Supplemental Table 1. Inclusion/Exclusion Criteria

<u>Inclusion Criteria</u>

Age	21-55 years old (verified with driver's license)
Cocaine Use (Disorder)	DSM-IV criteria for cocaine abuse or dependence; temperature-tested urine drug screen (UDS) positive for cocaine metabolites ($\geq$300 ng/ml)
Cardiovascular	Normal resting BP (systolic: 80-160 mmHg; diastolic: 50-95 mmHg), HR (50-90 bpm), and ECG (cardiologist evaluated)
Cognition	Shipley Institute of Living Scale (Zachary, 1991) total IQ score $\geq$ 80

<u>Exclusion Criteria</u>

Substance Use (Disorder)	UDS positive for opioids, methadone, amphetamines, or barbiturates ($\geq$300 ng/ml). UDS positive for benzodiazepines ($\geq$300 ng/ml) or THC ($\geq$50 ng/ml) allowed. Met DSM-IV criteria for dependence on alcohol, sedatives or marijuana; or DSM-IV abuse of alcohol or sedatives. Currently being treated, or desire to be treated, for any substance use disorder.
Physical Health Problems	Self-reported cardiovascular, pulmonary, systemic, or neurological conditions. Exposed during the past 30 days to medications that would increase study risk.
Psychiatric Conditions	Met DSM-IV criteria for current serious psychiatric illness (e.g. psychosis, bipolar, suicide attempts, major depression not substance-induced)
Dietary	Self-reported lactose intolerance (placebo dose)
Pregnancy	Urine positive for pregnancy (females only), self-reported lactation/breast-feeding, or heterosexually active and not using medically approved birth control (self-reported)

Supplemental Table 2. Measures of Cocaine-Seeking Behavior

	Placebo				N-acetylcysteine			
	Placebo-priming		Cocaine-priming		Placebo-priming		Cocaine-priming	
	$0.50	$1.50	$0.50	$1.50	$0.50	$1.50	$0.50	$1.50
Cocaine breakpoints	2833 (1061)	1210 (460)	5580 (1357)	3835 (1403)	2957 (1042)	1371 (591)	2996 (912)	1516 (763)
Total # cocaine choices	4.92 (0.98)	3.33 (0.76)	7.25 (0.92)	4.92 (1.28)	4.83 (1.07)	3.50 (0.78)	5.25 (0.95)	3.33 (0.90)

Note: Means ± 1 Standard Error of the Mean (SEM) are presented in each cell. Significant effects are described in the text.

Supplemental Table 3: Spectra Quality Metrics

	SNR	FWHM	CRLB% GLU	CRLB% GLN
Placebo	18.4 (4.0)	0.046 (0.008)	4.6 (1.1)	13.1 (3.0)
NAC	17.3 (2.8)	0.049 (0.008)	4.4 (0.5)	16.1 (7.7)

Note: Means (± 1 Standard Deviation) are presented. No significant differences for placebo vs. N-acetylcysteine (NAC) were observed ($ps > .45$). SNR = Signal-to-Noise ratio; FWHM = full-width half-maximum (ppm); CRLB% = Cramer-Rao Lower Bound %; GLU = Glutamate; GLN = Glutamine.

Supplemental Table 4. Statistical Summary of Cocaine Priming Effects

Measure	Priming X Time F (p)	NAC F (p)	NAC x Priming F (p)
Heart rate	18.98 (.001) ↑	-	-
Systolic BP	22.09 (.001) ↑	-	-
Diastolic BP	23.14 (.001) ↑	-	-
Oxygen saturation	-	9.52 (.01) ↓	-
Good drug effect VAS	18.51 (.001) ↑	-	-
Drug high VAS	16.45 (.002) ↑	-	-
Drug liking VAS	16.67 (.002) ↑	-	-
Stimulated VAS	18.96 (.001) ↑	-	-
Want drug again VAS	10.47 (.008) ↑	-	-
SSARS scale	21.59 (.001) ↑	-	-
CCQ anticipation of positive outcome	-	-	-
CCQ anticipation of relief	-	-	-
CCQ desire to use	-	-	-
CCQ lack of control over use	-	-	10.30 (.01) ↓
CCQ planning/intention to use	-	-	-

Note: Arrows highlight significant *F*-test values that survived Bonferroni-corrected threshold for each measure category (physiological, $p < .012$; VAS, $p < .01$; and CCQ, $p < .01$) and denote the direction of the effect. For the Cocaine Priming *X* Time interaction, ↑ indicates a greater post-cocaine (than post-placebo) response increase. For the NAC main effect, ↓ indicates that NAC attenuated the effect relative to placebo. For the NAC *X* Priming interaction, ↓ indicates that NAC attenuated the cocaine-priming effect (relative to that observed under placebo maintenance). BP = blood pressure; CCQ = cocaine craving questionnaire; SSARS = stimulant-sensitive adjective rating scale; VAS = visual analogue scale.