Appendix

Summary of Studies (listed in chronological order)

Study	Country	Research Design	Type of Treatment(s)	Sample	Outcome Variables	Findings
Rawson, R.A., Obert, J.L., McCann, M.J., & Mann, A.J. (1985). Cocaine treatment outcome: Cocaine use following inpatient, outpatient, and no treatment.	USA	Quasi-experimental	Matrix Model vs inpatient treatment vs no formal treatment	**n=83 cocaine users** Mean yrs of cocaine use: 6.5 years Sex: Majority were male (average 72% for the whole sample) Mean age: 29 years Mean education: 12.5 years Marital status: about 52% married, 38% single, 10% divorced No demographic or drug use differences across the treatment conditions (matrix vs in-patient or no formal treatment).	Treatment completion Cocaine use: return to monthly or more frequent cocaine use	Treatment completion rates were similar (21.6 out of 26 weeks for Matrix, and 26.5 out of 28 days for in-patient). At 8 month-follow-up, Matrix participants reported significantly lower rates of cocaine use than those in either the inpatient/hospital or no formal treatment conditions, but the inpatient group had a longer window for relapse than the Matrix group.
Rawson, R. A., Obert, J., McCann, M. J., & Ling, W. (1992). Psychological approaches for the treatment of cocaine dependence-A neurobehavioral approach.	USA	Quasi-experimental	Matrix Model	**n=486 cocaine users** Mean yrs of cocaine use: 7.2 years Location/SES: Beverly Hills (higher SES) n=314, Rancho Cucamonga (lower SES) n=172 Race/ethnicity: 76% White, 15% Black, 8% Hispanic, 1% Other Mean age: 29.6 years (range: 20-40 years) Sex: 74% male	Retention: length of treatment received Drug use: in-treatment urinalyses results	Beverly Hills (BH) sample averaged over 5 months in treatment while Rancho Cucamonga (RC) sample averaged over 3 months in treatment. 20% of the participants in RC dropped out within the first 2 weeks, whereas it was 8% for BH. 48% of BH sample completed 6-month treatment, whereas 22% of RC sample completed 6-month treatment. Of those who completed the 6-month phase, similar proportions in both sites completed the treatment program with no cocaine use detected by urinalysis or self-report during treatment (BH-44%; RC-40%; 43% for the whole sample). 88% of the urine samples taken during the treatment tested negative for stimulants.

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				Mean education: 13.5 years Mean annual income: $23,930 Marital status: 54% single, 32% married, 7% divorced, 7% other		
Rawson, R. A., Shoptaw, S. J., Obert, J. L., McCann, M. J., Hasson, A. L., Marinelli-Casey, P. J., Brethen, P. R., & Ling, W. (1995). An intensive outpatient approach for cocaine abuse treatment.	USA	Experimental	Matrix Model vs community resources	**n=100 cocaine users** Mean age: 31 years Mean education: 12.7 years Race/ethnicity: 50% White, 27% African American, 23% Latin American	Treatment Retention/Program Compliance: total no. of weeks in treatment and no. and type of sessions attended Drug use: urinalysis at follow-up for all and during treatment for only the Matrix group Psychosocial functioning: Addiction Severity Index (ASI; McLellan et al., 1985), Profile of Mood States (POMS; McNair et al., 1978), and the Center for Epidemiologic Studies-Depression (CES-D; Radloff, 1977)	At 3-and 6-month follow-up interviews, 40% of the community resources (CR) sample reported involvement in formal treatments. Of the Matrix sample (had a low SES profile), 24% completed the 6-month phase of the Matrix treatment. Drug use: Both groups had significant reductions in their cocaine use over the 12-month period. No significant differences between groups. Psychosocial Functioning: Both groups reported significant reductions over time in addiction severity (ASI) and in mood disturbance but there were no significant between-group differences. Dose-response: There was a significant interaction effect such that abstinent Matrix participants received treatment for longer than non-abstinent Matrix participants. This pattern was not evident in the CR group. Higher level of treatment participation was significantly associated with improvement in ASI employment and family subscales in the Matrix sample but not in the CR group.
Shoptaw, S., Rawson, R. A., McCann, M. J., & Obert, J. (1995).	USA	Experimental	Matrix treatment only vs Matrix treatment plus desipramine vs	**n=146 cocaine and methamphetamine users** Mean years of drug use: 4.1 years	Abstinence: weekly urinalysis Retention: length of treatment received	Effect of treatment condition: No significant differences between groups. However, medication adherence was poor.

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The Matrix Model of outpatient stimulant abuse treatment: Evidence of efficacy.			Matrix treatment plus placebo	(SD=3.1) of heavy stimulant use Mean age: 31 years Sex: 19% female Type of drug used: 91.1% cocaine, 8.9% meth Avg education: 12.8 years (SD=2.2) Marital status: 60% single, 16.6% married, 23.3% divorced or separated Race/ethnicity: 26.7% African American, 61.6% White, 11.7% Latinx Cocaine and meth participants were similar in demographic and drug use variables.	Addiction Severity Index (ASI) Behavioral Change Index (BCI): a 20-item self-report scale measuring drug/alcohol and prosocial behaviors Craving: Stimulant craving visual analogue scale Depressive symptoms: Center for Epidemiological Studies-Depression (CES-D)	Pretreatment characteristics and outcome: Ethnicity and drug of choice were significantly related to the outcomes. African Americans had fewer weeks in treatment compared to Caucasians, but not fewer than Latinos. In-treatment abstinence rates were smallest for African Americans. Meth users engaged for significantly longer treatment episodes than cocaine users. Meth users had better abstinence outcomes (but there was a small number of meth users in the sample). Treatment dose & abstinence: On average, 67.3% of urinalysis results were negative. Those in the longer treatment group (longer than 20 weeks) had a higher percentage of negative urinalysis (76.7%, SD = 21.5, n = 77) than those who stayed in treatment less than 20 weeks (56.8%, SD = 28.1, n = 69; t = 4.77, df = 126.9, p < .01). Those with longer treatment episodes showed significantly better abstinence outcomes than those with shorter episodes using criteria of 3 and 8 consecutive weeks of abstinence. Significant reductions in addiction behaviors (ASI), for alcohol/drug and prosocial behaviors (BCI), for depression (CES-D), and for cravings and withdrawal at 6 -month were found. In-treatment abstinence and drug use at follow-up: Those with negative urinalyses at 6-month follow-up (n = 60) were significantly more likely to show higher weekly negative urinalyses in treatment than their positive (n = 86) peers. Abstinence in treatment (using the 3 and 8 consecutive weeks criteria) was significantly related to abstinence at follow-up.
Huber, A., Ling, W., Shoptaw, S., Gulati, V., Brethen,	USA	Nonexperimental	Matrix Model	**n= 724 stimulant users**	Abstinence (random urine tests)	Race and drug of choice: A disproportionate number of the methamphetamine users were White (80.5%) while most of the cocaine users were non-

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P., & Rawson, R. (1997). Integrating treatments for methamphetamine abuse: A psychosocial perspective.				Drug type: 500 methamphetamine, 224 cocaine Methamphetamine-using sample Race/ethnicity: 80.5% White, 16.7% Hispanic, 1.9% African American Sex: 60% Male, 40% Female Marital status: 49% never married, 26% married, 25% previously married Employment: 27.5% work full-time, 11% work part-time, 62% not working Cocaine-using sample Race/ethnicity: 48% White, 15.8% Hispanic, 34% African American Sex: 69% Male, 31% Female Marital status: 36% never married, 37.5% married, 26% previously married Employment: 31% work full-time, 17.6% work part-time, 51% not working Samples differed significantly from each other on demographics.	Type of clinical contact (extracted from treatment notes) Frequency of clinical contact (extracted from treatment notes)	White (52%). More than 1/3 of the cocaine users were African Americans (34.2%), but less than 2% of methamphetamine users identified as African American (1.9%). Other differences: Methamphetamine users were younger, less likely to be married, less likely to be employed, and had lower education levels than cocaine users. Methamphetamine users started using stimulants at a younger age on average than cocaine users. Cocaine users tend to binge, whereas methamphetamine users use meth daily. Cocaine users were more likely to report that they are addicted to the drug and have received prior treatment. A higher proportion of cocaine users drink alcohol frequently compared to methamphetamine users, but meth users reported use of other major classes of drugs in the past year. Response to treatment: No differences in type and amount of treatment were found between methamphetamine and cocaine users. Both groups stayed in treatment for the same duration (M=17.5 weeks); survival curves were almost identical. Urinalysis results were not significantly different between the two groups. 19.3% of the methamphetamine users tested positive for methamphetamine, whereas 13.3% of cocaine users tested positive for cocaine.

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Rosenblum, A., Magura, S., Palij, M., Foote, J., Handelsman, L., & Stimmel, B. (1999). Enhanced treatment outcomes for cocaine-using methadone patients.	USA	Experimental	High Intensity Treatment (CBT, based on Matrix Model) vs low intensity treatment (weekly group and brief check ins)	**n=198 cocaine-dependent methadone maintenance program participants** Tx condition: 140 in high intensity (Matrix), 58 in low intensity group Sex: 57% male Mean age: 38 years Race/ethnicity: 34% Black, 52% Hispanic, 13% White Marital status: 31% married Educational attainment: 53% HS grad, Employment: 16% employed MH symptoms: 40% had mood disorder, 27% had anxiety disorder High intensity group had more Hispanic participants, more participants with a mood disorder, and higher global severity than the low intensity group. No other significant differences between groups.	Drug use: weekly urinalysis for cocaine and opiates, self-report for cocaine, heroin, injected drugs, alcohol, diazepam, and marijuana. Psychiatric symptom intensity: Brief Symptom Inventory (BSI; Derogais and Spenser, 1982) Positive affect: Positive-Affect Negative- Affect Scale (Watson et al., 1988). Other dependent variables include employment, legal status, and stable residence	Retention in the methadone clinic was high for both groups: 90% at 6 months, 78% at 1 year and 66% at 72 weeks. Treatment assignment was strongly related to the number of sessions attended. Low intensity subjects (26 sessions in protocol) attended a mean of 11.9 (SD=6.9) sessions; high intensity subjects (120 sessions in protocol), attended a mean of 54.1 sessions (SD=36.6, t [196]=8.68, p < 0.001). Drug use: Participants in both the high and low treatment intensity groups showed significant and equivalent declines in cocaine use at the two follow-up points per urinalysis. Employment, legal status (on probation, parole, work release or bail), and residence (stable vs. unstable housing) stayed the same across the three assessment periods. Psychiatric symptoms: BSI scores declined at follow-up with the high intensity group showing a greater decline than the low intensity treatment group. Mixed model ANOVA results: No main effect for treatment condition (high vs low intensity) was found. Less cocaine use at follow-up was associated with lower severity of cocaine use at baseline and with completion of either therapy. A severity X completion X time effect (F(3,561)=3.11, P<0.05) was found: positive outcomes over time for low severity completers relative to low-severity non-completers. There was a between-subjects interaction effect. Those with severe cocaine use had less positive urine samples if they received Matrix treatment.

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Rawson, R. A., Marinelli-Casey, P., Anglin, M. D., Dickow, A., Frazier, Y., Gallagher, C., Galloway, G. P., Herrell, J., Huber, A., McCann, M. J., Obert, J., Pennell, S., Reiber, C., Vandersloot, D., & Zweben, J. (2004). A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence.	USA	Experimental	Matrix Model vs TAU	**n=978 methamphetamine-dependent individuals** (randomly assigned to receive either TAU at each site or a Matrix Model) Mean years of drug use: 7.5 years of life-time methamphetamine use and 11.5 days of use in the past 30 days Preferred route of methamphetamine use: 65% smoking, 24% IV injecting, 11% snorting Sex: 45% male, Race/ethnicity: 60% Caucasian, 18% Hispanic and 17% Asian/Pacific Islander Mean age: 32.8 years Mean education: 12.2 years. Employment: 69% employed. Marital status: 16% married and not separated	Retention: number of clinical contacts (recoded as five-category variable where 5=longest retention, 1=shortest retention) Program completion: attended at least one treatment session in the last scheduled week of treatment (1=completed, 2=not completed) Abstinence: urinalysis (1= 50–100% meth-free, 2= 0%-50% meth-free, 3=0% meth-free), self-report of meth-use Functioning: Addiction Severity Index; ASI)	Retention: Higher retention in Matrix condition than TAU, except the drug court site. Five of the eight comparisons are statistically significant and indicate increased retention in the Matrix condition. Being in the Matrix condition was associated with a 38% increase in odds of staying in treatment (OR=1.38), controlling for treatment length. Treatment completion: The completion rate was 40.9% for Matrix participants and 34.2% for TAU participants, which was statistically significant (P = 0.031). Controlling for demographics and the frequency and route of meth use, the logistic regression showed that Matrix participants had 27% higher odds of completing treatment than TAU participants (OR=1.27). TAU participants at 3 sites were 85%, 74%, and 54% less likely to complete treatment. At the drug court site, TAU participants had higher odds of treatment completion than Matrix participants (OR= 2.17). When drug site data was excluded from the overall analysis, logistic regression analysis revealed that Matrix participants had 37% higher odds of completing treatment than TAU participants (as opposed to 27% higher odds in models including drug court data). Abstinence: Controlling for demographics, frequency of meth use, and route of meth use, Matrix participants had 31% higher odds of providing clean samples than TAU participants (OR=1.31). The Matrix condition is associated with longer mean periods of abstinence than the TAU condition (2 out of 8 sites had significant differences). Discharge and 6-month follow-up urinalyses results were not significantly different between Matrix and TAU samples. At discharge, 66% of Matrix samples had meth-free samples, compared to 69% for TAU. At 6-month follow-up, 69% of Matrix and 69% of TAU participants had meth-free samples.

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						Addiction severity index (ASI): Both groups showed improvements in drug, alcohol, psychiatric, and family domains of ASI across six months but there were no significant differences in ASI scores between the groups.
Rawson, R. A., Gonzales, R., Pearce, V., Ang, A., Marinelli-Casey, P., & Brummer, J. (2008). Methamphetamine dependence and human immunodeficiency virus risk behavior.	USA	Nonexperimental (secondary data)	Matrix Model vs TAU	**n=784 methamphetamine users** (received either Matrix treatment or TAU) Current MA use in the past month averaged 11.4 ± 9.5 days at baseline. Lifetime MA use averaged 7.5 years (SD = 6.0) at baseline. <u>At baseline</u> Sex: 51% female Race/ethnicity: 65.5% White (other race/ethnic categories not specified) Avg age: 32.8 years (SD=7.8, range=18-60) Avg education: 12 years (SD=1.7) <u>At 3-year follow-up</u> Race/ethnicity: 67.6% Caucasian Sex: 59.8% female Mean age: 36.2 years (SD = 8.0; range = 21–59 years)	Risky behaviors: self-reported injection and high-risk sexual practices (Texas Christian University AIDS Risk Assessment [Simpson et al., 1994]) at baseline and follow-up periods. The TCU AIDS Risk Assessment is an 18-item inventory assessing high-risk sexual and drug use behaviors commonly associated with exposure to HIV. Higher scores indicate riskier sexual activities. Sexual risk composite scores were coded as 0 (if no risky behaviors) or 1 (if they engaged in risky behavior).	Treatment condition: No significant differences in HIV risk practices (injection or unsafe sexual practices) by treatment condition. Change in risky behaviors: The proportion of the sample who injected methamphetamine within the previous 30 days significantly reduced between baseline and treatment discharge (14.6% to 5.4%, based on a matched baseline to discharge sample of 784). Subanalysis of high-risk injection practices (injectors only; n = 128 from baseline to discharge) showed that high-risk practices were significantly reduced. High-risk sexual practices substantially reduced after treatment participation (baseline to treatment discharge). Types of sexual practices that saw significant reductions included having sex without condoms in general, having sex with IV users without condoms, having sex with methamphetamine users without condoms, and having sex while high on drugs. Retention and injection behavior: There was a significant relationship between retention and HIV risk outcomes. Both longer stays in treatment and completing treatment predicted reduction in risky injection and sexual behaviors controlling for SES and methamphetamine use in past 30 days. Long term outcomes: Change in HIV risk behaviors was examined at 3-year follow-up, controlling for treatment condition and completion, current meth use in the past month, and SES. Injection practices and risky sexual practices

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						significantly reduced from baseline to 3-year follow-up.
Marinelli-Casey, P., Gonzales, R., Hillhouse, M., Ang, A., Zweben, J., Cohen, J., Hora, P. F., & Rawson, R. A. (2008). Drug court treatment for methamphetamine dependence: Treatment response and posttreatment outcomes.	USA	Nonexperimental (secondary data)	Matrix Model plus Drug court vs Matrix Model only	**n=287 methamphetamine dependent individuals** Tx condition: 57 drug court plus Matrix treatment (drug court), 230 Matrix treatment only (non-drug court) Sex: 63% male Mean age: 32.5 years Race/ethnicity: 55% White, 26% Latino, 9% Asian Educational attainment: 19% less than high school Employment: 72% full-time employed Marital status: 53% single, 19% married, 27% divorced or separated The only significant difference between samples was Latino ethnicity (i.e., there were more Latino participants in the drug court than in non-drug court sites). At treatment entry, drug court sample used meth for significantly fewer days in the month prior to entry,	Immediate dropout: dropping out within the first 30 days of admission Retention: average length of stay in outpatient treatment (16 weeks possible) In-treatment meth use: Urinalysis Completion: a dichotomous variable, defined as those who completed the 16-week Matrix Model with no more than two consecutive missed weeks of treatment versus those who did not complete treatment Addiction Severity Index (ASI 5th edition; McLellan et al., 1992)	Retention: Drug court participants stayed in treatment longer than 30 days after initial admission (79% vs. 57%; p< .01) and were retained in treatment at a much higher rate (11.2 +/- 6.2 vs. 8 +/- 6.5 weeks; F = 12.33, p < .001) than non-drug court participants. Treatment completion: Treatment completion rates were highest among drug court participants compared to non-drug court participants (56.1% vs. 31.7%; p < .001). Controlling for baseline participant and drug use factors, being enrolled in drug court was the most significant predictor of treatment completion (B = 0.784, p < .01, r2 = 4.8%). In treatment meth use: The drug court group provided a higher proportion of clean urine samples than the non-drug court group (97.3% vs. 90.5%, respectively; F = 8.63, p < .001). Controlling for baseline variables, drug court participants were more likely (B = 4.93, p < .001) to stay abstinent during treatment. Those who were both using meth less frequently in the month prior to treatment admission and enrolled at the drug court were more likely to be meth-free in treatment than non-drug court participants (B = 0.28, p < .01). Discharge and follow up outcomes (6 months and 12 months after treatment): The drug court sample had greater reductions in positive urinalysis at discharge and follow-up than non-drug court sample. Those with greater frequency of meth use at baseline had increased meth use at follow-up (B = 0.22, p < .001), whereas those with a higher percentage of meth-free urine samples during treatment had decreased meth use at follow-up (B = 0.38, p < .001).

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				was less likely to have had previous drug abuse treatment episodes, and was less likely to be injection users		ASI: Significant improvements were found in all subscales. The drug court participants and non-drug court participants only differed in drug use domain outcomes. At both 6 and 12 months after treatment, greater reductions in the drug use domain were observed for drug court participants compared to non-drug court participants (F = 20.252, p < .001; F = 5.119, p < .05, respectively).
Perngparn, U., Limanonda, B., Aramrattana, A., Pilley, C., Areesantichai, C., & Taneepanichskul, S. (2011). Methamphetamine dependence treatment rehabilitation in Thailand: A model assessment.	Thailand	Nonexperimental	Matrix Model vs inpatient	**n=135 yaba-dependent men** Tx condition: 43 Matrix, 92 inpatient treatment Mean daily drug use: 3 tablets of yaba (meth+caffeine) per day <u>Matrix Model</u> Mean age: 23.2 years Race: 100% Thai Religion: 97.7% Buddhist, 2.3% Other Marital Status: 72.1% never married, 23.3% married Employment: 16.3% unemployed <u>Inpatient</u> Mean age: 23.9 years Race: 97.8% Thai, 2.2% Other Religion: 94.6% Buddhist, 5.4% Other Marital status: 68.5% never	Ratings of self: psychological functioning (e.g., self-esteem, depression), social functioning (e.g., hostility, risk taking) Ratings of treatment process: treatment motivation, participation in treatment, counselor attitude and behavior (e.g., rapport) Ratings of program attributes: treatment service, peer support, and social support	1.5 and 3 months in treatment comparisons: The inpatient group had significant improvements in all ratings of the program attributes (treatment service, peer support, and social support), counselor attitude and behavior (counselor rapport and competence), and participation in treatment (therapeutic engagement and personal progress), but the Matrix group did not. Both groups showed significant improvement in self-esteem, depression, and anxiety measures from 1.5 to 3 months. The Matrix group had increased self-efficacy, but the inpatient group did not. Follow-up outcomes after treatment completion: 18.6% of inpatient model clients and 21% of Matrix Model clients relapsed at 3 and 6 months after treatment completion. Two participants reported sniffing glue and the rest used yaba. After completing follow-up at 6-month, the survival rates of inpatient and Matrix Models showed no significant difference in abstinence.

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				married, 26.1% married Employment: 29.3% unemployed There were no significant demographic differences between the two samples except for education level		

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Rawson, R. A., Gonzales, R., Greenwell, L., & Chalk, M. (2012). Process-of-care measures as predictors of client outcome among a methamphetamine-dependent sample at 12- and 36-month follow-ups	USA	Nonexperimental (secondary data)	Matrix Model vs TAU	**n=871 methamphetamine-dependent individuals** Race/ethnicity: 67.6% White, 14.7% Hispanic, 11.9% Asian/Pacific Islander, 3.6% American Indian/Alaska Native, 2% African American Sex: 57% women Mean age: 33 years	Abstinence: negative urinalysis at 12-month or 36 months after treatment	Matrix treatment group outcomes Having three consecutive negative urine samples during treatment was associated with increased odds of abstaining from meth use at 12-month follow-up (OR=2.94). Factors that decreased the odds of abstinence at 12-month follow-up for the Matrix group included being older (OR= 0.95) and having experienced unstable living conditions at baseline (OR=0.42). Having three consecutive negative urine samples in treatment was also associated with higher odds of abstinence at 36-month follow-up (OR=3.07). TAU group outcomes Having three consecutive negative urine samples was associated with increased odds of abstinence at 12-month follow-up (OR= 3.05) compared to those who did not have three or more consecutive negative test samples. Increases in the number of alcohol or drug treatments between baseline and 12-month follow-up was also associated with higher odds of abstinence at 12-month follow-up (OR= 1.92). None of the variables predicted abstinence at 36-month follow-up for the TAU group. Combined sample: Having three consecutive negative urine samples and increases in the number of alcohol or drug treatments between baseline and 12-month follow-up were both associated with higher odds of abstinence, whereas older age was associated with lower odds of abstinence at 12-month and 36-month follow-up. Abstinence at 36-months was 31% lower for females than for males. Neither engagement nor retention predicted abstinence at any follow-up timepoint or for any treatment group in the multivariate analyses, but they were significantly related to 12-month follow-up abstinence in the bivariate analyses. They were not related to 36-month abstinence.

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Mousavi, S. G., Sharbafchi, M. R., Salehi, M., Peykanpour, M., Karimian Sichani, N., & Maracy, M. (2015). The efficacy of N-acetylcysteine in the treatment of methamphetamine dependence: A double-blind controlled, crossover study.	Iran	Experimental	Matrix & Matrix plus N-acetylcysteine (NAC)	**n= 23 methamphetamine users** (originally 32) Mean years of dependency: 4.1 years (SD=2.2, range: 1-8 years) Mean age: 29.2 years (SD=4.93, range= 22-40 years) Sex: 19 males, 4 females No sig demographic differences between the two treatment condition groups.	Meth craving: adapted version of Cocaine Craving Questionnaire-Brief [CCQ-Brief]that replaced "cocaine" with "meth" in the item wording. Includes 10 items with 7-point visual analog scale ranging from strongly disagree to strongly agree)	<u>End of first session (the first 4 weeks) craving scores</u> Group A (NAC): 3.38 (SD=1.16) Group B (Placebo): 5.96 (SD=1.03) <u>End of second session (crossover; the second 4 weeks) craving scores</u> Group A (Placebo): 4.57 (SD=1.88) Group B (NAC): 3.2 (SD=0.86) Repeated measures analysis showed that there was a reduction in the craving scores during the consecutive weeks with NAC, while this was not observed during the placebo condition.
Salehi, M., Emadossadat, A., Kheirabadi, G. R., Maracy, M. R., & Sharbafchi, M. R. (2015). The effect of buprenorphine on methamphetamine cravings.	Iran	Experimental	Matrix plus Buprenorphine vs Matrix and placebo pill	**n=40 methamphetamine dependent men** Mean age: 31 years (range: 18 and 40 years) No additional demographic information was provided.	Meth craving: Cocaine Craving Questionnaire-Brief (CCQ-Brief). Used 10 items for cocaine craving due to a lack of meth-specific measures. Authors also mentioned that craving patterns for cocaine and meth are similar. CCQ-B was administered at baseline and 10 times after starting treatment) Meth use: urine test	Analysis of covariance repeated measures showed changes over time, and the intervention effect on these changes was significant. The paired t test showed that the change differs in each measurement time (there were 11 comparisons at different points in treatment). Mean craving scores at baseline were significantly different in all the weeks of the study (compared baseline to each following 10 measurements in treatment). The group effect shows significant difference between the placebo and medication groups during the study (the difference became significant at Week 8 and remained significant for all the following weeks). The Matrix plus buprenorphine group consistently had lower mean craving scores starting from Week 8 (third visit) through the end of Week 28 (11th visit). Urine test: The proportion of those who had a positive urine test in the Matrix plus buprenorphine group was consistently and significantly lower than Matrix plus placebo group starting week 8 (3rd visit) through Week 26 (10th visit); there was no significant difference between treatment groups at the last visit.

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Moeeni, M., Razaghi, E. M., Ponnet, K., Torabi, F., Shafiee, S. A., & Pashaei, T. (2016). Predictors of time to relapse in amphetamine-type substance users in the matrix treatment program in Iran: A Cox proportional hazard model application.	Iran	Nonexperimental	Matrix Model	**n=128 amphetamine-type substance users** Drug type: 98% methamphetamine, 2% ecstasy Mean age at first time use: 22 years Mean duration of addiction: 5.2 years, Mean duration of amphetamine dependence: 2.2 years Sex: 100% male Mean age: 30 years Educational attainment: 39% high school drop out Marital status: 44 single, 35 married, and 21 divorced Employment: 63% had a job. Drug injection history: 20% had practiced drug injection Polysubstance use history: 86% engaged in poly-substance use prior to treatment Arrest history: 28% arrested at least once (none were violent offenses) Sexual behaviors: 78% had casual sexual relationships	Relapse: positive urinalysis (twice in the first month and once per month after that), return to use report (by patient or family members, at end of follow up)	Nearly 62 % of the patients relapsed during the treatment program or in the 6-month follow-up period. Matrix treatment attendance, casual sex habits, criminal offences, family support, and lifetime duration of ATS dependence were significant in predicting relapse. On average, attending an additional session reduced the relapse rate by 18%. Having a history of casual sex habits predicted a shorter time to relapse. Having a history of criminal offense predicted higher rate of relapse whereas passable or strong family support predicted longer time to relapse. Risk for relapse increased by each year of ATS dependence history (2% increase per every year of dependence).

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Magidson, J. F., Gouse, H., Burnhams, W., Wu, C. Y. Y., Myers, B., Joska, J. A., & Carrico, A. W. (2017). Beyond methamphetamine: Documenting the implementation of the Matrix Model of substance use treatment for opioid users in a South African setting.	South Africa	Non-experimental	Matrix Model	**n=1863 participants with opioid or methamphetamine as the primary substance** Drug use type: 1,329 in primary meth group, and 534 in primary opioid group Sex: 63.6% male, 36.4% female Race/ethnicity: 98% Coloured, 1.5% Black Employment: 88% unemployed Marital status: 68.8% single; 19.4% married; 11% widowed, separated, or divorced Mean age: 27.4 years (SD=6.4 years) Mode of use: 99.2% smoke their drug of choice Compared to the opioid group, meth group were more likely to be male, have a previous treatment episode, have lower problem recognition on SOCRATES scale, but have greater actions to address	Treatment initiation: attending a minimum of one group or individual session following treatment intake Treatment engagement: using City's Matrix Key Supervisor clinically meaningful cut-offs: 1) attending at least four group sessions (two weeks); 2) attending at least eight group sessions (i.e., completing early recovery; one month); and 3) later engagement (attending at least 16 group sessions; two months) Urine toxicology at treatment exit: urine drug screens administered weekly to all participants using a Drugs of Abuse Panel Test Card for meth, benzodiazepine, cocaine, opiates, and marijuana	Treatment initiation: Of those screened with primary methamphetamine or opioid use, 831 initiated treatment. Primary meth users had over 50% higher odds of initiating treatment compared to primary opioid users (OR = 1.53; 95%CI: 1.24–1.88). No other variables in the model were significant. Treatment engagement: In the total sample, 381 individuals (45.8%) attended at least 4 group sessions, 246 individuals (29.6%) attended at least 8 group sessions, and 173 individuals (20.8%) attended at least 16 group sessions. Variables that were significantly related to each indicator of engagement at p < 0.1 included age, prior treatment episode, gender, and "taking steps" subscale of SOCRATES. These four variables were included as covariates in all subsequent analyses. Completion of 4 sessions: Primary methamphetamine users had almost 4.5 times greater odds of attending at least four treatment sessions compared to primary opioid users (OR = 4.48; 95%CI: 2.27–8.84). The only other variable significantly associated with completion of at least four treatment sessions was the SOCRATES "taking steps" subscale. Higher scores on the taking steps subscale of the SOCRATES were associated with greater odds of attending at least four treatment sessions (OR = 1.06; 95%CI: 1.02–1.11). Completion of 8 sessions: primary methamphetamine users had greater odds of attending at least eight treatment sessions compared to primary opioid users (OR = 2.44; 95%CI: 1.20–4.94). Individuals who received prior treatment had 42% lower odds of having attended at least eight treatment sessions compared to individuals who had no prior treatment episodes

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				substance use (as measured by taking steps measure from the SOCRATES).		(OR = 0.58; 95%CI: 0.34–0.98). Higher scores on the taking steps subscale of the SOCRATES was associated with increased odds of treatment engagement (OR=1.08; 95%CI: 1.03–1.14). Additionally, older age was associated with increased odds of attending at least eight treatment sessions (OR = 1.05; 95%CI: 1.01–1.08). Completion of 16 sessions: primary methamphetamine users had over 3 times greater odds of attending at least 16 treatment sessions compared to primary opioid users (OR = 3.04; 95%CI: 1.29–7.13). Higher scores on the taking steps subscale of the SOCRATES was associated with an 11% increased odds of treatment engagement (OR = 1.11; 95%CI: 1.04–1.18). Older age was associated with increased odds of attending at least 16 treatment sessions (OR = 1.04; 95%CI: 1.00–1.08). Abstinence: 645 individuals in the sample had urine drug testing at treatment exit (77.6% of the 831 who initiated treatment). Nearly half (45.4%, n = 293) of participants had a negative urine toxicology test at treatment exit. Among 529 primary meth users with urinalysis results, 42.9% had a positive urine test for meth at treatment exit (n = 227). Only the taking steps subscale was significantly associated with abstinence (not primary substance) in the regression model. Higher taking steps subscale scores were associated with increased odds of abstinence at treatment exit (OR = 1.12; 95%CI: 1.06–1.18).

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Masaeli, N., Zarkob, H., Kheirabadi, G., Soleimani, N., & Amini, M. (2018). The effect of Matrix Model on depression, anxiety, and quality of life in methamphetamine users and their caregivers.	Iran	Nonexperimental	Matrix Model	**n=28 meth-dependent participants and 27 caregivers**. <u>Participants</u> Sex: 100% male Mean age: 40.2 years (SD=12.9 years) Educational attainment: 78.6% high school degree or less <u>Caregivers</u> Sex: not specified Avg age: 32.7 years (SD=6.7 years) Educational attainment: 70.4% high school degree or less	Quality of life: short form of the WHO quality of life questionnaire (WHOQOL-BREF) Anxiety symptoms: Zung Self-Rating Anxiety Scale Depressive symptoms: Beck Depression Inventory	Data from baseline, 2 months after intervention, and 6 months after intervention were compared using repeated measures ANOVA. The mean scores for depression and anxiety decreased for both groups after the intervention, whereas the mean score for quality of life increased. All ANOVA analyses were significant indicating that there were significant differences between groups at all 3 time points.
Aryan, N., Banafshe, H. R., Farnia, V., Shakeri, J., Alikhani, M., Rahimi, H., Sehat, M., Mamsharifi, P., Ghaderi, A., & Omidi, A. (2020). The therapeutic effects of methylphenidate and matrix-methylphenidate on addiction severity, craving, relapse and mental health in the methamphetamine use disorder.	Iran	Experimental	Matrix Model plus methylphenidate (MPH) vs Matrix only vs MPH only vs control (received nothing)	**n=85 methadone patients who were using methamphetamine completed the trial** (originally 100) Mean years of drug use: 2 years Mean duration in methadone maintenance therapy: 4.5 years Tx conditions: Matrix Model treatment (n = 20), MPH (n = 22), matrix combined with MPH (n = 21), and control	Craving: Desire for Drug Questionnaire (DDQ). Severity of addiction: Leeds Dependence Questionnaire (LDQ) to measure the degree of dependency from mild to severe Mental health: General Health Questionnaire (GHQ-12), which includes 12 items rated on a 4-point Likert scale (0 = not	Scale scores (craving, severity of addiction and mental health) at baseline did not significantly differ among the treatment groups. Matrix-MPH group, compared to Matrix Model only, MPH only, and control group had significantly reduced desire for drug and dependence severity and better scores on the GHQ-12. The Matrix only and control groups did not have any significant improvements in any of those measures (pre-post), however, the MPH-only group had significant reductions in desire for drug and dependence severity (pre-post). Meth-positive urine tests gradually declined in all four groups, but the reduction was greater in the Matrix-MPH group compared with other groups. The prevalence of negative METH urine tests in the last week for each group was: 20% in Matrix Model treatment group, 40.9% in MPH group, 61.9% in Matrix-MPH group, and 5% in the control group. GEE logistic regression model showed that the Matrix plus MPH condition had a

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				(received nothing) (n = 22) Sex: 100% male Mean age: 31 years Educational attainment: 60% less than high school Marital status: 35% single, 35% divorced or widowed, 30% married Employment: 48% unemployed Samples did not differ significantly from each other on key characteristics.	at all, 4 = much more than usual) Relapse: urine tests for amphetamine, METH, and methadone at the beginning of the study and every three weeks during check-in visits	significant effect on abstinence compared to other groups. Compared to the control group, the Matrix plus MPH group had greater odds of having a negative urine test (OR= 7.63; CI: 2.82–20.67). The Matrix only group did not differ significantly from the MPH only or control groups on any of the outcomes.
Esmaeili, S., Taremian, F., Rezaei, M., Vousooghi, N., & Mostafavi, H. (2021, in press). Comparison of the efficacy of Matrix therapy, transcranial magnetic Stimulation, and cognitive rehabilitation in attention bias modification and craving reduction in stimulant drug users.	Iran	Quasi-experimental	Matrix Treatment vs cognitive rehabilitation vs repetitive transcranial magnetic stimulation (rTMS) vs control group	**n=40 male stimulant drug users** (originally 46 but 6 were excluded) Tx condition: 10 in each intervention group and 10 in control group Avg age: 34 years <u>Matrix treatment group</u> Marital status: 10% single, 80% married, 0% divorced <u>Cognitive modification group</u> Marital status: 30% single, 60% married, and 10% divorced <u>rTMS group</u>	Craving Desire for Drug Questionnaire (DDQ) Substance Dependence Severity Scale (SDSS; Miele, 2000): a semi-structured interview questionnaire designed based on the DSM-IV and ICD-10 drug and alcohol dependence definitions that show the intensity and frequency of the dependence over the past 30 days Dot-probe task (DPT): measures attentional bias	Repeated measure ANOVA results showed that the effect of time in three stages of craving assessment (pre-treatment, post-treatment, and follow-up) was significant in all four studied groups. In the Matrix, rTMS, and cognitive modification groups, treatment significantly affected the severity of addiction dependence and attentional bias at three assessment time points. In the control group, the effect of time in three stages of assessing the severity of addiction and attention bias was not significant. The results of ANCOVA showed a significant difference between the means of the dependent variables in the study groups in both the post-treatment and 1-month follow-up stages, controlling for age and consumption rate. A pairwise comparison of groups analysis of LSD test results showed no significant difference between the three groups (Matrix, rTMS, and cognitive modification treatment) in the dependent variables in post-treatment and follow-up. Mean scores for craving, severity of addiction

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				Marital status: 60% single, 20% married, and 20% divorced <u>Control group</u> Marital status: 40% single, 50% married, and 10% divorced No significant marital differences between groups. One-way ANOVA showed the mean age of Matrix group was significantly higher compared to other groups.	towards stimulants' craving-related cues via computerized task (Begh et al., 2013; De Voogd et al., 2016; Lancee et al., 2017)	dependence, and attentional bias significantly decreased for all three groups compared to the control group at post-treatment and follow-up.
Azadbakht, A., Salehi, M., Maracy, M. R., & Banafshe, H. R. (2022). The effects of oxytocin on craving, mental health parameters, and stress hormones in methamphetamine-dependent patients undergoing Matrix treatment model: A randomized, double-blind clinical trial.	Iran	Experimental	Matrix Model plus oxytocin vs Matrix plus placebo	**n= 42 methamphetamine dependent individuals** (originally 50) Mean years of drug use: 6.5 years of meth use Tx condition: 21 Matrix plus placebo, 21 Matrix plus oxytocin (OXT) condition Sex: 100% male Mean age: 33.6 years Educational attainment: 76% high school or more Employment: 57% employed Marital status: 55% married, 45% single Samples did not significantly differ in key	Craving: Cocaine Craving Questionnaire-Brief (CCQ-Brief) Inventory Depression: Beck Depression Inventory Anxiety: Beck Anxiety Inventory ACTH: blood test Cortisol: blood test	No side effects were observed in the OXT group. The Matrix plus OXT group had significant improvements in craving scores and depression scores after 4 weeks of intervention compared to the Matrix plus placebo group. No significant differences were found between the two groups in anxiety scores. Matrix plus OXT group had decreased cortisol levels at the end of the trial (at the 4-week) and at follow-up (at the 8-week) compared to the Matrix plus placebo group. Also, at the end of the 4-week intervention, the Matrix plus OXT group had significantly reduced ACTH levels, but no significant differences in the 8-week follow-up were found.

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				characteristics and baseline characteristics were similar between the groups.		
Fayaz Feyzi, Y., Vahed, N., Sadeghamal Nikraftar, N., & Arezoomandan, R. (2022). Synergistic effect of combined transcranial direct current stimulation and Matrix Model on the reduction of methamphetamine craving and improvement of cognitive functioning: a randomized sham-controlled study.	Iran	Experimental	Matrix Model plus transcranial direct current stimulation (tDCS) over dorsolateral prefrontal cortex (DLPFC) vs Matrix plus sham vs Matrix only.	**n= 40 methamphetamine users** (originally 60). Mean duration of meth use: 5 years Tx condition: 15 active tDCS with Matrix, 12 sham tDCS with Matrix, 13 Matrix only Sex: 100% male Avg age: 35 years, Mean years of education: 13 years	Memory: Wechsler Memory Scale (WMS), including forward and backward digit span subscales that examine short-term working memory Task switching: Wisconsin Card Sorting Test (WCST) Drug craving: Obsessive-Compulsive Drug Use Scale (OCDUS), a 12-item scale measuring three components of drug craving Drug consumption and relapse: urine tests and interviews (90% of participants were administered urine tests and the rest were interviewed)	Wechsler Memory Scale (WMS) outcomes: The active tDCS plus Matrix group showed significantly better performance in auditory and visual memory at post-intervention compared to baseline. Sham tDCS plus Matrix group showed an improvement in visual working memory but poorer auditory working memory in the post-intervention compared to the baseline (neither were significant). There was a non-significant relative improvement in both subscales of the WMS from baseline to post-intervention in the Matrix only group. Wisconsin Card Sorting Test (WCST) outcomes: Active tDCS plus Matrix group showed a significant increase in the number of true answers and a significant decrease in the number of false answers from the baseline to the post-intervention. The other two groups also showed improvements, but they were not significant. ANCOVA showed no significant differences between groups in audio and visual memory, and subscales of WCST. Craving outcomes: Drug craving in all three groups declined from baseline to the post-intervention but it was only significant for active tDCS plus Matrix group. There was a significant difference in craving scores between groups. The reduction of the craving score in the active tDCS group was greater than in the other two groups with a large effect size. Relapse outcomes: At one-month following the intervention, relapse rates were lowest in the active

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						tDCS group (i.e., 18% in active tDCS, 50% in sham tDCS, and 55% in Matrix psychotherapy only group; χ2 (2) = 3.43, p = .17). Relapse rates were not significantly different between groups. Relationship between craving and cognitive performance: In the active tDCS group, craving was significantly correlated with most of the subscales including the number of completed categories (r = −.59, p < .05), conceptual responses (r = −.8, p < .001), the number of true answers (r = −.036, p < .05), perseverative errors (r = .54, p < .05), and visual span (r ” −.53, p < .05). Side effects: While some participants reported side effects resulting from tDCS, most others reported typical initial tingling at the beginning of the stimulation, mainly under the scalp electrode. One case reported first-degree skin burn. Two participants complained of headaches, and two participants reported dizziness.
Basereh, S., Safarzadeh, S., & Hooman, F. (2022). The effectiveness of group dialectical behavior therapy and structured Matrix treatment on quit addiction self-efficacy, distress tolerance, and mindfulness in individuals with stimulant drug abuse.	Iran	Quasi-experimental	Matrix Model vs DBT vs control (received buprenorphine treatment)	**n=75 stimulant drug abusers** Tx condition: 25 structured Matrix Model, 25 DBT, and 25 control Mean age: 34.5 years Mean years of addiction: 5 years Educational attainment: 65% middle school Marital status: 60% single No information was provided about gender.	Quit addiction self-efficacy questionnaire (Bramson, 1991): 16 items measuring skills, such as decision-making, problem-solving, communication, and assertion. Distress tolerance scale (Simons and Gaher, 2005): 15 items with 5-point Likert items and four subscales, including the perceived capability for toleration of	According to the MANCOVA, significant differences were found between the control, DBT, and SMT groups for some dependent variables: quit addiction self-efficacy (F = 71.28, P=0.001), distress tolerance (F=42.27, P=0.001), and mindfulness (F = 48.38, P = 0.001). There was a significant difference between the control group and DBT group, as well as the control group and Matrix group on quit addiction self-efficacy, distress tolerance, and mindfulness (P< 0.001). There was a significant difference between DBT and Matrix groups regarding distress tolerance (P = 0.020). No significant difference was observed between the Matrix and DBT groups regarding mindfulness and quit addiction self-efficacy.

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					emotional distress (tolerance), attention absorbed by negative emotions (absorption), subjective appraisal of distress (appraisal), and regulation efforts to alleviate distress (regulation). Higher scores indicate more severe distress. Mindful attention awareness scale (Brown and Ryan, 2003): 15 items with 6-point response options ranging between 1 (Almost Always) and 6 (Almost Never). The scores range between 15 and 90. A high score on this scale indicates higher levels of mindfulness (Low = 15-30; Moderate = 30-60; High = 60-90).	