Supplemental Table 1 - Reward Processing Studies with Chronic Pharmacotherapy Administration:

First author, year	Medication, dose, duration	Active (Drug) N	Control (Placebo) N	Population Type	Scan Timing	Analysis Approach	Results	Effect on Reward Processing Circuitry
Alcohol Cue Reactivity								
Myrick et al., 2008	50mg NTX x 7 days 0.5mg OND x 7 days 50mg NTX + 0.5mg OND x 7 days	23 23 20	24	NTS AD	Post	Whole Brain and ROI	- NTX reduced activation to alcohol cues in ventral striatum. -OND reduced activation to alcohol cues in ventral striatum. -NTX + OND reduced activation to alcohol cues in ventral striatum.	↓ ↓ ↓
Schacht et al., 2013b	50mg NTX x 6 days	35	39	NTS AD	Post	ROI	- No significant effect of NTX on activation in regions of interest: VS, mPFC, OFC.	-
Lukas et al., 2013	380mg extended-release NTX (single dose delivered 14 days prior to scanning)	15	13	TS Detoxed AD	Pre, Post	Whole Brain	- NTX reduced activation in orbital gyri, cingulate, inferior frontal gyrus, and middle frontal gyrus to visual alcohol cues compared to placebo. - NTX reduced activation in superior frontal gyrus, supramarginal gyrus, postcentral gyrus, and angular gyrus to alcohol odors compared to placebo.	↓ -
Schacht et al., 2017	50mg NTX x 14 days	59	57	TS AD	Pre, Post	ROI	- NTX reduced right ventral striatal activation to alcohol cues compared to placebo.	↓

Bach et al., 2019	Open-label NTX x 14 days	22	13	TS Detoxed AD	Pre, Post	Whole Brain and ROI	- NTX reduced alcohol cue-elicited activation in the putamen compared to the non-pharmacological withdrawal treatment group.	↓
Schacht et al., 2014	2mg varenicline x 14 days	18	17	NTS AD	Post	ROI	- VAR reduced activation in bilateral OFC compared to placebo.	↓
Schacht et al., 2013a	1200mg Gabapentin (maximum dose) x 21 days + 2mg infusions of flumazenil x 2 days	28	20	TS AD	Post	Whole Brain	- No significant main effect of medication. In individuals with high levels of alcohol withdrawal GBP increased activation in ACC in response to alcohol cues compared to placebo.	-
Beck et al., 2018	30-270mg baclofen x 14 days (individually titrated, mean dose = 138mg)	10	13	TS Detoxed AD	Pre, Post	ROI	- BAC decreased activation in left OFC, bilateral amygdala, and left VTA compared to placebo	↓
Holla et al., 2018	60mg baclofen x 17 days	23	n/a	TS AUD	Pre, Post	Whole Brain and ROI	- BAC increased activation in bilateral DLPFC and right ACC, and decreased activation in right insula compared to control group with AUD.	↑ and ↓
Logge et al., 2019	30mg baclofen (low dose) or 74mg baclofen (high dose) x 17 days	11 (low dose) 8 (high dose)	11	TS AD	Post	Whole Brain	- No significant group differences for low dose - High dose BAC decreased activation to alcohol cues in	- ↓

							the DLPFC, mPFC, and ACC compared to placebo. baclofen compared to placebo.	
Myrick et al., 2010	15mg aripiprazole x 14 days	14	16	NTS AD	Post	ROI	- APZ reduced activation in left VTA and right VS compared to placebo group.	↓
Han et al., 2013	15mg aripiprazole + 20mg Escitalopram x 42 days	14	17	TS Detoxed AD with comorbid MDD	Pre, Post	Whole brain	- APZ + ESC increased activation in left ACC compared to ESC alone.	↑
Schacht et al., 2018	15mg aripiprazole x 7 days	38	43	NTS AUD	Post	ROI	- APZ interacted with DAT1 genotype; in 9R carriers APZ reduced VS activation whereas in 10R homozygotes, APZ increased VS activation to alcohol cues compared to placebo.	-
Kwako et al., 2015b	1000mg pexacerfont x 21 days	29	26	TS Detoxed AD	Post	Whole Brain	- No significant effect of PEX on alcohol cue reactivity.	-
Schwandt et al., 2016	350mg verucerfont x 21 days	18	21	TS Detoxed AD	Post	Whole Brain	- Mixed effects, VER reduced activation in some frontal, temporal, and occipital regions, and increased activation in other frontal and temporal regions compared to placebo.	↑ and ↓
George et al., 2008	50mg LY686017 x 21 days	25	25	TS Detoxed AD	Post	Whole Brain	- No significant medication effect.	-

Kwako et al., 2015a	125mg aprepitant x 21 days	26	27	TS Detoxed AD with PTSD	Post	Whole Brain	- No significant effects of APREP on neural alcohol cue reactivity.	-
Langosch et al., 2012	1998mg acamprosate x 14 days	12	10	TS AD	Pre, Post	Whole Brain and ROI	- No significant effect of acamprosate on modulating BOLD response to alcohol cues.	-
Kiefer et al., 2015	50mg D-cycloserine x 21 days	16	16	TS Detoxed AD	Pre, Post	Whole brain	- DCS combined with cue-exposure-based extinction training (CET) reduced activation in ventral and dorsal striatum compared to CET alone.	↓
Monetary Incentive Delay Task / Alcohol Food Incentive Delay Task								
Vatsalya et al., 2015*	2mg varenicline x 14 days	17	12	NTS HD	Post	Whole Brain and ROI	- VAR reduced activation in striatum, insula, and amygdala during alcohol anticipation compared to placebo.	↓
								10 ↓ 1 ↑ 2 ↑ and ↓ 9 Null

Supplemental Table 2 - Affective Processing Studies with Chronic Pharmacotherapy Administration:

First author, year	Medication, dose, duration	Active (Drug) N	Control (Placebo) N	Population Type	Scan Timing	Analysis Approach	Results	Effect on Affective Processing Circuitry
Affective Image Stimuli								
Spagnolo et al., 2014	50mg NTX x 9 days	31	32	TS AD	Post	ROI	- NTX increased activation in ventral striatum to all stimuli compared to placebo.	↑
Gowin et al., 2016*	2mg varenicline x 14 days	17	15	NTS HD	Post	Whole Brain and ROI	- VAR reduced activation in left amygdala when viewing fearful faces compared to placebo.	↓
Kwako et al., 2015b	1000mg pexacerfont x 21 days	29	26	TS Detoxed AD	Post	Whole Brain	- No significant effect of PEX on neural processing of affective stimuli.	-
Schwandt et al., 2016	350mg verucerfont x 21 days	18	21	TS Detoxed AD	Post	Whole Brain	- VER reduced activation in right amygdala to fearful faces compared to placebo.	↓
Kwako et al., 2015a	125mg aprepitant x 21 days	26	27	TS Detoxed AD with PTSD	Post	Whole Brain	- No significant medication effects on activation to affective faces.	-
Affective Face Stimuli								
Kwako et al., 2015b	1000mg pexacerfont x 21 days	29	26	TS Detoxed AD	Post	Whole Brain	- No significant effect of PEX on neural processing of negative images.	-
Schwandt et al., 2016	350mg verucerfont x 21 days	18	21	TS Detoxed AD	Post	Whole Brain	- No significant medication effects.	-
George et al., 2008	50mg LY686017 x 21 days	25	25	TS Detoxed AD	Post	Whole Brain	- LY686017 reduced activation to negative images in insula and occipital	↓

							regions compared to placebo.	
Kwako et al., 2015a	125mg aprepitant x 21 days	26	27	TS Detoxed AD with PTSD	Post	Whole Brain	- APREP increased activation to negative affective stimuli in bilateral vmPFC compared to placebo.	↑
								3 ↓ 2 ↑ 4 Null

Supplemental Table 3 - Reward Processing Studies with Acute Pharmacotherapy Administration:

First author, year	Medication, dose, duration	AUD N	Comparison Group N	Analysis Approach	Results	Effect on Reward Processing Circuitry
Alcohol Cue Reactivity						
Hermann et al., 2006	400mg amisulpride x 2 hours	10 AD	10 Healthy Controls	Whole Brain	- Amilsulpride reduced alcohol cue-elicited activation in right thalamus to alcohol cues compared to placebo and normalized activation compared to healthy controls.	↓
Hansson et al., 2018	24 IU oxytocin (instranasal) x 45 minutes	12 NTS-HD	N/A	Whole Brain and ROI	- Oxytocin reduced activation to alcohol cues in the insula, hippocampus, cingulate gyrus, and medial frontal gyrus compared to placebo.	↓
Monetary Incentive Delay Task / Alcohol Food Incentive Delay Task						
Nestor et al., 2017*	50mg NTX x 2 hours	21 abstinent AD only 25 abstinent Polysubstance (AD + Other Drug Dependence)	35 Healthy Controls	Whole Brain	- No significant group X medication interaction on reward processing.	-
Quelch et al., 2017	18mg nalmefene x 4 hours	18 AUD	N/A	Whole Brain and ROI	- Nalmefene reduced activation in striatum and brainstem/cerebellum during reward processing compared to placebo while receiving an alcohol infusion.	↓
Murphy et al., 2017	60mg GSK598809 x 2 hours	18 abstinent AD Only 32 abstinent Polysubstance (AD + other dependence)	33 Healthy Controls	Whole brain and ROI	- Significant group X medication interaction in DLPFC, such that GSK598809 increased reward response in AUD individuals more than the polysubstance or healthy control groups.	↑

Delay Discounting						
Boettiger et al., 2009	50mg NTX x 2 hours	9 abstinent AD	10 Healthy controls	Whole Brain and ROI	- No significant group X medication interaction. NTX increased activation in OFC during "later" decisions across AUD and healthy control groups.	↑
Schmaal et al., 2014*	200mg modafinil x 2 hours	14 AD	18 Healthy Controls	Whole Brain	- Group X medication interaction in left superior frontal gyrus and vmPFC when making "now" decisions, such that in individuals with AUD, modafinil increased activation in the SFG and decreased activation in the vmPFC compared to controls.	↑ and ↓
						3 ↓ 2 ↑ 1 ↑ and ↓ 1 Null

Supplemental Table 4 - Affective Processing Studies with Acute Pharmacotherapy Administration:

First author, year	Medication, dose, duration	AUD N	Comparison Group N	Analysis Approach	Results	Effect on Affective Processing Circuitry
Affective Image Stimuli						
Savulich et al., 2017	50mg NTX x 2 hours	18 abstinent AD only 21 abstinent Polysusbtance (AD + Cocaine or Opioid Dependence)	21 Heathy Controls	ROI	- No effect of NTX on AUD only group. NTX reduced amygdala activation in polysubstance using group compared to AUD and HC groups.	-

Supplemental Table 5 - Inhibitory Control Studies with Acute Pharmacotherapy Administration:

First author, year	Medication, dose, duration	AUD N	Comparison Group N	Analysis Approach	Results	Effect on Inhibitory Control Circuitry
Go/No-Go						
Nestor et al., 2018*	50mg NTX x 2 hours	21 abstinent AD only 25 abstinent Polysubstance (AD + Other Drug Dependence)	35 Healthy Controls	Whole Brain	- Significant group X medication interaction in left OFC and left anterior insula. In AUD only individuals, NTX increased activation in OFC compared to the polysubstance group. In polysubstance users, NTX increased activation in the anterior insula compared to the AUD only group.	↑
Murphy et al., 2017	60mg GSK598809 x 2 hours	18 abstinent AD Only 32 abstinent Polysubstance (AD + other dependence)	33 Healthy Controls	Whole brain and ROI	- No significant group X medication interaction.	-
Stop Signal Task						
Schmaal et al., 2013b*	200mg modafinil x 2 hours	16 AD	16 Healthy Controls	Whole brain	- Group X medication interaction in left putamen, such that modafinil increased activation in AUD individuals compared to controls.	↑
						0 ↓ 2 ↑ 1 Null