Data Analysis for Kayla Nelson's Doctoral Dissertation

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Contents

Data Import and Wrangling

Descriptive Statistics for SASB Surfaces

| group_type	surface	pre_mean	post_mean	pre_sd	pos_sd	pre_min	pre_max	post_min	post_max
Substance Use	surf_1	-153.394737	28.94118	759.0863	788.8952	-1680	918	-1074	1455
Substance Use	surf_2	-115.184211	372.35294	436.4271	512.5501	-861	558	-390	1176
Substance Use	surf_3	687.947368	936.75000	688.1497	781.9741	-906	1680	-660	1680
Substance Use	surf_4	299.526316	263.25000	513.9983	555.9494	-693	1119	-984	1005
Substance Use	surf_5	785.684210	948.30000	526.0541	672.9466	-345	1635	-189	1680
Substance Use	surf_6	273.789474	278.40000	606.4617	399.2944	-1140	1365	-414	984
Substance Use	surf_7	891.600000	987.90000	707.8860	656.7928	-1053	1680	-222	1680
Substance Use	surf_8	286.950000	367.35000	314.0810	367.8621	-378	960	-222	1005
Substance Use	surf_9	701.250000	981.35294	579.4059	671.2512	-288	1680	-156	1680
Substance Use	surf_10	224.400000	385.58824	562.4884	607.8639	-708	984	-657	1287
Non-Substance	surf_1	3.272727	-76.90909	841.3505	691.3816	-1008	1344	-1164	1008
Non-Substance	surf_2	-36.000000	645.81818	387.5461	512.7071	-828	570	-414	1365
Non-Substance	surf_3	970.800000	1010.00000	675.3743	753.1255	-90	1680	-651	1680
Non-Substance	surf_4	247.200000	148.66667	333.9796	548.4733	-258	780	-780	1050
Non-Substance	surf_5	973.800000	902.10000	443.3107	775.4483	177	1635	-783	1680
Non-Substance	surf_6	408.000000	230.10000	400.2449	503.7977	-249	1005	-471	825
Non-Substance	surf_7	1286.700000	1109.70000	440.2010	514.8659	483	1680	336	1680
Non-Substance	surf_8	477.600000	380.52000	350.2136	442.5900	-45	1242	-321	1185
Non-Substance	surf_9	999.600000	893.70000	495.3136	512.2215	369	1680	-180	1512
Non-Substance	surf_10	164.700000	123.30000	524.4987	600.6221	-840	906	-1230	975

Key: surf_1 = INTAFF; surf_2 = INTAUT; surf_3 = SOSTAFF; surf_4 = SOSTAUT; surf_5 = SOSIAFF; surf_6 = SOSIAUT; surf_7 = SSOTAFF; surf_8 = SSOTAUT; surf_9 = SSOIAFF; surf_10 = SSOIAUT.

Hypothesis 1

H1: Participants seeking treatment for substance abuse will report greater hoped-for affiliation in a reported significant-other relationship following use of their substance of choice compared to participants not seeking treatment for substance abuse.

1. Boxplot for Affiliation Scores by Group at Pre- and Post-Substance Use.
2. Independent T-tests for H1.
3. Assumptions for H1.

1. Boxplot for H1

Figure 1. Boxplots of SASB Affiliation by Interpersonal and Group Pre and Post Substance Use
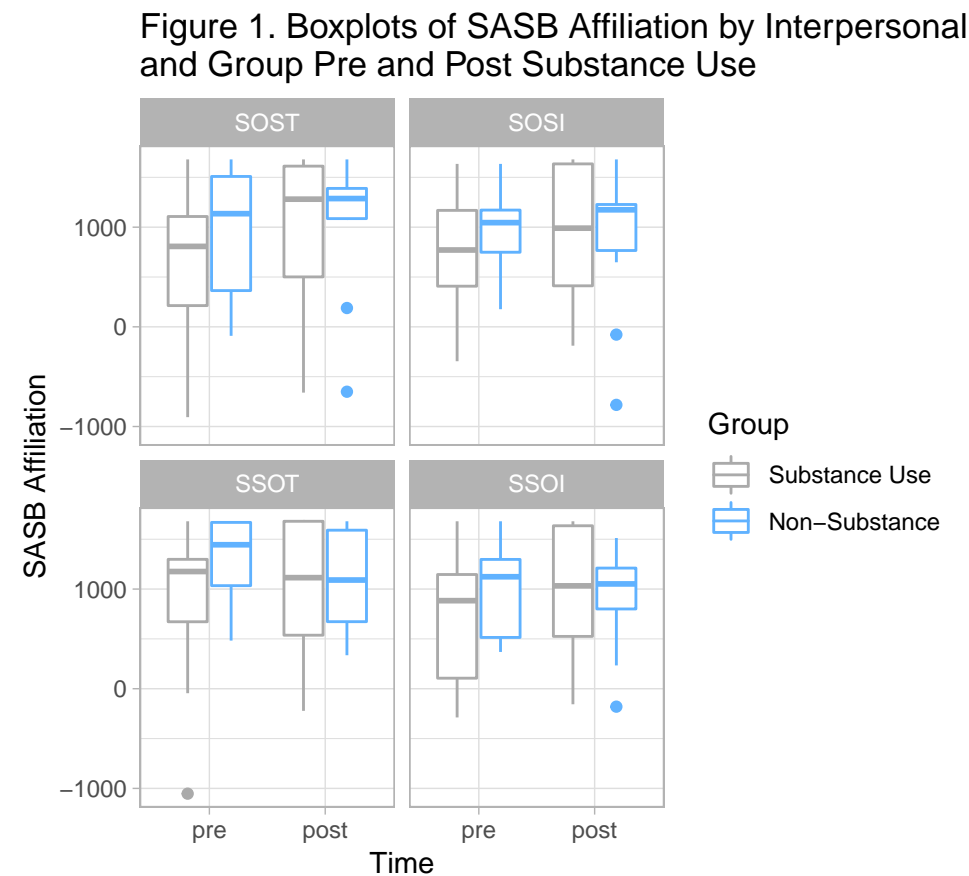
Note. SOST = Significant Other to Subject Transitive; SOSI = Significant Other
SSOT = Subject to Significant Other Transitive; SSOI = Subject to Significant O

2. Independent T-Tests for H1

surface	statistic	p.value	parameter	conf.low	conf.high	sasb_surface
surf_3	-0.4555534	0.6537473	19.48384	-0.9877866	0.6341692	SOST
surf_5	-1.0090096	0.3243163	21.26083	-1.1762301	0.4073281	SOSI
surf_7	-0.3787930	0.7080509	24.91082	-0.8839190	0.6093288	SSOT
surf_9	-1.1279619	0.2702553	24.51376	-1.1823513	0.3460971	SSOI

3. Assumptions for H1

  a) Shapiro Test for H1

```
##
##  Shapiro-Wilk normality test
##
## data:  sasb_residuals$surf_3
## W = 0.93993, p-value = 0.1101

##
##  Shapiro-Wilk normality test
##
## data:  sasb_residuals$surf_5
## W = 0.9884, p-value = 0.9826

##
##  Shapiro-Wilk normality test
##
## data:  sasb_residuals$surf_7
## W = 0.96371, p-value = 0.3839

##
##  Shapiro-Wilk normality test
##
## data:  sasb_residuals$surf_9
## W = 0.97543, p-value = 0.748
```

  b) Levene's Test for H1

```
## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1   0.751 0.3941
##       26

## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1  0.9303 0.3433
##       27

## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1  1.0655 0.3108
##       28

## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1  2.7369 0.1106
##       25
```
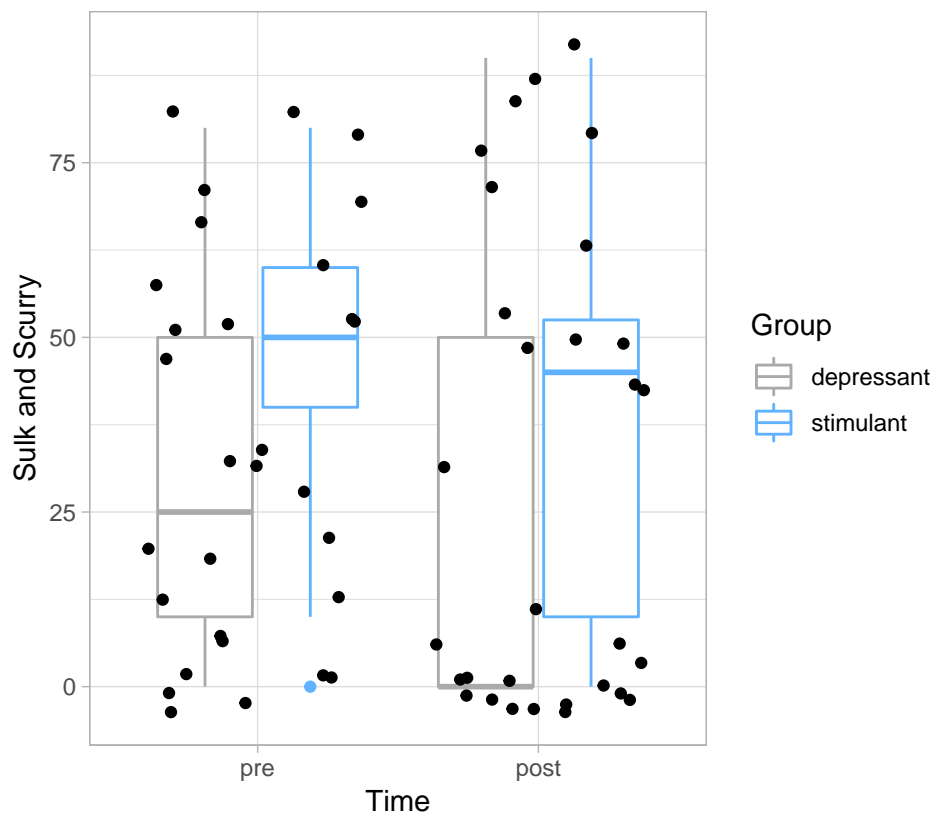
Hypothesis 2

H2: Adolescents who reported depressants as their drug of choice will rate their significant others as more sulking and resentful prior to using compared to adolescents who do not report depressants as their drug of choice.

1. Boxplot for SASB Items "Sulk and Scurry by Drug of Choice.
2. Independent T-Test for H2.
3. Means and Standard Deviations for H2.
4. Assumptions for H2.

1. Boxplot for H2

Figure 2. Boxplots of SASB Cluster 6 Significant Other Su
and Drug Type Pre and Post Substance Use

2. Independent T-test for H2

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  h2_data_na$sosicl6p by h2_data_na$doc_fa
## W = 64, p-value = 0.2657
## alternative hypothesis: true location shift is not equal to 0
```
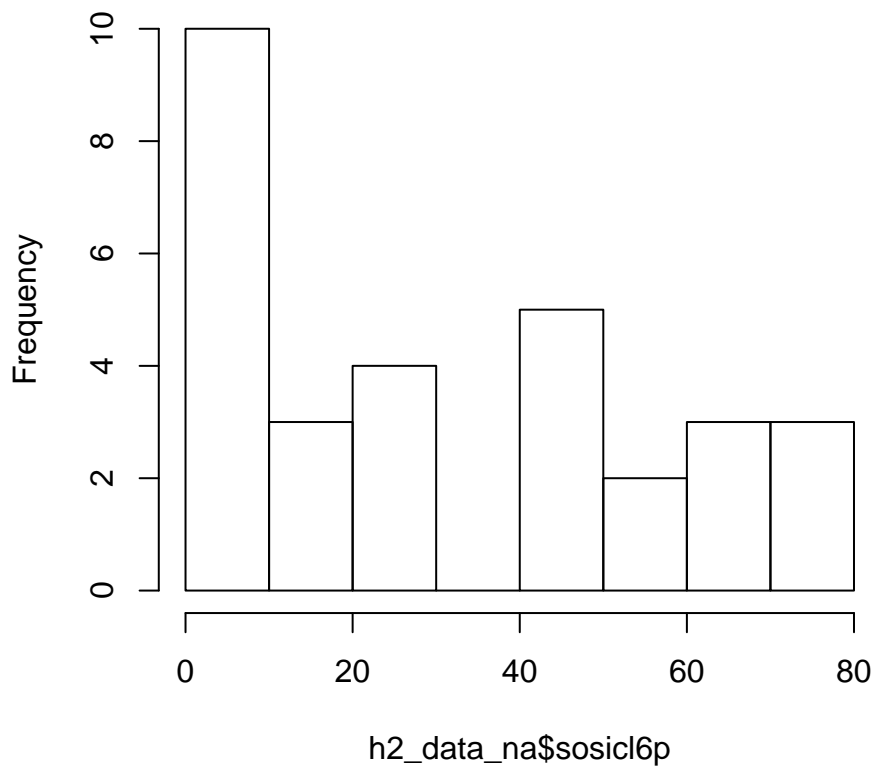
3. Means and SD for H2

```
## # A tibble: 2 x 3
##   doc_fa      mean    sd
##   <fct>      <dbl> <dbl>
## 1 depressant  30.9  28.1
## 2 stimulant   45    26.7
```

4. Assumptions for h2

a) Shapiro for H2

```
##
##  Shapiro-Wilk normality test
##
## data:  h2_data_na$sosicl6p
## W = 0.90032, p-value = 0.008551
```

Histogram of h2_data_na$sosicl6p

b) Levene's Test for H2

```
## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1  0.5138 0.4794
##       28
```

Hypothesis 3

H3: Participants seeking treatment for substance abuse will report greater hoped-for introject (self-concept) affiliation following use of their substance of choice compared to participants not seeking treatment for substance abuse.

Analyses are almost identical to H1 but with the introject affiliation surface, surface 1. The analyses include the following:

1. Boxplot for introject affiliation differences between treatment groups pre- and post-substance use.
2. Independent t-test examining difference in residual change in introject affiliation between treatment groups.
3. Assumptions for H3.

1. Boxplot for H3

Figure 3. Boxplot of SASB Introject Affiliation by Treatm
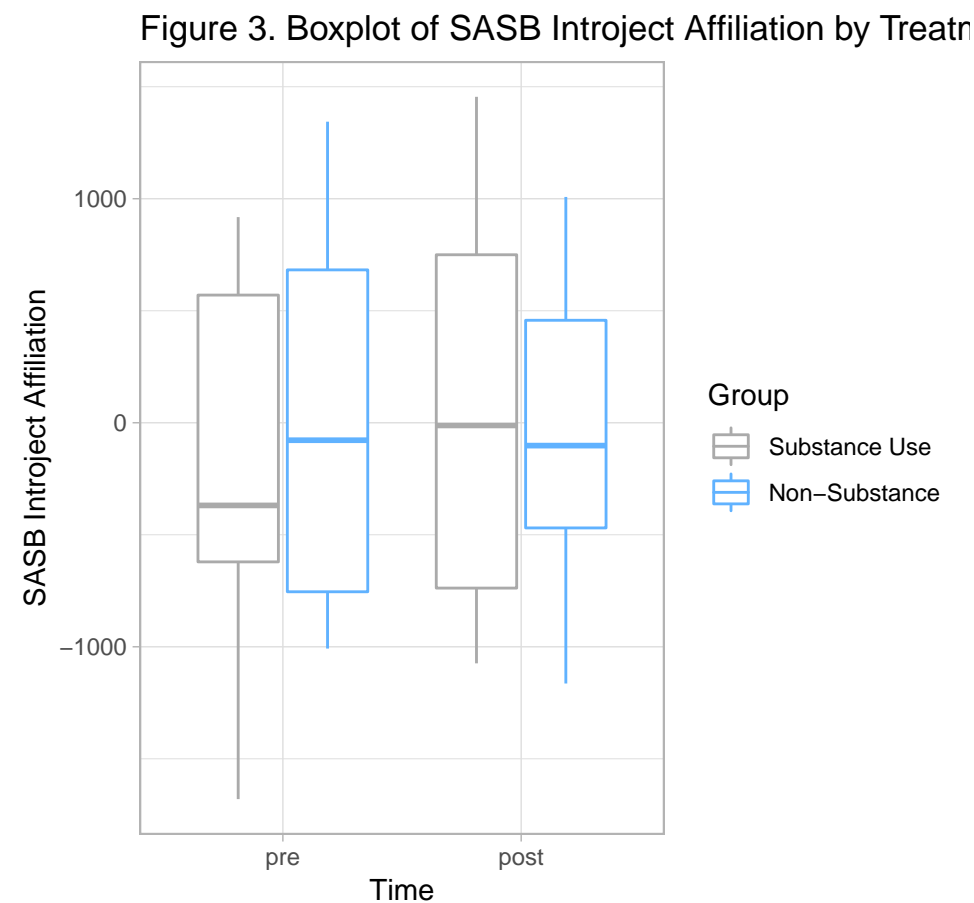
2. Independent T-Test for H3

surface	statistic	p.value	parameter	conf.low	conf.high	sasb_surface
surf_1	-0.6595468	0.5160968	22.9937	-1.080495	0.558079	int-aff

3. Assumptions for H3

    a) Shapiro for H3

```
##
##  Shapiro-Wilk normality test
##
## data:  sasb_residuals$surf_1
## W = 0.97365, p-value = 0.7
```

    b) Levene's Test for H3

```
## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1  0.2939 0.5925
##       25
```

Hypothesis 4

H4: Participants seeking treatment for substance abuse will report less negative affect following use of their substance of choice compared to participants not seeking treatment for substance abuse.

1. Summary Statistics for H4 and H5 including PANAS Positive and Negative Affect Prior and Post-Substance Use
2. Boxplot for Change in PANAS Negative Affect by Treatment Group
3. Independent t-test for Residual Change in PANAS Negative Affect by Treatment group
4. Three Supplmental Paired t-tests for difference in PANAS Negative Affect

a) Overall Change in PANAS Negative Affect
b) Change in PANAS Negative Affect for Substance-Use Group Only
c) Change in PANAS Negative Affect for Non-Substance-Use Group Only

5. Assumptions for H4

1. Summary PANAS Statistics for H4 and H5

a) Mean and Standard Deviations by Group for PANAS Pre and Post

group	pos_pre_mean	pos_post_mean	neg_pre_mean	neg_post_mean	pos_pre_sd	pos_pos_sd	neg_pre_sd	neg_post_sd
C	27.36364	29.0	26.0	25.54545	11.560906	7.389181	10.12917	8.153081
E	26.30000	29.6	29.5	23.15000	8.541539	9.708379	10.15926	10.204617

b) Minimum and Maxiumum by Group for PANAS Pre and Post

group	pos_pre_min	pos_pos_min	neg_pre_min	neg_post_min	pos_pre_max	pos_pos_max	neg_pre_max	neg_post_max
C	13	11	12	16	49	38	41	42
E	11	10	12	10	39	50	49	40

2. Boxplot for H4

Figure 4. Change in Negative Affect (PANAS) Prior and A
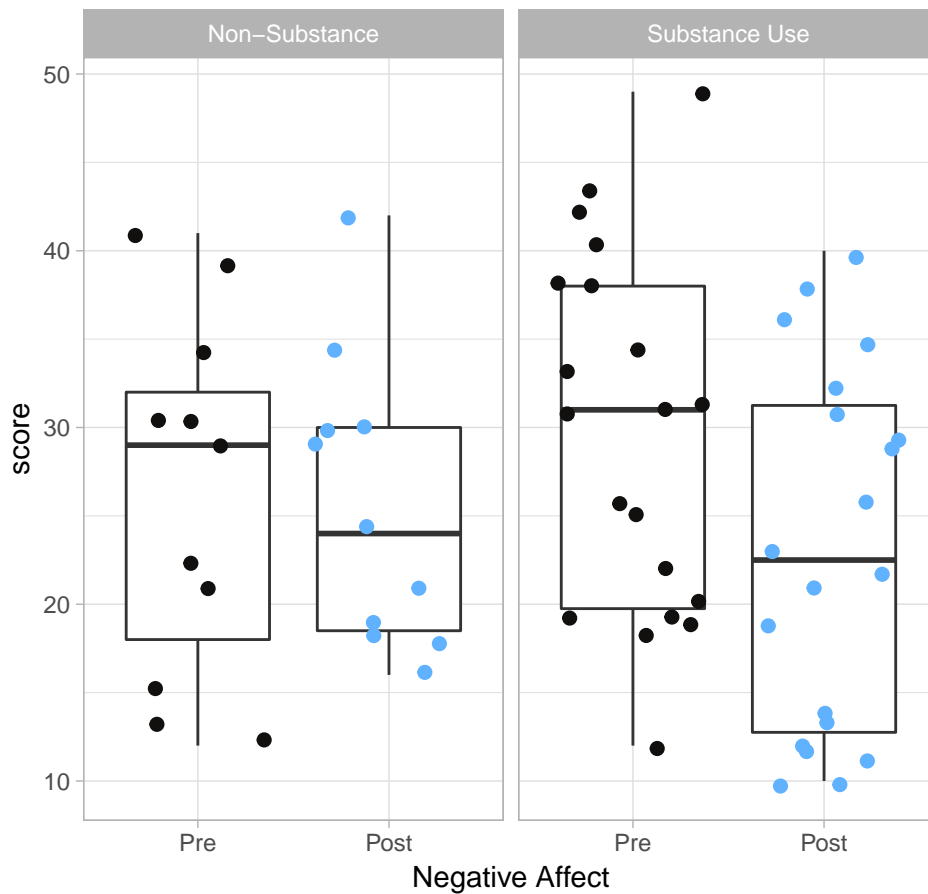
3. Independent T-Test for H4

```
##
##  Welch Two Sample t-test
##
## data:  panas_processed$panas2_res by panas_processed$group
## t = 0.79305, df = 24.643, p-value = 0.4353
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.4570023  1.0286518
## sample estimates:
## mean in group C mean in group E
##       0.1856569      -0.1001679
```

4. Supplemental Paired T-tests for H4

a) Overall Difference in Negative Affect between Substance Use and Non-Substance Use Participants

```
##
##  Paired t-test
```

```
##
## data:  panas_data$panas2_2 and panas_data$panas2_1
## t = -1.7727, df = 30, p-value = 0.08644
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -9.1636961  0.6475671
## sample estimates:
## mean of the differences
##               -4.258065
```

The difference in negative affect change following substance use was non-significant between substance and non-substance use participants (t(30)=-1.77, p=0.09)

   b) Paired t-test for change in negative affect using Substance Use Group Only

```
##
##  Paired t-test
##
## data:  su$panas2_2 and su$panas2_1
## t = -2.1612, df = 19, p-value = 0.04366
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -12.4997258  -0.2002742
## sample estimates:
## mean of the differences
##                   -6.35
```

Substance use participants showed a significant decrease in negative affect following substance use (t(19)=-2.16, p=0.04)

   c) Paired t-test for change in negative affect using Non-Substance Use Group Only

```
##
##  Paired t-test
##
## data:  nsu$panas2_2 and nsu$panas2_1
## t = -0.11118, df = 10, p-value = 0.9137
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -9.564256  8.655165
## sample estimates:
## mean of the differences
##               -0.4545455
```

Non-substance use participants did not show a significant decrease in negative affect following substance use (t(10)=-0.11, p=0.91)

5. Assumptions for H4

   a) Shapiro for H4

```
##
##  Shapiro-Wilk normality test
##
## data:  panas_processed$panas2_res
## W = 0.95646, p-value = 0.2345
```

   b) Levene's for H4

```
## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1  1.2984 0.2638
##       29
```
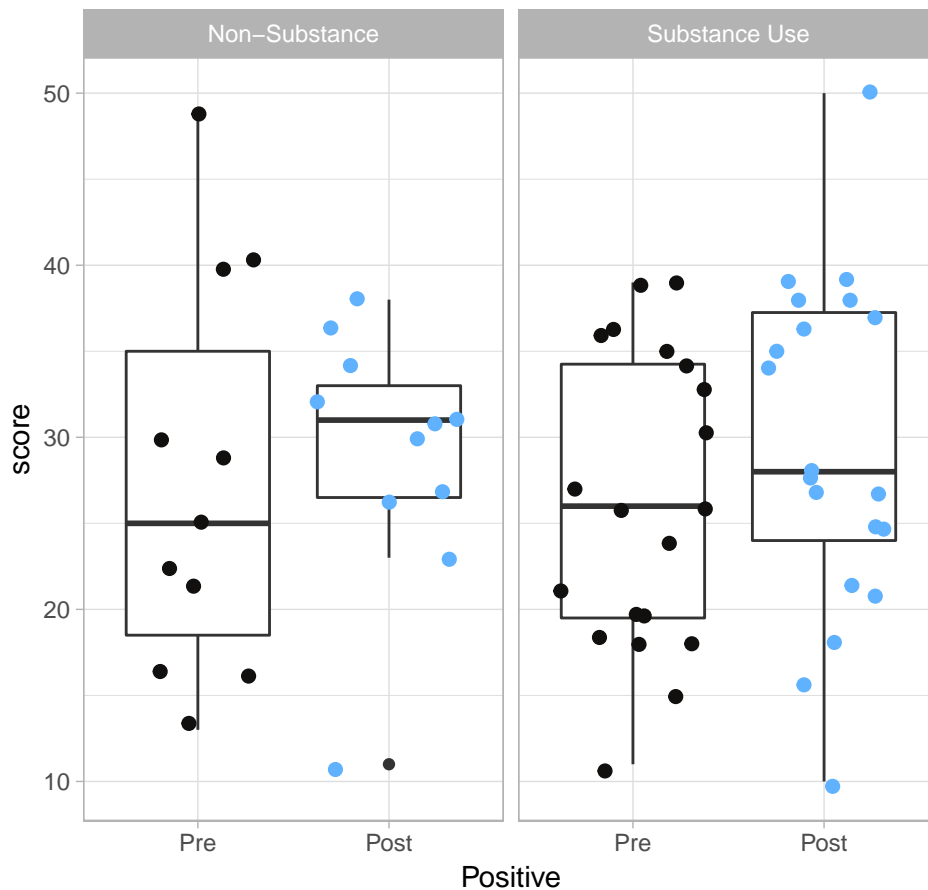
Hypothesis 5

Hypothesis 5: Participants not seeking treatment for substance abuse will report greater positive affect following substance use compared to participants seeking treatment for substance abuse.

1. Boxplot for Change in Positive Affect by Treatment Group
2. Independent t-test for Residual Change in PANAS Positive Affect by Treatment group
3. Three Supplmental Paired t-tests for difference in PANAS Positive Affect

a) Overall Change in PANAS Positive Affect
b) Change in PANAS Positive Affect for Substance-Use Group Only
c) Change in PANAS Positive Affect for Non-Substance-Use Group Only

4. Assumptions for H5

1. Boxplot for H5

Figure 5. Change in Positive Affect (PANAS) Prior and Af

2. Independent T-Test for H5

```
##
##  Welch Two Sample t-test
##
## data:  panas_processed$panas1_res by panas_processed$group
```

13

```
## t = -0.10376, df = 27.151, p-value = 0.9181
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.7499027  0.6776923
## sample estimates:
## mean in group C mean in group E
##      -0.02524439      0.01086080
```

3. Supplemental Paired T-tests for H5

a) Overall Difference in Positive Affect between Substance Use and Non-Substance Use Participants

```
##
##  Paired t-test
##
## data:  panas_data$panas1_2 and panas_data$panas1_1
## t = 1.0162, df = 30, p-value = 0.3177
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -2.735993  8.155348
## sample estimates:
## mean of the differences
##                2.709677
```

The difference in positive affect change following substance use was non-significant between substance and non-substance use participants (t(30)=-1.02, p=0.32)

b) Paired t-test for change in positive affect using Substance Use Group Only

```
##
##  Paired t-test
##
## data:  su$panas1_2 and su$panas1_1
## t = 1.033, df = 19, p-value = 0.3146
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -3.38648  9.98648
## sample estimates:
## mean of the differences
##                     3.3
```

Substance use participants showed a non-significant change in positive affect following substance use (t(19)=1.03, p=0.32)

c) Paired t-test for change in positive affect using Non-Substance Use Group Only

```
##
##  Paired t-test
##
## data:  nsu$panas1_2 and nsu$panas1_1
## t = 0.3294, df = 10, p-value = 0.7486
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -9.432282 12.705009
## sample estimates:
## mean of the differences
##                1.636364
```

Non-substance use participants showed a non-significant change in positive affect following substance use (t(10)=-0.33, p=0.75)

4. Assumptions for H5

```
##
##  Shapiro-Wilk normality test
##
## data:  panas_processed$panas1_res
## W = 0.97243, p-value = 0.5881

## Levene's Test for Homogeneity of Variance (center = median)
##       Df F value Pr(>F)
## group  1  2.3081 0.1395
##       29
```

Hypothesis 6

Three exploratory analyses examined change in relationship and emotions following substance use as they are associated with parental monitoring, peer acceptance, and diagnostic group. Due to no variability in diagnostic group, questions regarding diagnostic group were dropped. Three questions examined were as follows:

1. H6-1: Higher levels of parental monitoring would be associated with a decrease in negative affect following substance use.

a) Scatterplot of Parental Monitoring and Change in PANAS (Negative and Positive Affect) regardless of treatment group
b) H6-1 Pearson Correlation Coefficients
c) H6-1 Assumptions

2. H6-2: Higher levels of peer acceptance would be associated with an increase in positive affect substance use.

a) Scatterplot of Peer Support and Change in PANAS (Negative and Positive Affect) regardless of treatment group
b) H6-2 Pearson Correlation Coefficients
c) H6-2 Assumptions

3. H6-3: Higher levels of peer acceptance would be associated with an increase in perceived affiliation in the actions of a significant other towards the participant following substance use.

a) H6-3 Scatterplot of Peer Support and change in perception of Significant Other acting towards Participant with Affiliation following substance use
b) H6-3 Pearson Correlation Coefficient

1. H6-1

a) H6-1 Scatterplot

Figure 6. Scatter plot of parental monitor
by change in positive and negative PANAS
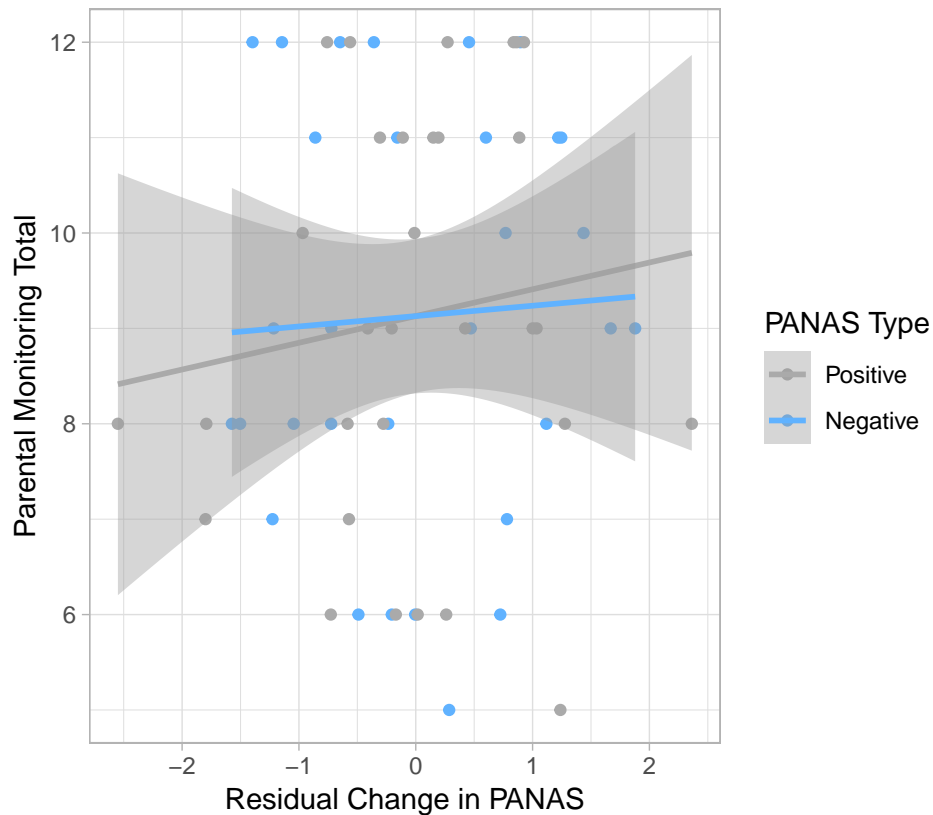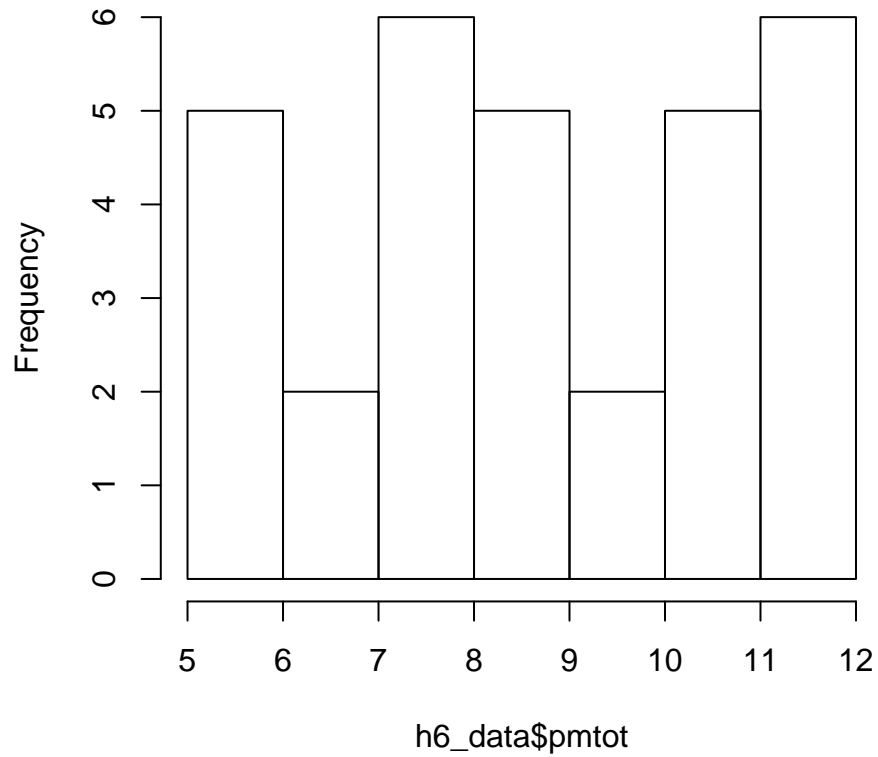
b) H6-1 Pearson Correlation Coefficients

```
##
##  Pearson's product-moment correlation
##
## data:  h6_data$panas2_res and h6_data$pmtot
## t = 0.27347, df = 29, p-value = 0.7864
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.3091804  0.3979054
## sample estimates:
##        cor
## 0.05071587

##
##  Pearson's product-moment correlation
##
## data:  h6_data$panas1_res and h6_data$pmtot
## t = 0.70961, df = 29, p-value = 0.4836
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.2345565  0.4635245
## sample estimates:
##        cor
## 0.1306416
```
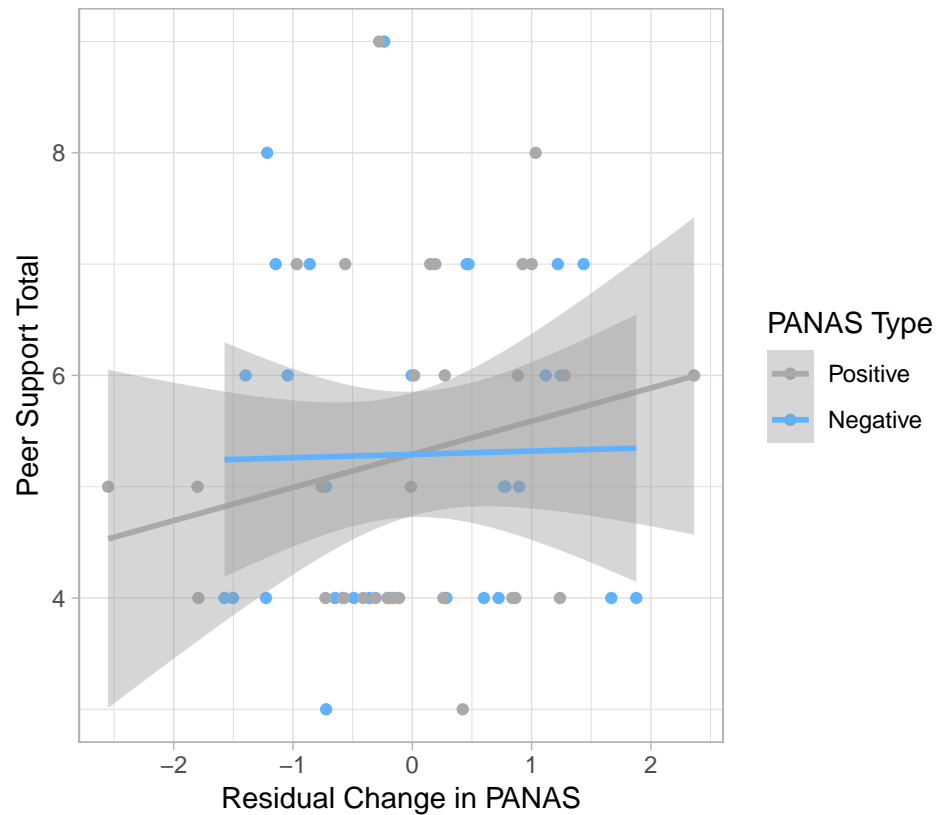
C) H6-1 Assumptions

```
##
##  Shapiro-Wilk normality test
##
## data:  h6_data$pmtot
## W = 0.92138, p-value = 0.02569
```

Histogram of h6_data$pmtot

h6_data$pmtot

2. H6-2

Figure 7. Scatter plot of peer support
by change in positive and negative PANAS

a) H6-2 Scatterplot

b) H6-2 Pearson Correlation Coefficients

```
##
##  Pearson's product-moment correlation
##
## data:  h6_data$panas2_res and h6_data$psmtot
## t = 0.10843, df = 29, p-value = 0.9144
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.3366097  0.3718194
## sample estimates:
##        cor
## 0.02013164

##
##  Pearson's product-moment correlation
##
## data:  h6_data$panas1_res and h6_data$psmtot
## t = 1.0968, df = 29, p-value = 0.2818
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.1665491  0.5173259
## sample estimates:
##        cor
```
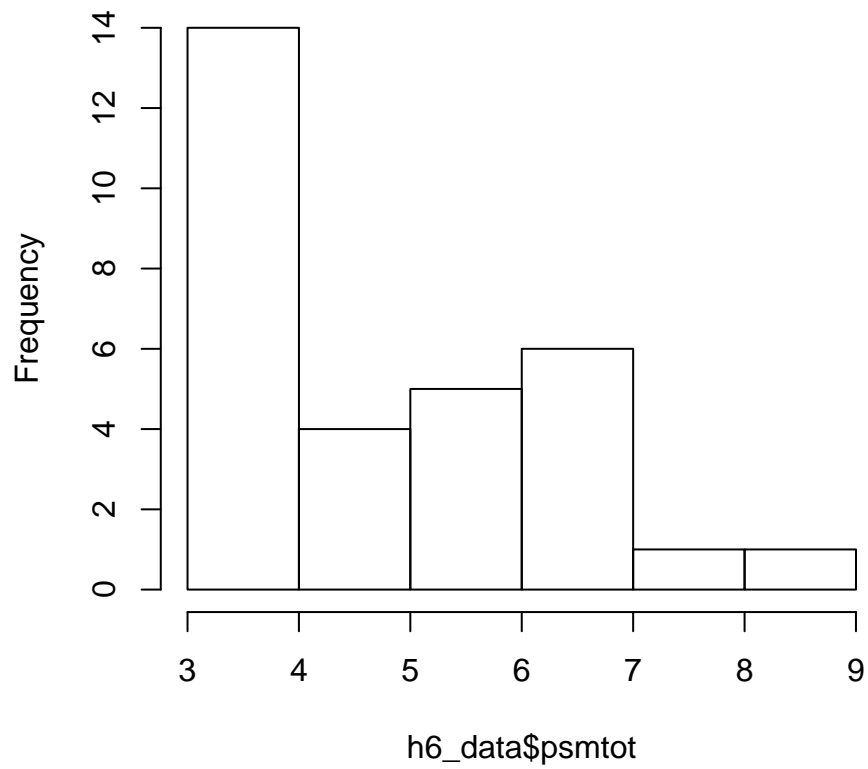
```
## 0.1995686
```

C) H6-2 Assumptions

```
##
##  Shapiro-Wilk normality test
##
## data:  h6_data$psmtot
## W = 0.87207, p-value = 0.001553
```
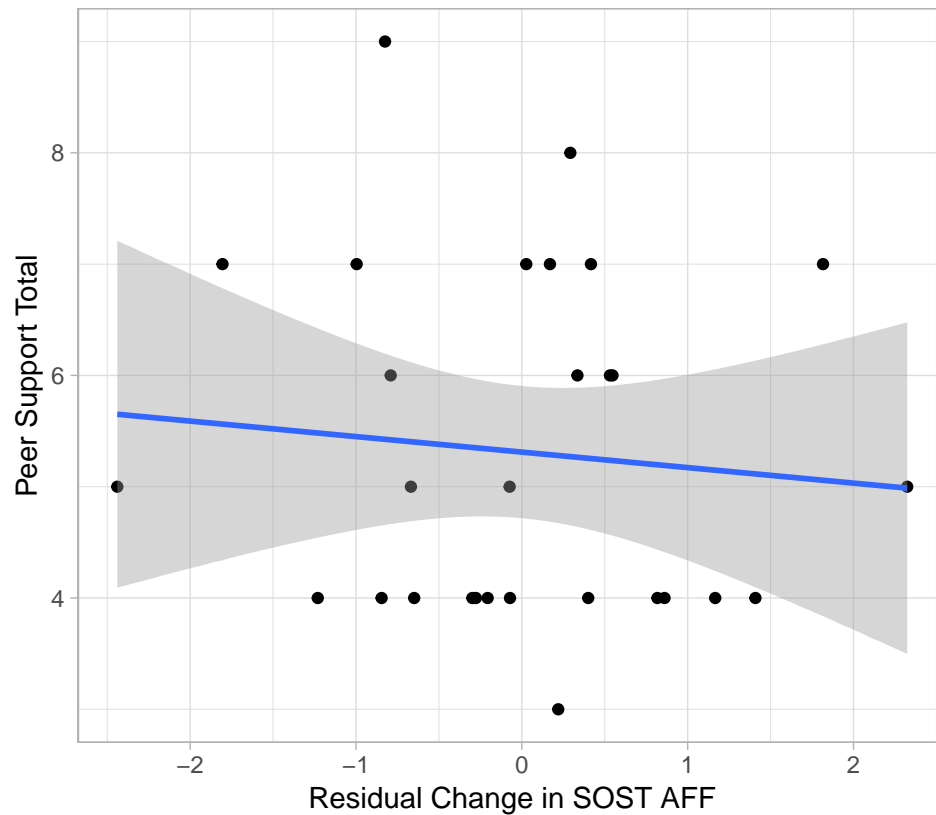
Histogram of h6_data$psmtot

3. H6-3

Figure 8. Scatter plot of peer support
by change in SOST AFF

Note. SOST = Significant Other to Subject – Affiliation

a) H6-3 Scatterplot

b) H6-3 Pearson Correlation Coefficient

```
##
##  Pearson's product-moment correlation
##
## data:  h63_data$surf_5 and h63_data$psmtot
## t = -0.48507, df = 27, p-value = 0.6315
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.4443166  0.2832065
## sample estimates:
##         cor
## -0.09294678
```