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Supplementary Information for
Attention-bias modification in drug addiction: Enhancing control of subsequent habits.

Authors: Muhammad A. Parvaz*[1,2], Pias Malaker[1], Anna Zilverstand[3], Scott J. Moeller[4], Nelly Alia-Klein[1,2], Rita Z. Goldstein*[1,2].

Affiliations:
[1]Department of Psychiatry, Icahn School of Medicine at Mount Sinai, New York, NY 10029
[2]Department of Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY 10029
[3]Department of Psychiatry and Behavioral Sciences, University of Minnesota, Minneapolis, MN 55414
[4]Departments of Psychiatry and Psychology, Renaissance School of Medicine at Stony Brook University, Stony Brook, NY 11794

*Correspondence may be addressed to: Muhammad A Parvaz, One Gustav L. Levy Place, Box 1230, New York, NY 10029-6574; Tel: 212-241-3638; Fax: 212-803-6743; Muhammad.Parvaz@mssm.edu. Or Rita Z. Goldstein, One Gustav L. Levy Place, Box 1230, New York, NY 10029-6574; Tel: 212-659-8886; Rita.Goldstein@mssm.edu.

This PDF file includes:

    Supplementary text
    Tables S1 to S4

Supplementary Information Text

Stimuli

All the International Affective Picture System pictures used for the neutral blocks are as follows:

2020.bmp, 2025.bmp, 2038.bmp, 2102.bmp, 2104.bmp, 2210.bmp, 2215.bmp, 2381.bmp, 2385.bmp, 2393.bmp, 2396.bmp, 2397.bmp, 2440.bmp, 2441.bmp, 2480.bmp, 2493.bmp, 2499.bmp, 2635.bmp, 7000.bmp, 7002.bmp, 7004.bmp, 7006.bmp, 7009.bmp, 7010.bmp, 7020.bmp, 7034.bmp, 7036.bmp, 7038.bmp, 7041.bmp, 7052.bmp

All the IAPS pictures used for the threat blocks are as follows:

1110.bmp, 1120.bmp, 1301.bmp, 1321.bmp, 1525.bmp, 1930.bmp, 2691.bmp, 2811.bmp, 3181.bmp, 3500.bmp, 3530.bmp, 5971.bmp, 6021.bmp, 6200.bmp, 6210.bmp, 6212.bmp, 6230.bmp, 6260.bmp, 6300.bmp, 6350.bmp, 6360.bmp, 6510.bmp, 6550.bmp, 6560.bmp, 6571.bmp, 6836.bmp, 8485.bmp, 9423.bmp, 9425.bmp, 9495.bmp, 9600.bmp, 9611.bmp, 9620.bmp, 9621.bmp, 9622.bmp, 9630.bmp, 9635.1.bmp, 9901.bmp, 9902.bmp, 9925.bmp, 1050.bmp, 1201.bmp, 1205.bmp, 1300.bmp, 6211.bmp, 6213.bmp, 6242.bmp, 6250.1.bmp, 6312.bmp, 6313.bmp, 6315.bmp, 6530.bmp, 6821.bmp, 6834.bmp, 6838.bmp, 9424.bmp, 9427.bmp, 9428.bmp, 9903.bmp, 9920.bmp

Demographics

The HC and iCUD groups did not differ on age, gender, race, education, and non-verbal IQ ($p>0.08$). Although iCUD reported significantly more dysphoric symptoms [total score on the Beck Depression Inventory (BDI)] and higher frequency of cigarette smoking compared to HC,

severity of dysphoric symptoms and cigarette use (number of cigarettes smoked per day) did not correlate with pre-instruction LPP amplitudes [BDI: (Drug: $r=0.015$, $p>0.1$; Threat: $r=-0.010$, $p>0.1$; Neutral: $r=-0.026$, $p>0.1$) | number of cigarettes smoked per day: (Drug: $r=0.128$, $p>0.1$; Threat: $r=-0.128$, $p>0.1$; Neutral: $r=0.075$, $p>0.1$)], post-instruction LPP amplitudes [BDI: (Drug Look: $r=0.014$, $p>0.1$; Drug Decrease: $r=-0.149$, $p>0.1$; Threat Look: $r=-0.016$, $p>0.1$; Threat Decrease: $r=0.004$, $p>0.1$; Neutral Look: $r=0.074$, $p>0.1$) | number of cigarettes smoked per day: (Drug Look: $r=0.069$, $p>0.1$; Drug Decrease: $r=-0.123$, $p>0.1$; Threat Look: $r=-0.061$, $p>0.1$; Threat Decrease: $r=-0.071$, $p>0.1$; Neutral Look: $r=-0.165$, $p>0.1$)] nor with subsequent changes in GD [BDI: (Drug (Look-Decrease): $r=-0.016$, $p>0.1$; Threat (Look-Decrease): $r=-0.169$, $p>0.1$) | number of cigarettes smoked per day: (Drug (Look-Decrease): $r=-0.075$, $p>0.1$; Threat (Look-Decrease): $r=-0.048$, $p>0.1$)], and therefore, were not used as covariates in our analyses.

Table S1

Average number of trials used for **(A)** averaged ERPs, and **(B)** average GD per condition for iCUD and HC. iCUD demonstrated a significantly greater number of GD trials for the pre-instruction drug-related [$t(56)=2.33$, $p=0.023$] and neutral [$t(55)=-2.39$, $p=0.020$] pictures relative to HC.

A)

	HC (N=28)		iCUD (N=30)	
	Look	Decrease	Look	Decrease
Drug	27.29 ± 2.83	27.46 ± 2.91	26.77 ± 2.54	26.80 ± 2.52
Threat	27.07 ± 3.74	26.61 ± 3.79	26.43 ± 3.79	26.70 ± 3.56
Neutral	54.39 ± 5.85	-	53.50 ± 4.48	-

B)

	HC (N=28)				
	Pre-Instruction	Post-Instruction		Attention-Screen	
		Look	Decrease	Look	Decrease
Drug	15.61 ± 10.98*	19.57 ± 8.49	19.46 ± 8.72	15.64 ± 7.26	16.18 ± 6.87
Threat	16.57 ± 12.31	21.21 ± 8.99	20.75 ± 8.98	16.07 ± 7.26	16.17 ± 7.47
Neutral	16.32 ± 11.31*	41.82 ± 16.00	-	33.89 ± 12.43	-

	iCUD (N=30)				
	Pre-Instruction	Post-Instruction		Attention-Screen	
		Look	Decrease	Look	Decrease
Drug	22.30 ± 10.88*	22.40 ± 6.03	21.93 ± 6.64	18.10 ± 5.05	17.37 ± 5.83
Threat	20.87 ± 9.97	22.13 ± 8.22	21.47 ± 7.70	17.87 ± 6.87	17.07 ± 6.44
Neutral	21.00 ± 8.94*	45.13 ± 13.17	-	36.57 ± 10.57	-

*Significant difference between healthy controls (HC) and individuals with cocaine use disorder (iCUD) ($p<0.05$). Event related potentials (ERPs), Gaze Duration (GD)

Table S2

Pre- and post-instruction LPP amplitudes and "Like" and "Want" ratings for each picture type and instruction.

		HC (N=28)			
	Pre-instruction LPP (µV)	Post-instruction LPP (µV)		Like ratings	Want ratings
Drug	0.87 ± 1.46	Look	0.94 ± 2.21	0.53 ± 0.93	0.27 ± 0.61
		Decrease	0.41 ± 2.12	0.44 ± 0.78	0.18 ± 0.29
Threat	1.39 ± 1.63[b]	Look	0.97 ± 1.80[d]	0.54 ± 0.93	0.23 ± 0.43
		Decrease	0.48 ± 1.57	0.76 ± 0.79	0.42 ± 0.51
Neutral	0.74 ± 1.10	Look	0.24 ± 1.30	1.71 ± 0.77	1.17 ± 0.61
		iCUD (N=30)			
	Pre-instruction LPP (µV)	Post-instruction LPP (µV)		Like ratings	Want ratings
Drug	1.24 ± 1.22[a]	Look	0.40 ± 1.33[c]	1.76 ± 1.26	1.59 ± 1.28
		Decrease	-0.37 ± 1.69	1.71 ± 1.07	1.45 ± 1.07
Threat	1.27 ± 1.41[b]	Look	0.41 ± 1.76	0.77 ± 0.77	0.65 ± 0.73
		Decrease	-0.14 ± 2.53	0.83 ± 0.67	0.73 ± 0.68
Neutral	0.70 ± 1.27	Look	0.46 ± 1.74	1.73 ± 0.62	1.48 ± 0.70

Means ± standard deviation (S.D.). Within-group significant differences ($p<0.05$) are denoted by [a]Drug>Neutral, [b]Threat>Neutral, [c]Drug-Look>Drug-Decrease, [d]Threat-Look>Threat-Decrease. Healthy controls (HC); individuals with cocaine user disorder (iCUD).

Table S3

The GD (msec) for each picture type and instruction. On the *attention screen*, three pictures (each of a different category; drug, threat, and neutral) and a blank were assigned randomly per quadrant and GD was assessed for each quadrant.

		HC (N=28)			
		Drug	Threat	Neutral	Blank
Drug	Look	283.03 ± 85.13	307.82 ± 102.67	331.85 ± 92.50	387.45 ± 83.63
	Decrease	293.94 ± 104.14	318.32 ± 74.01	318.28 ± 79.42	373.27 ± 99.89
Threat	Look	325.28 ± 117.21	292.67 ± 116.89	311.61 ± 75.93	380.68 ± 126.20
	Decrease	304.51 ± 101.99	310.80 ± 114.02	308.98 ± 74.15	402.47 ± 107.79
Neutral	Look	344.41 ± 73.81	303.17 ± 65.52	308.13 ± 87.68	370.52 ± 68.74

		iCUD (N=30)			
		Drug	Threat	Neutral	Blank
Drug	Look	297.68 ± 78.04[c]	303.09 ± 69.71	322.87 ± 93.64	418.62 ± 101.49
	Decrease	252.93 ± 81.35	308.42 ± 126.59	377.57 ± 105.56	396.10 ± 114.49
Threat	Look	301.22 ± 95.66	296.45 ± 97.49	336.06 ± 99.75	385.60 ± 110.28
	Decrease	278.42 ± 72.21	289.59 ± 80.55	333.43 ± 98.54	412.25 ± 101.24
Neutral	Look	296.38 ± 55.94	298.18 ± 66.79	340.29 ± 63.39	411.82 ± 84.27

Means ± standard deviation (S.D.). Within-group significant differences ($p < 0.05$) are denoted by [a]Drug>Neutral, [b]Threat>Neutral, [c]Drug-Look>Drug-Decrease, [d]Threat-Look>Threat-Decrease. Healthy controls (HC); individuals with cocaine user disorder (iCUD).

Table S4

Pre – **(A)** and post-instruction GD **(B)** for each picture type and instruction type for iCUD and HC.

A)

	HC	N	iCUD	N
Drug (ms)	963.23 ± 65.09	26	970.96 ± 45.43	30
Threat (ms)	945.21 ± 69.23	27	968.33 ± 43.03	29
Neutral (ms)	941.85 ± 68.17*	27	977.47 ± 42.84*	30

B)
Means ± standard deviation (S.D.). *

	HC				iCUD			
	Look	N	Decrease	N	Look	N	Decrease	N
Drug (ms)	4289.63 ± 574.27	28	4279.14 ± 533.17	27	4494.83 ± 409.60	30	4418.29 ± 444.35	30
Threat (ms)	4375.98 ± 554.14	27	4383.78 ± 572.10	27	4503.55 ± 434.55	29	4504.64 ± 480.98	29
Neutral (ms)	4363.81 ± 459.21	28	-	-	4477.22 ± 394.78	30	-	-

Significant difference between healthy controls (HC) and individuals with cocaine use disorder (iCUD) ($p<0.05$). Gaze Duration (GD).