Beck Depression Index

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BACKGROUND

- *Investigation examining the efficacy of 4 psychosocial treatments for cocaine-dependent patients*
- Focused Variables: **The Beck Depression Inventory (BDI)**
  - a 21-item, self-report rating inventory that measures characteristic attitudes and symptoms of depression
- One of the most popular scales for evaluating the severity of depression
- Past data has shown that BDI offers the best validity as a screening tool for depression when compared to other depression screens
- Looking for the relationship between depressive symptoms and cocaine use
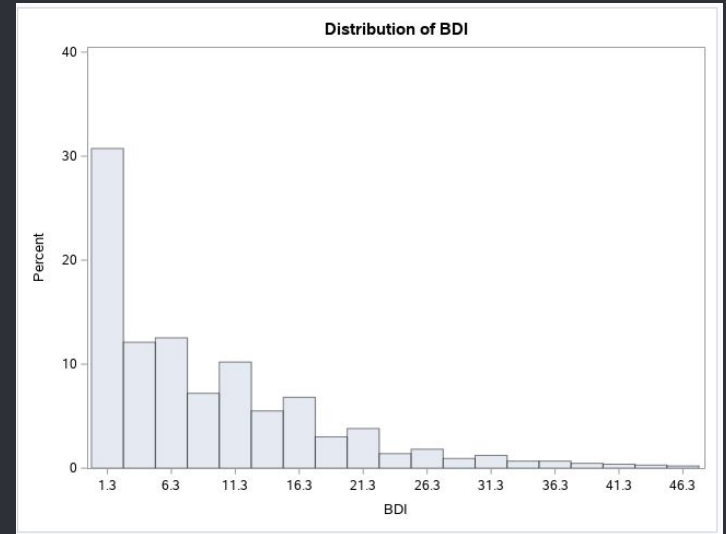
BACKGROUND

BDI Score Scale

0-9	Minimal Depression
10-18	Mild Depression
19-29	Moderate Depression
30-63	Severe Depression

Treatment Conditions

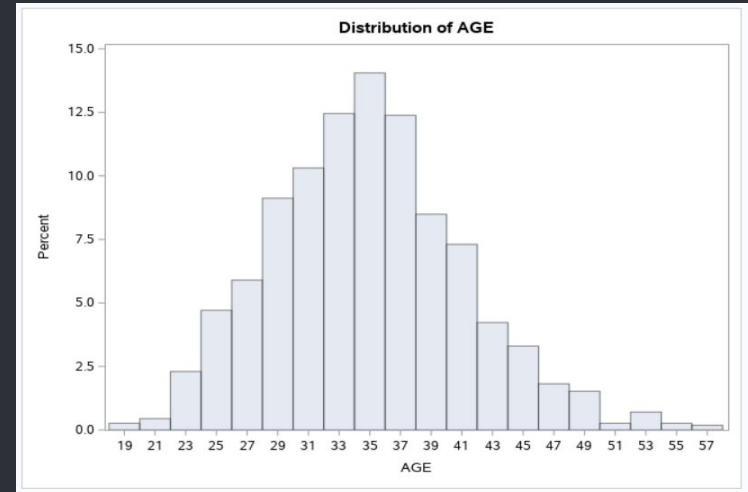|	
IDC	Individual Drug Counseling
CT	Cognitive Therapy
SE	Supportive-Expressive Psychodynamic Therapy
GDC	Group Drug Counseling

DATA

◦ What is the relationship between BDI and cocaine-dependent patients?

◦ Distribution: Skewed Right

◦ There is increasing recognition that depression is not homogenous!

→ Two individuals receiving a depression diagnosis may actually have no symptoms in common.

Distribution of BDI

DATA

- Month 0-6: Users who use it at month 0 had a higher BDI rating but overall very similar.
- Number of cases: 2697
- Race: 0 - Others: 43.83%
  1 - Caucasian: 56.17%
- Gender: M - 0: 76.46% F - 1: 23.54%
- Ages: 19-57 Most of the participants are middle-aged.

Distribution of AGE

The FREQ Procedure

GENDER	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	2062	76.46	2062	76.46
1	635	23.54	2697	100.00

RACE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1515	56.17	1515	56.17
0	1182	43.83	2697	100.00

CORRELATION & REGRESSION

- All variables with a correlation coefficient (r) >= 0.4 were other psychological tests
- 36 variables out of 75 had an r value less than 0.2

GSI	0.78		ZMO	0.46		M0ACL30	0.05
HAM27	0.69		M0CPI	-0.25		M0COC30	0.05
SIGHD17	0.66		GENDER	0.06		AGE	-0.02
BAI	0.65		MAR_STAT	-0.06		RACE	0.02
PSBDI	0.61		JOB	-0.06		EDUCATE	0.01

CORRELATION & REGRESSION

○ Tried to model BDI based on the following variables with SAS's rsquare option

○ ZM0 is a Psych composite so it's likely the R-square is high due to BDI comprising part of it

Number in Model	R-Square	Variables in Model
1	0.2104	ZM0
1	0.0635	M0CPI
1	0.0040	MAR_STAT
1	0.0037	JOB
1	0.0035	GENDER
1	0.0033	M0ALU30
1	0.0026	M0COC30
1	0.0016	GTHS
1	0.0011	CRACK
1	0.0006	AGE
1	0.0001	EDUCATE

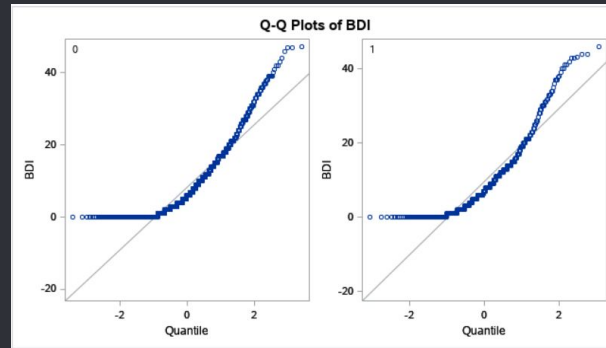| 11	0.2234	GENDER AGE MAR_STAT JOB CRACK ZM0 M0CPI EDUCATE GTHS M0ALU30 M0COC30

RELATIONSHIP

- One-Way ANOVA of BDI by Gender
  - 0 = Male
  - 1 = Female
- Gender is significant
  - Equal variance assumption violated (see QQ Plot)
  - Significantly more males
- Females are more depressed
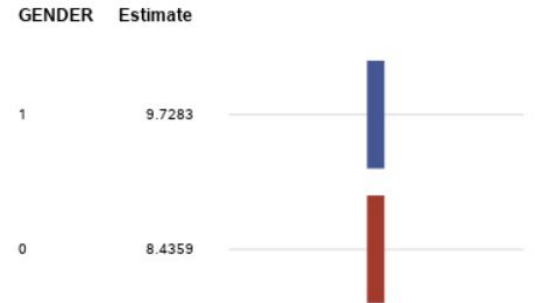
Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	556	1804	1.29	0.0001

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	2360	-2.96	0.0031
Satterthwaite	Unequal	838.54	-2.77	0.0058

Q-Q Plots of BDI

BDI SNK Grouping for Means of GENDER (Alpha = 0.05)

Means covered by the same bar are not significantly different.

GENDER	Estimate	
1	9.7283	
0	8.4359	

RELATIONSHIP

- ANCOVA of BDI by Treatment Condition and Age
- No interaction of treatment condition and age on BDI
- Main Effect of Treatment Condition - significant
- Main Effect of Age - not significant

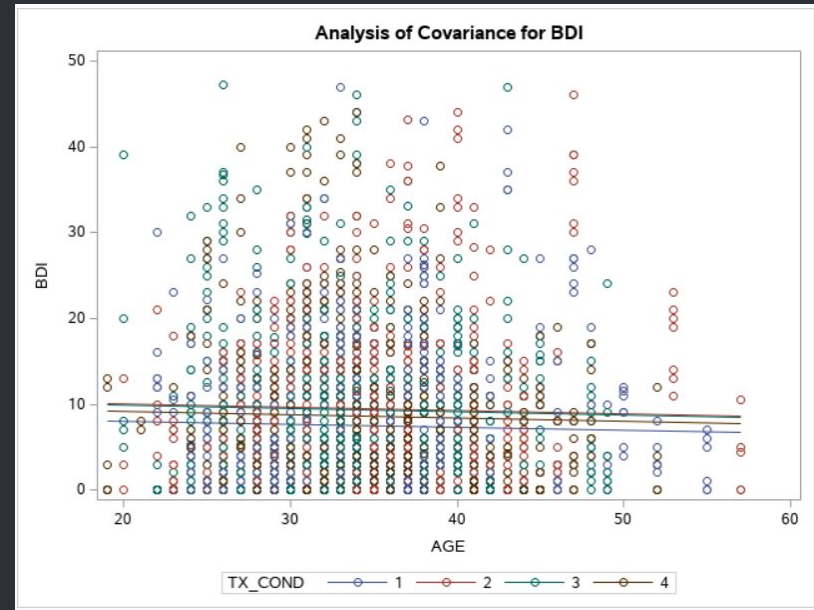**ANCOVA of BDI by Treatment Group and Age**

The GLM Procedure

Dependent Variable: BDI

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1568.4361	392.1090	4.85	0.0007
Error	2357	190659.9240	80.8909		
Corrected Total	2361	192228.3601			

R-Square	Coeff Var	Root MSE	BDI Mean
0.008159	102.8976	8.993939	8.740672

Source	DF	Type I SS	Mean Square	F Value	Pr > F
TX_COND	3	1440.255636	480.085212	5.93	0.0005
AGE	1	128.180438	128.180438	1.58	0.2082

Source	DF	Type III SS	Mean Square	F Value	Pr > F
TX_COND	3	1450.991469	483.663823	5.98	0.0005
AGE	1	128.180438	128.180438	1.58	0.2082

Analysis of Covariance for BDI
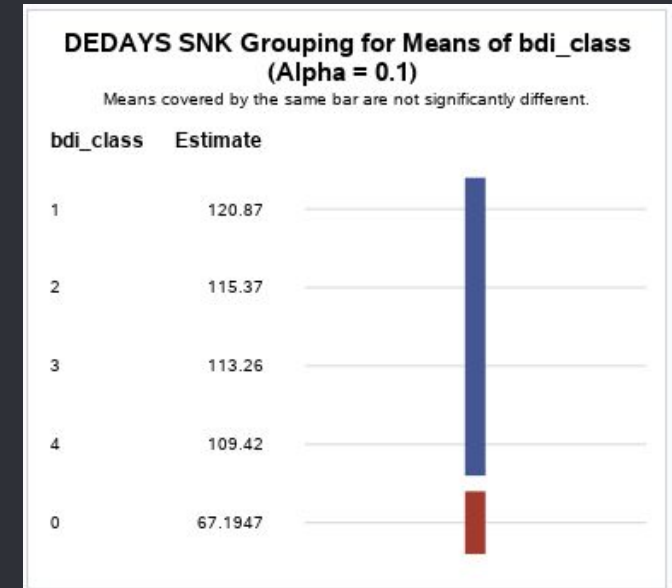
BDI CLASS

- ◦ Created bdi_class variable based upon classification levels mentioned earlier (higher level = more depressed)
- ◦ Used class 0 as a default value for patients without scores
- ◦ Ran anova test for several variables to see if classes differed at 10% alpha level

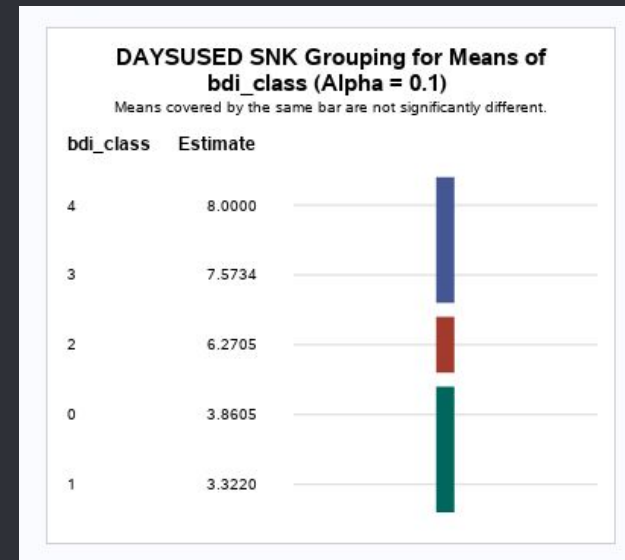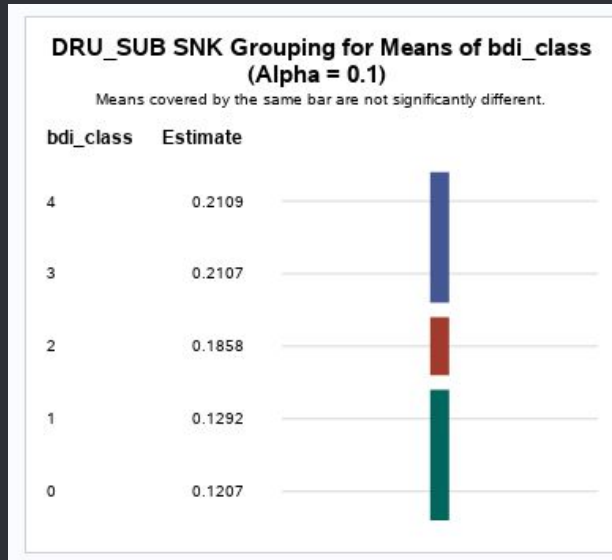| Class	Count	Pct
No Data - 0	339	12.6%
Minimal -1	1478	54.8%
Mild - 2	568	21.1%
Moderate - 3	219	8.1%
Severe - 4	93	3.4%
Total	**2,697**	**100%**

BDI CLASS

- The following variables had no difference or only had a difference with bdi_class 0:
  - M0coc30
  - M0alu30
  - Censor
  - Complete
  - Dedays
- Dru_sub and Daysused were both identified to have interesting and significant differences between classes

```
proc anova data=test ;
    class bdi_class;
    model dru_sub = bdi_class;
    means bdi_class / snk alpha=0.1;
run;
```

DEDAYS SNK Grouping for Means of bdi_class (Alpha = 0.1)

Means covered by the same bar are not significantly different.

bdi_class	Estimate
1	120.87
2	115.37
3	113.26
4	109.42
0	67.1947

BDI Class

- Daysused - number of days the person has used in the last 30 days
- Dru_sub - drug composite of addiction severity index (ASI)
- This test makes the best case for depression severity positively impacting drug use

POSSIBLE EXPLORATION

- Attempted transformation by looking at BDI class and its classification levels
- 0 = catch all for people who DID NOT have a score
  - Was statistically significant different by: 5%, 10%, 15%, and 20% alpha levels
- Clearer relationship understanding
- Dayused & Dru_sub
  - Looking at BDI & ASI: must consider whether the relationship between them is the same within a subject as it is between subjects
  - Possible future additional analysis with time as a covariate to assess if the relationship maintains itself

CONCLUSIONS

- Overall, cocaine has an emotional outcome on a person.
- People of different backgrounds will likely not have similar BDI ratings
- Other key factors may play apart in a person's depression other than cocaine usage
- The dataset does not have an equal distribution of each group (gender, race, age, etc.).

Works Cited

Beck Depression Inventory (BDI). (n.d.). *American Psychological Association*. Retrieved from

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