Psychosocial Treatments for Cocaine Dependence – Revisiting Statistically

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Background

- On the treatment of cocaine part of NIDA collaborate treatment study.
- Four intervention treatment types, which were:
  - IDC Individual Drug Counseling coded =1
  - CT Cognitive Therapy coded=2
  - SE Supportive-Expressive Therapy coded=3
  - GDC Group Drug Counseling coded=4
- Participants assessed monthly for 6 months during active treatment, and a primary outcome of focus was the Addiction Severity Index (ASI).
  - Psychiatric Composite concerns psychiatric symptom severity.

Data

- Dataset, with a population size of 487 eligible cocaine-dependent adults, five clinical sites.
- Participants were mainly male. A natural question is how it is different between the two genders?
  - Males coded as 0, Females coded as 1 (verified with frequency table).
- Variables of focus were:
  - Outcome variable assigned was PSY_SUB, the ASI Psych Composite
  - Intervention variable: treatment condition, TX_COND
  - Moderator variable: gender
  - Time at months 3 and 6

Model

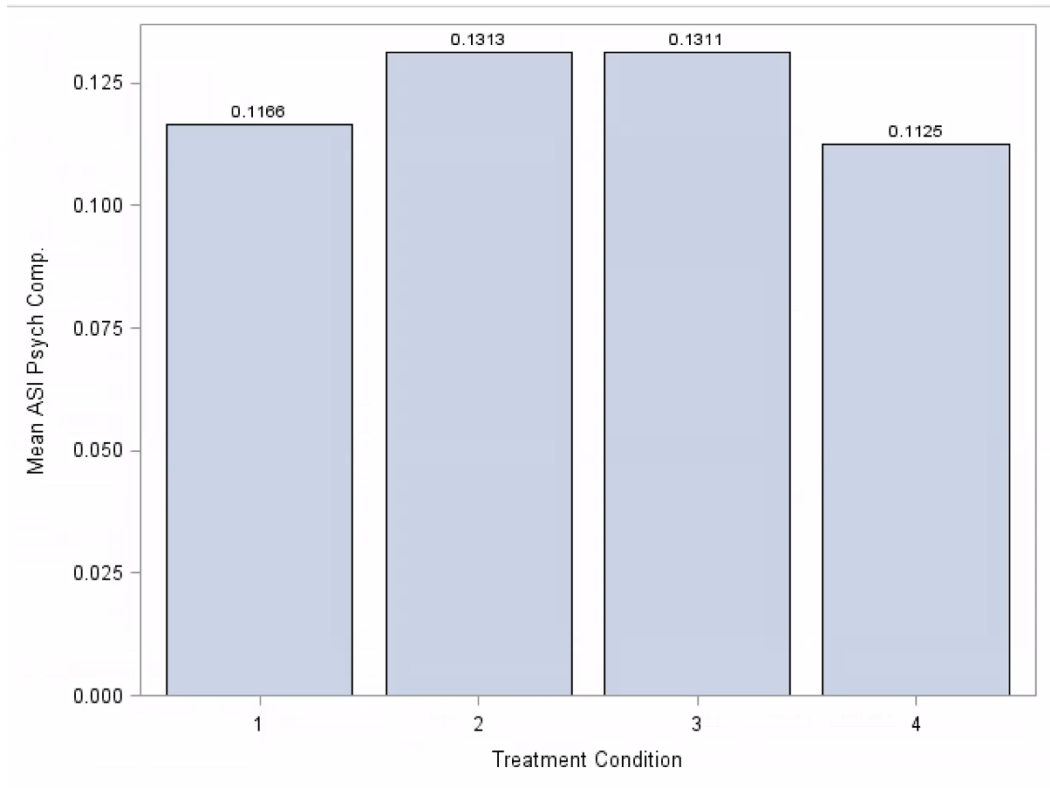
- All performed in SAS, using procedure mixed for linear models.
- Cross-Sectional Analyses at Month 3 and Month 6
- Basic modeling
  - PSY_SUB vs TX_COND
- Interaction modeling
  - PSY_SUB vs TX_COND, Gender, and TX_COND-Gender ineraction term
- Three-way interaction modeling
  - PSY_SUB vs TX_COND, Gender, month, three two-interaction terms, and TX_COND-Gender-month interaction term

Results: Month 3

- Basic Model

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
TX_COND	3	345	0.27	0.8503

Least Squares Means						
Effect	TX_COND	Estimate	Standard Error	DF	t Value	Pr > |t|
TX_COND	1	0.1166	0.01927	345	6.05	<.0001
TX_COND	2	0.1313	0.01916	345	6.85	<.0001
TX_COND	3	0.1311	0.01894	345	6.93	<.0001
TX_COND	4	0.1125	0.01873	345	6.01	<.0001



Results: Month 3

- Interaction Modeling by Gender

Type 3 Tests of Fixed Effects

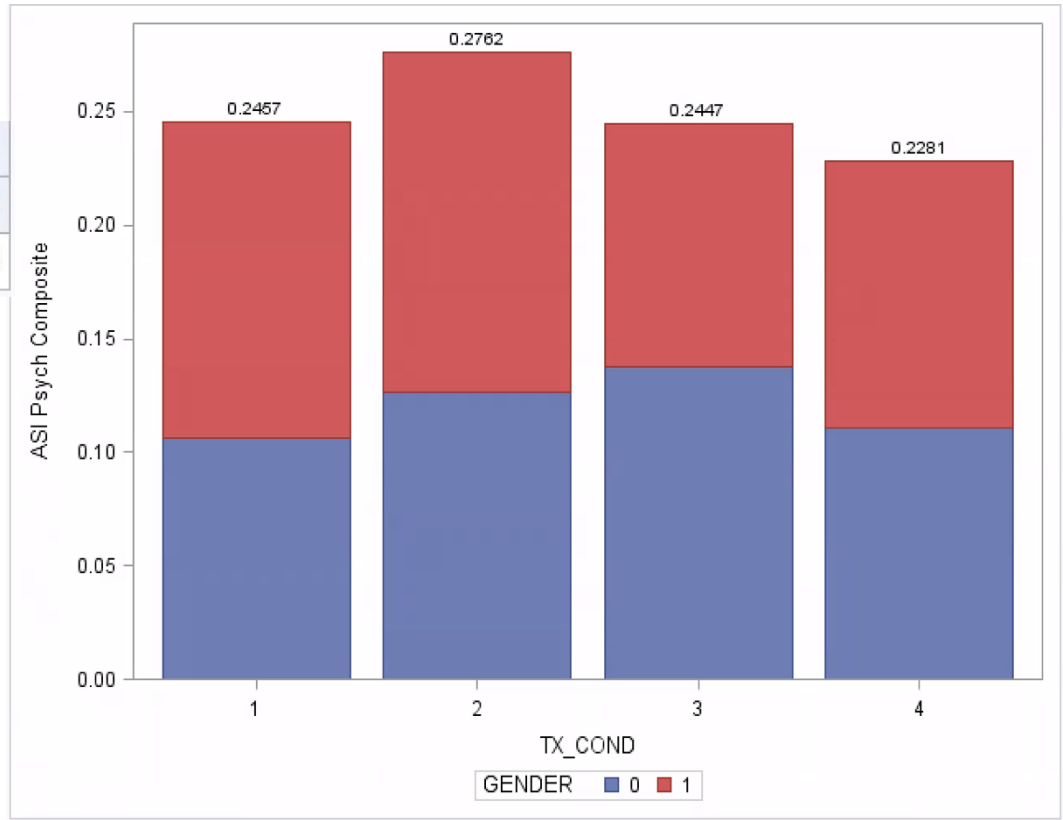
Effect	Num DF	Den DF	F Value	Pr > F
TX_COND	3	341	0.19	0.9040
GENDER	1	341	0.12	0.7336
TX_COND*GENDER	3	341	0.38	0.7680

Contrasts

Label	Num DF	Den DF	F Value	Pr > F
Interaction test	1	341	0.02	0.8796

Least Squares Means

Effect	TX_COND	GENDER	Estimate	Standard Error	DF	t Value	Pr > |t|	Alpha	Lower	Upper
TX_COND*GENDER	1	0	0.1067	0.02322	341	4.60	<.0001	0.05	0.06103	0.1524
TX_COND*GENDER	1	1	0.1390	0.03498	341	3.97	<.0001	0.05	0.07019	0.2078
TX_COND*GENDER	2	0	0.1268	0.02147	341	5.91	<.0001	0.05	0.08456	0.1690
TX_COND*GENDER	2	1	0.1494	0.04326	341	3.45	0.0006	0.05	0.06429	0.2345
TX_COND*GENDER	3	0	0.1378	0.02147	341	6.42	<.0001	0.05	0.09560	0.1801
TX_COND*GENDER	3	1	0.1069	0.04092	341	2.61	0.0094	0.05	0.02638	0.1873
TX_COND*GENDER	4	0	0.1107	0.02195	341	5.04	<.0001	0.05	0.06754	0.1539
TX_COND*GENDER	4	1	0.1174	0.03641	341	3.22	0.0014	0.05	0.04575	0.1890

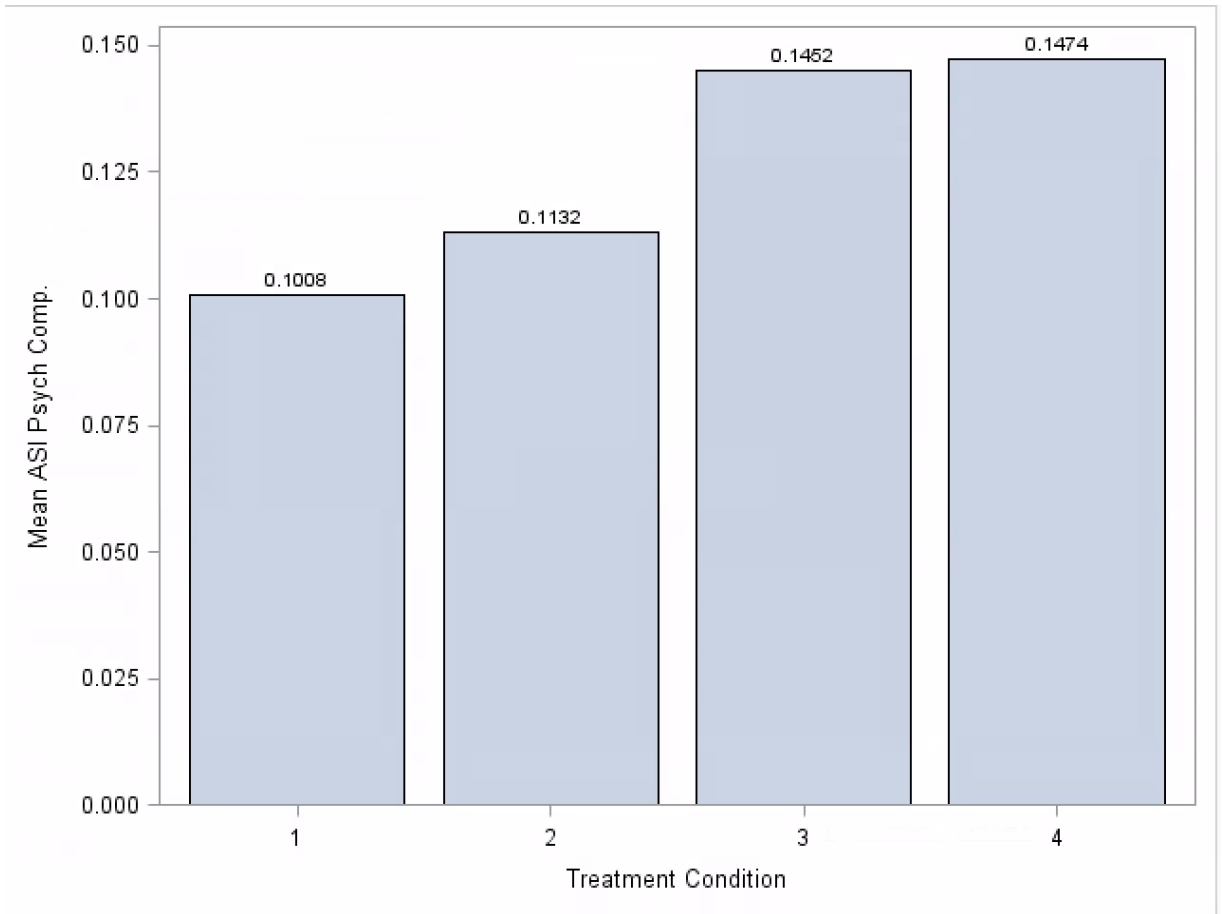


Results: Month 6

- Basic Model

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
TX_COND	3	372	1.60	0.1885

Least Squares Means						
Effect	TX_COND	Estimate	Standard Error	DF	t Value	Pr > |t|
TX_COND	1	0.1008	0.01851	372	5.45	<.0001
TX_COND	2	0.1132	0.01802	372	6.28	<.0001
TX_COND	3	0.1452	0.01861	372	7.80	<.0001
TX_COND	4	0.1474	0.01812	372	8.14	<.0001



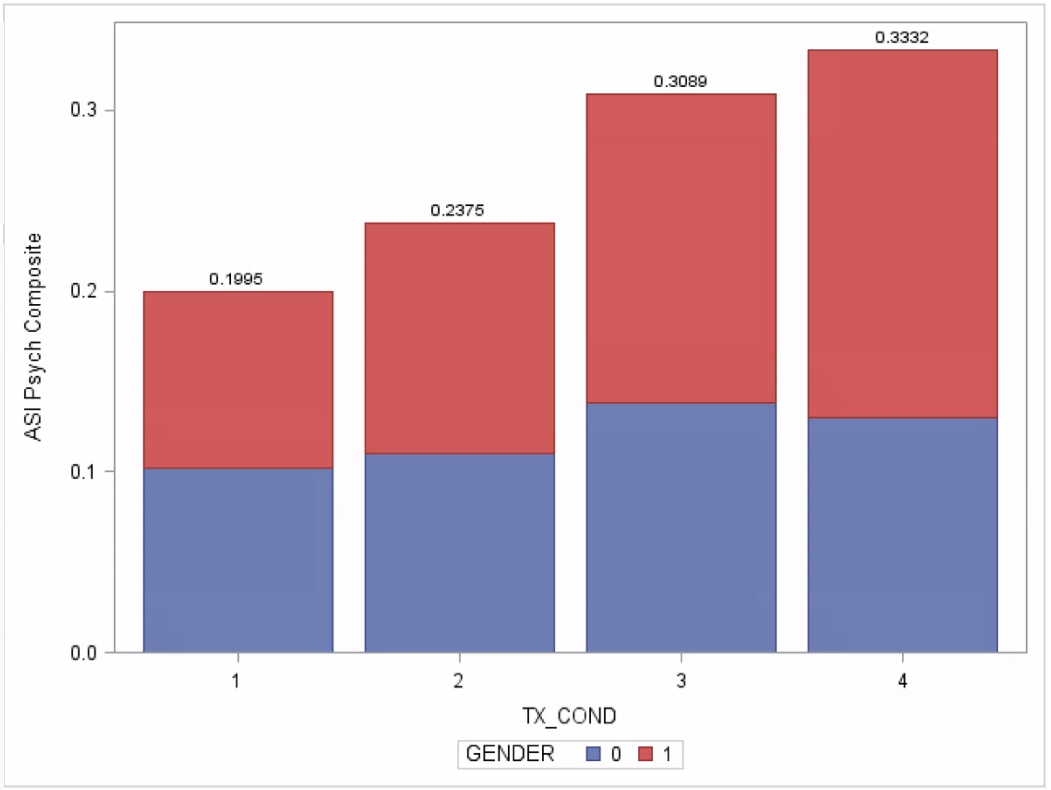
Results: Month 6

- Interaction Modeling by Gender

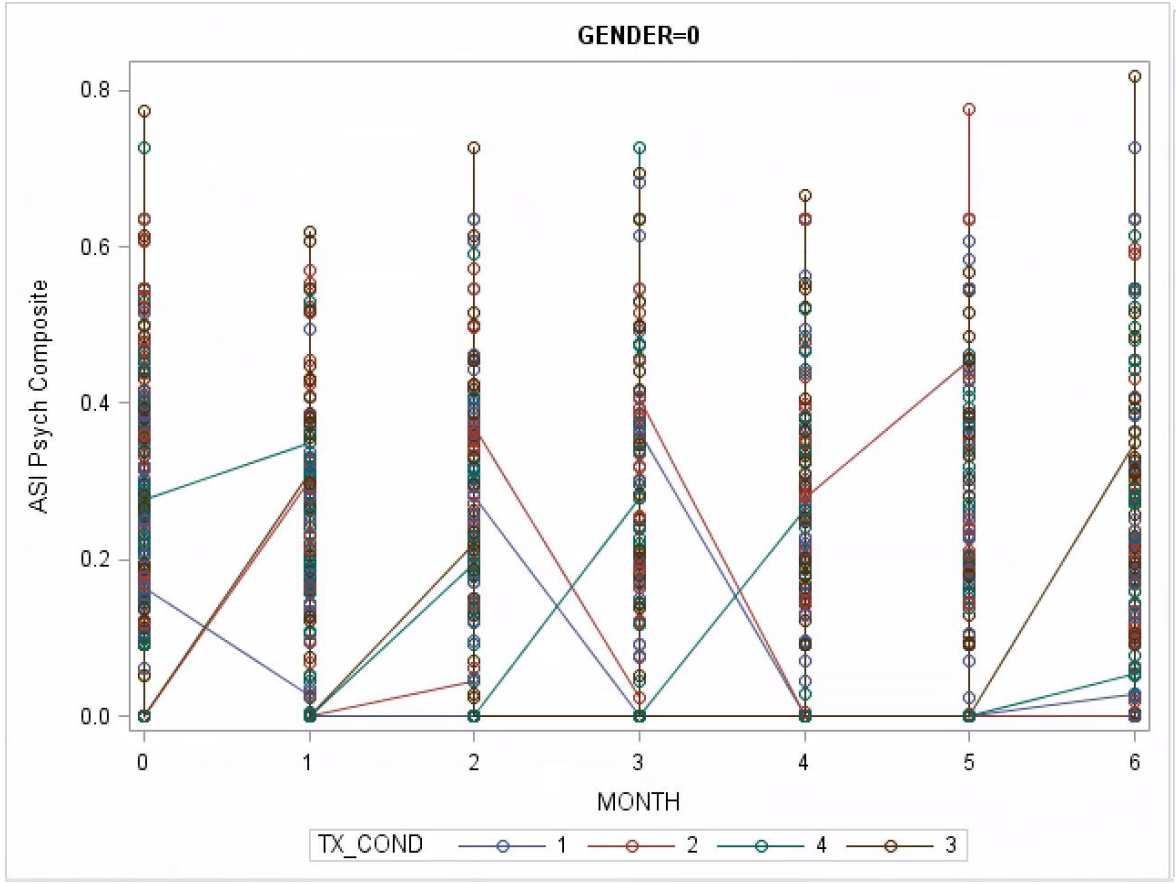
Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
TX_COND	3	368	2.15	0.0932
GENDER	1	368	1.86	0.1733
TX_COND*GENDER	3	368	0.63	0.5970

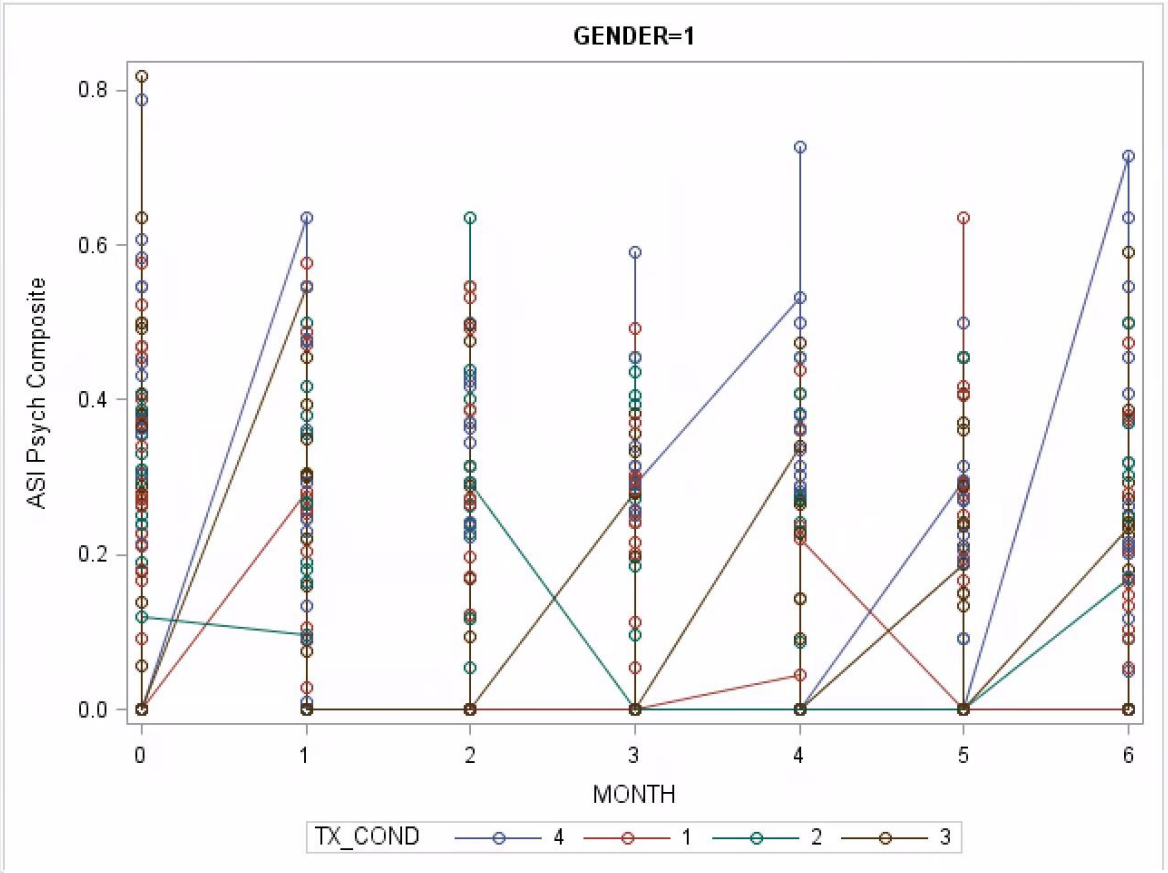
Contrasts				
Label	Num DF	Den DF	F Value	Pr > F
Interaction test	1	368	0.13	0.7150

Least Squares Means										
Effect	TX_COND	GENDER	Estimate	Standard Error	DF	t Value	Pr > |t|	Alpha	Lower	Upper
TX_COND*GENDER	1	0	0.1023	0.02203	368	4.64	<.0001	0.05	0.05899	0.1456
TX_COND*GENDER	1	1	0.09719	0.03418	368	2.84	0.0047	0.05	0.02999	0.1644
TX_COND*GENDER	2	0	0.1100	0.01998	368	5.51	<.0001	0.05	0.07072	0.1493
TX_COND*GENDER	2	1	0.1274	0.04186	368	3.04	0.0025	0.05	0.04513	0.2098
TX_COND*GENDER	3	0	0.1379	0.02108	368	6.54	<.0001	0.05	0.09644	0.1793
TX_COND*GENDER	3	1	0.1710	0.03971	368	4.31	<.0001	0.05	0.09290	0.2491
TX_COND*GENDER	4	0	0.1297	0.02079	368	6.24	<.0001	0.05	0.08887	0.1706
TX_COND*GENDER	4	1	0.2035	0.03703	368	5.50	<.0001	0.05	0.1307	0.2763



Results: 3-Way Interaction Modeling





Results: 3-Way Interaction Modeling

Least Squares Means								
Effect	TX_COND	GENDER	MONTH	Estimate	Standard Error	DF	t Value	Pr > |t|
TX_COND*GENDER*MONTH	1	0	0	0.1797	0.01937	2627	9.28	<.0001
TX_COND*GENDER*MONTH	1	0	1	0.1108	0.02228	2627	4.97	<.0001
TX_COND*GENDER*MONTH	1	0	2	0.1574	0.02263	2627	6.95	<.0001
TX_COND*GENDER*MONTH	1	0	3	0.1067	0.02338	2627	4.56	<.0001
TX_COND*GENDER*MONTH	1	0	4	0.09749	0.02300	2627	4.24	<.0001
TX_COND*GENDER*MONTH	1	0	5	0.1208	0.02228	2627	5.42	<.0001
TX_COND*GENDER*MONTH	1	0	6	0.1023	0.02228	2627	4.59	<.0001
TX_COND*GENDER*MONTH	1	1	0	0.1949	0.03036	2627	6.42	<.0001
TX_COND*GENDER*MONTH	1	1	1	0.1663	0.03666	2627	4.54	<.0001
TX_COND*GENDER*MONTH	1	1	2	0.1424	0.03666	2627	3.88	0.0001
TX_COND*GENDER*MONTH	1	1	3	0.1390	0.03523	2627	3.95	<.0001
TX_COND*GENDER*MONTH	1	1	4	0.09091	0.03523	2627	2.58	0.0099
TX_COND*GENDER*MONTH	1	1	5	0.1110	0.03335	2627	3.33	0.0009
TX_COND*GENDER*MONTH	1	1	6	0.09719	0.03457	2627	2.81	0.0050
TX_COND*GENDER*MONTH	2	0	0	0.2078	0.01814	2627	11.45	<.0001
TX_COND*GENDER*MONTH	2	0	1	0.1546	0.02047	2627	7.55	<.0001
TX_COND*GENDER*MONTH	2	0	2	0.1214	0.02088	2627	5.81	<.0001
TX_COND*GENDER*MONTH	2	0	3	0.1268	0.02162	2627	5.86	<.0001
TX_COND*GENDER*MONTH	2	0	4	0.1182	0.02060	2627	5.74	<.0001
TX_COND*GENDER*MONTH	2	0	5	0.1147	0.02132	2627	5.38	<.0001
TX_COND*GENDER*MONTH	2	0	6	0.1100	0.02021	2627	5.44	<.0001
TX_COND*GENDER*MONTH	2	1	0	0.1704	0.03920	2627	4.35	<.0001
TX_COND*GENDER*MONTH	2	1	1	0.1600	0.04121	2627	3.88	0.0001
TX_COND*GENDER*MONTH	2	1	2	0.1841	0.04121	2627	4.47	<.0001
TX_COND*GENDER*MONTH	2	1	3	0.1494	0.04356	2627	3.43	0.0006
TX_COND*GENDER*MONTH	2	1	4	0.1429	0.04121	2627	3.47	0.0005
TX_COND*GENDER*MONTH	2	1	5	0.06523	0.04121	2627	1.58	0.1135

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
TX_COND	3	2627	2.66	0.0467
GENDER	1	2627	7.96	0.0048
MONTH	6	2627	6.17	<.0001
TX_COND*GENDER*MONTH	45	2627	0.62	0.9795

Conclusion

- Suggestions can be hard to draw based solely on gender despite the wide gender gap, where males made up more than half of the study who were cocaine dependence and eligible for treatment.
- In addition, since there were over 2,000 who were potentially consulted, perhaps means that males were more likely to seek treatment or be eligible.
- This suggests to explore other variables of interest, such as age, where age and gender can be observed in tandem.

Citation

- Crits-Christoph, P. “Psychosocial Treatments for Cocaine Dependence: National Institute on Drug Abuse Collaborative Cocaine Treatment Study.” *Archives of General Psychiatry*, vol. 56, no. 6, 1 June 1999, pp. 493–502, https://doi.org/10.1001/archpsyc.56.6.493.