (a)	.048	.016	.017 - .079	3.013	**.003**	**.005**
CUDIT-R ~ AS Craving (b)	1.733	.336	1.075 - 2.392	5.160	**<.001**	**<.001**
Indirect (ab)	.083	.032	.021 - .146	2.602	**.009**	**.019**
Direct (c`)	.027	.100	-.169 - .222	.267	.790	1.0
Total (ab + c`)	.110	.102	-.090 - .310	1.075	.283	.567
Grams per week	*B*	*SE* (B)	95%CI	*z*	*p*	*p*$_{bonf}$
Grams/Week ~ AS Craving (c)	1.033	.215	.611 - 1.454	4.803	**<.001**	**<.001**
Attentional Bias ~ AS Craving (a)	.552	.183	.194 - .910	3.019	**.003**	**.005**
Grams/Week ~ Attentional Bias (b)	-.101	.064	-.225 - .024	1.578	.114	.229
Indirect (ab)	-.055	.040	-.133 - .022	1.399	.162	.324
Direct (c`)	1.033	.215	.611 - 1.454	4.803	**<.001**	**<.001**
Total (ab + c`)	.977	.213	.560 - 1.395	4.589	**<.001**	**<.001**
Grams per week	*B*	*SE* (B)	95%CI	*z*	*p*	*p*$_{bonf}$
Grams/Week ~ Attentional bias (c)	-.101	.064	-.225 - .024	1.578	.114	.229
AS Craving ~ Attentional bias (a)	.048	.016	.017 - .080	3.019	**.003**	**.005**
Grams/Week ~ AS Craving (b)	1.033	.215	.611 - 1.454	4.803	**<.001**	**<.001**
Indirect (ab)	.050	.020	.012 - .088	2.556	**.011**	**.021**
Direct (c`)	-.101	.064	-.225 - .024	1.578	.114	.229
Total (ab + c`)	-.051	.065	-.178 - .077	.778	.437	.873

Note: AS craving: average session craving; CUDIT-R: cannabis use disorder identification test; p$_{bonf}$: Bonferroni corrected p-values; SE: standard error; R^2: adjusted R-squared; Maximum likelihood estimation used in all models.

Table S9. Results of exploratory moderated-mediation analyses including average session (AS) craving instead of session induced (SI) craving						
Model	**Results**					
CUDIT-R	**B**	**SE (B)**	**95%CI**	**z**	**p**	**pbonf**
CUDIT-R ~ AS Craving (c1)	1.794	.335	1.137 - 2.450	5.353	**<.001**	**<.001**
Attentional Bias ~ AS Craving (a)	.552	.180	.198 - .906	3.059	**.002**	**.004**
CUDIT-R ~ Attentional bias (b1)	.064	.100	-.133 - .261	.637	.524	1.0
CUDIT-R ~ Interference control (c2)	-.012	.027	-.065 - .040	.458	.647	1.0
CUDIT-R ~ Attentional bias * Interference control (b2)	-.012	.008	-.027 - .003	1.512	.130	.260
CUDIT-R ~ AS Craving * Interference control (c3)	.007	.025	-.042 - .055	.262	.793	1.0
Indirect (a(b + b2W))	.036	.057	-.075 - .148	.641	.522	1.0
Direct (c1+c3W)	1.793	.335	1.136 - 2.449	5.350	**<.001**	**<.001**
Total (direct+indirect)	1.829	.331	1.181 - 2.477	5.532	**<.001**	**<.001**
Index of moderated mediation (ab2)	-.006	.005	-.016 - .003	1.356	.175	.350
CUDIT-R	**B**	**SE (B)**	**95%CI**	**z**	**p**	**pbonf**
CUDIT-R ~ Attentional bias (c1)	.064	.103	-.139 - .267	.618	.537	1.0
AS Craving ~ Attentional bias (a)	.050	.016	.018 - .081	3.059	**.002**	**.004**
CUDIT-R ~ AS Craving (b1)	1.794	.335	1.137 - 2.450	5.354	**<.001**	**<.001**
CUDIT-R ~ Interference control (c2)	-.012	.027	-.065 - .040	.458	.647	1.0
CUDIT-R ~ AS Craving * Interference control (b2)	.007	.025	-.042 - .055	.261	.794	1.0
CUDIT-R ~ Attentional bias * Interference control (c3)	-.012	.008	-.027 - .004	1.465	.143	.286
Indirect (a(b + b2W))	.089	.033	.023 - .154	2.655	**.008**	**.016**
Direct (c1+c3W)	.066	.104	-.138 - .270	.633	.527	1.0
Total (direct+indirect)	.155	.107	-.055 - .364	1.448	.147	.295
Index of moderated mediation (ab2)	.000	.001	-.002 - .003	.260	.795	1.0
Grams per week	**B**	**SE (B)**	**95%CI**	**z**	**P**	**pbonf**
Gram/Week ~ AS Craving (c1)	.975	.213	.558 - 1.392	4.588	**<.001**	**<.001**
Attentional Bias ~ AS Craving (a)	.559	.182	.202 - .916	3.069	**.002**	**.004**
Gram/Week ~ Attentional bias (b1)	-.106	.064	-.231 - .018	1.672	.095	.189
Gram/Week ~ Interference control (c2)	.058	.017	.025 - .091	3.460	**.001**	**.001**
Gram/Week ~ Attentional bias * Interference control (b2)	-.002	.005	-.011 - .008	.360	.719	1.0
Gram/Week ~ AS Craving * Interference control (c3)	-.009	.016	-.040 - .022	.574	.566	1.0
Indirect (a(b + b2W))	-.059	.040	-.138 - .020	1.463	.143	.287
Direct (c1+c3W)	.977	.213	.561 - 1.394	4.598	**<.001**	**<.001**
Total (direct+indirect)	.918	.210	.506 - 1.330	4.362	**<.001**	**<.001**
Index of moderated mediation (ab2)	-.001	.003	-.006 - .004	.358	.720	1.0
Grams per week	**B**	**SE (B)**	**95%CI**	**z**	**p**	
Gram/Week ~ Attentional bias (c1)	-.106	.065	-.234 - .022	1.624	.104	.209
AS Craving ~ Attentional bias (a)	.050	.016	.018 - .082	3.069	**.002**	**.004**
Gram/Week ~ AS Craving (b1)	.975	.212	.559 - 1.391	4.591	**<.001**	**<.001**
Gram/Week ~ Interference control (c2)	.058	.017	.025 - .091	3.460	**.001**	**.001**
Gram/Week ~ AS Craving * Interference control (b2)	-.009	.016	-.040 - .022	-.572	.567	1.0
Gram/Week ~ Attentional bias * Interference control (c3)	-.002	.005	-.012 - .008	-.350	.726	1.0
Indirect (a(b + b2W))	.049	.019	.011 - .086	2.552	**.011**	**.021**
Direct (c1+c3W)	-.106	.066	-.235 - .023	1.610	.107	.215
Total (direct+indirect)	-.057	.067	-.188 - .074	.852	.394	.788
Index of moderated mediation (ab2)	-.000	.001	-.002 - .001	.563	.574	1.0

Note: AS craving: average session craving; CUDIT-R: cannabis use disorder identification test; pbonf : Bonferroni corrected p-values; SE: standard error; Maximum likelihood estimation used in all models; See Figure S2 & Figure S3 for additional information on the included models.

Table S10. Results of regression analyses assessing the association between interference control and heaviness and severity of use in individuals in treatment for CUD.							
Model	**Results**						
CUDIT-R	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p_{bonf}**	**F-test**
Intercept	-.121	.705	-.1.524 - 1.282	.172	.864	1.0	$F(1,84) < .001, R^2 = -.012,$ $p = .978, \ p_{bonf} = 1.0$
Interference control	.001	.056	-.110 - .113	.027	.978	1.0	
Grams per week	**B**	**SE (B)**	**95%CI**	**t**	**p**	**p_{bonf}**	**F-test**
Intercept	-.252	.938	-2.126 - 1.620	.269	.788	1.0	$F(1,65) = 1.482, R^2 = .007,$ $p = .228, p_{bonf} = .455$
Interference control	.091	.075	-.059 - .241	1.218	.228	.455	
Note: CUDIT-R: cannabis use disorder identification test; p_{bonf} : Bonferroni corrected p-values; SE: standard error; R^2: adjusted R-squared							

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