DataFest Project

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INSERT DATE

```
library(tidyverse)
library(broom)
library(knitr)
library(yardstick)
```

```
ca <- read_csv("data/CA/ca.csv")
de <- read_csv("data/DE/de.csv")
uk <- read_csv("data/UK/uk.csv")
uk_pc <- read_csv("data/UK/postalcodes.csv")
us18 <- read_csv("data/US/us_18.csv")
us19 <- read_csv("data/US/us_19.csv")
```

Is there a relationship between different mental illnesses and the use of certain drugs?

```
us18 %>%
  drop_na(MENT_ANX, THC_NMU) %>%
  count(MENT_ANX, THC_NMU)
```

```
## # A tibble: 4 x 3
##   MENT_ANX THC_NMU     n
##      <dbl>   <dbl> <int>
## 1        0       0   336
## 2        0       1   364
## 3        1       0   276
## 4        1       1   380
```

```
us18 %>%
  drop_na(MENT_DEP, STIM_NMU) %>%
  count(MENT_DEP, STIM_NMU)
```

```
## # A tibble: 4 x 3
##   MENT_DEP STIM_NMU     n
##      <dbl>    <dbl> <int>
## 1        0        0   878
## 2        0        1   528
## 3        1        0   995
## 4        1        1   451
```

```
full_model <- glm(OP_NMU_EVER ~ MENT_ANX + MENT_ADHD + MENT_AUT + MENT_BIP +
                    MENT_BPD + MENT_DEP + MENT_EAT + MENT_OCD +
                    MENT_PANIC + MENT_PPD + MENT_PTSD + MENT_SCH,
                  data = us18,
                  family = "binomial")

tidy(full_model)
```

```
## # A tibble: 13 x 5
##    term        estimate std.error statistic  p.value
##    <chr>          <dbl>     <dbl>     <dbl>    <dbl>
##  1 (Intercept) -2.20       0.0228   -96.7   0.
##  2 MENT_ANX     0.534      0.0459    11.6   2.57e-31
##  3 MENT_ADHD    0.595      0.0643     9.26  2.01e-20
##  4 MENT_AUT     0.688      0.123      5.59  2.22e- 8
##  5 MENT_BIP     0.460      0.0725     6.34  2.27e-10
##  6 MENT_BPD     0.768      0.116      6.61  3.81e-11
##  7 MENT_DEP     0.206      0.0463     4.45  8.76e- 6
##  8 MENT_EAT     0.392      0.101      3.87  1.08e- 4
##  9 MENT_OCD     0.0129     0.0846     0.153 8.79e- 1
## 10 MENT_PANIC  -0.0640     0.0719    -0.890 3.73e- 1
## 11 MENT_PPD     0.117      0.117      0.999 3.18e- 1
## 12 MENT_PTSD    0.00938    0.0721     0.130 8.97e- 1
## 13 MENT_SCH    -0.430      0.157     -2.73  6.31e- 3
```

```
selected_model <- step(full_model, direction = "backward")
```

```
## Start:  AIC=22723.36
## OP_NMU_EVER ~ MENT_ANX + MENT_ADHD + MENT_AUT + MENT_BIP + MENT_BPD +
##     MENT_DEP + MENT_EAT + MENT_OCD + MENT_PANIC + MENT_PPD +
##     MENT_PTSD + MENT_SCH
##
##              Df Deviance   AIC
## - MENT_PTSD   1    22697 22721
## - MENT_OCD    1    22697 22721
## - MENT_PANIC  1    22698 22722
## - MENT_PPD    1    22698 22722
## <none>             22697 22723
## - MENT_SCH    1    22705 22729
## - MENT_EAT    1    22712 22736
## - MENT_DEP    1    22717 22741
## - MENT_AUT    1    22726 22750
## - MENT_BIP    1    22736 22760
## - MENT_BPD    1    22739 22763
## - MENT_ADHD   1    22778 22802
## - MENT_ANX    1    22829 22853
##
## Step:  AIC=22721.37
## OP_NMU_EVER ~ MENT_ANX + MENT_ADHD + MENT_AUT + MENT_BIP + MENT_BPD +
##     MENT_DEP + MENT_EAT + MENT_OCD + MENT_PANIC + MENT_PPD +
##     MENT_SCH
##
##              Df Deviance   AIC
## - MENT_OCD    1    22697 22719
## - MENT_PANIC  1    22698 22720
## - MENT_PPD    1    22698 22720
## <none>             22697 22721
## - MENT_SCH    1    22705 22727
## - MENT_EAT    1    22712 22734
## - MENT_DEP    1    22717 22739
## - MENT_AUT    1    22726 22748
## - MENT_BIP    1    22736 22758
## - MENT_BPD    1    22740 22762
```

```
## - MENT_ADHD   1    22778 22800
## - MENT_ANX    1    22830 22852
##
## Step:  AIC=22719.4
## OP_NMU_EVER ~ MENT_ANX + MENT_ADHD + MENT_AUT + MENT_BIP + MENT_BPD +
##     MENT_DEP + MENT_EAT + MENT_PANIC + MENT_PPD + MENT_SCH
##
##              Df Deviance   AIC
## - MENT_PANIC  1    22698 22718
## - MENT_PPD    1    22698 22718
## <none>             22697 22719
## - MENT_SCH    1    22705 22725
## - MENT_EAT    1    22712 22732
## - MENT_DEP    1    22717 22737
## - MENT_AUT    1    22727 22747
## - MENT_BIP    1    22737 22757
## - MENT_BPD    1    22740 22760
## - MENT_ADHD   1    22779 22799
## - MENT_ANX    1    22831 22851
##
## Step:  AIC=22718.16
## OP_NMU_EVER ~ MENT_ANX + MENT_ADHD + MENT_AUT + MENT_BIP + MENT_BPD +
##     MENT_DEP + MENT_EAT + MENT_PPD + MENT_SCH
##
##             Df Deviance   AIC
## - MENT_PPD   1    22699 22717
## <none>            22698 22718
## - MENT_SCH   1    22706 22724
## - MENT_EAT   1    22712 22730
## - MENT_DEP   1    22718 22736
## - MENT_AUT   1    22727 22745
## - MENT_BIP   1    22737 22755
## - MENT_BPD   1    22740 22758
## - MENT_ADHD  1    22780 22798
## - MENT_ANX   1    22833 22851
##
## Step:  AIC=22717.1
## OP_NMU_EVER ~ MENT_ANX + MENT_ADHD + MENT_AUT + MENT_BIP + MENT_BPD +
##     MENT_DEP + MENT_EAT + MENT_SCH
##
##             Df Deviance   AIC
## <none>            22699 22717
## - MENT_SCH   1    22707 22723
## - MENT_EAT   1    22714 22730
## - MENT_DEP   1    22719 22735
## - MENT_AUT   1    22729 22745
## - MENT_BIP   1    22739 22755
## - MENT_BPD   1    22743 22759
## - MENT_ADHD  1    22782 22798
## - MENT_ANX   1    22835 22851
```

```
tidy(selected_model)
```

```
## # A tibble: 9 x 5
##   term        estimate std.error statistic  p.value
```

```
##   <chr>          <dbl>     <dbl>     <dbl>    <dbl>
## 1 (Intercept)   -2.20     0.0228    -96.7  0.
## 2 MENT_ANX       0.529    0.0449     11.8  4.72e-32
## 3 MENT_ADHD      0.599    0.0637      9.41 5.17e-21
## 4 MENT_AUT       0.693    0.123       5.65 1.56e- 8
## 5 MENT_BIP       0.458    0.0712      6.43 1.29e-10
## 6 MENT_BPD       0.769    0.113       6.79 1.13e-11
## 7 MENT_DEP       0.206    0.0459      4.49 6.96e- 6
## 8 MENT_EAT       0.394    0.100       3.92 8.78e- 5
## 9 MENT_SCH      -0.421    0.156      -2.69 7.13e- 3
```

```
exp(-2.2043266) #intercept
```

```
## [1] 0.1103248
```

```
exp(0.5291633) #anxiety
```

```
## [1] 1.697511
```

```
exp(0.5989596) #adhd
```

```
## [1] 1.820224
```

```
exp(0.6934428) #autism
```

```
## [1] 2.000591
```

```
exp(0.4576649) #bipolar disorder
```

```
## [1] 1.580379
```

```
exp(0.7693153) #borderline personality disorder
```

```
## [1] 2.158288
```

```
exp(0.2061905) #depression
```

```
## [1] 1.228987
```

```
exp(0.3939109) #eating disorder
```

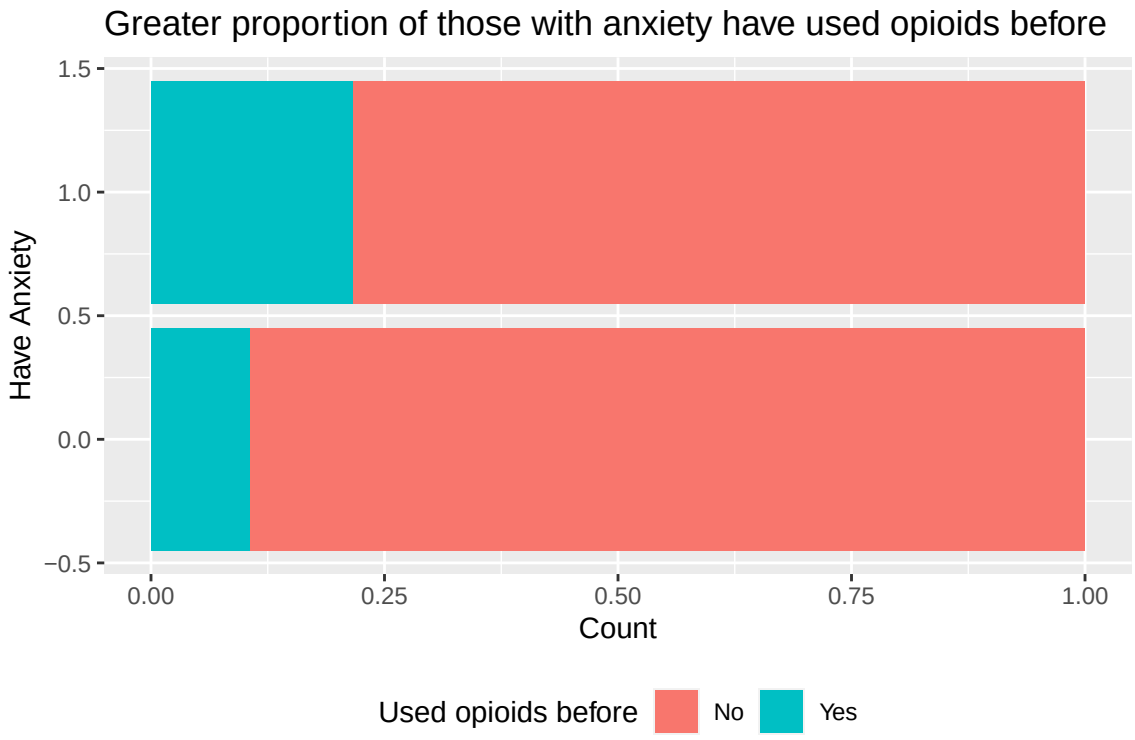
```
## [1] 1.482768
```

```
exp(-0.4207547) #schizophrenia
```

```
## [1] 0.6565511
```

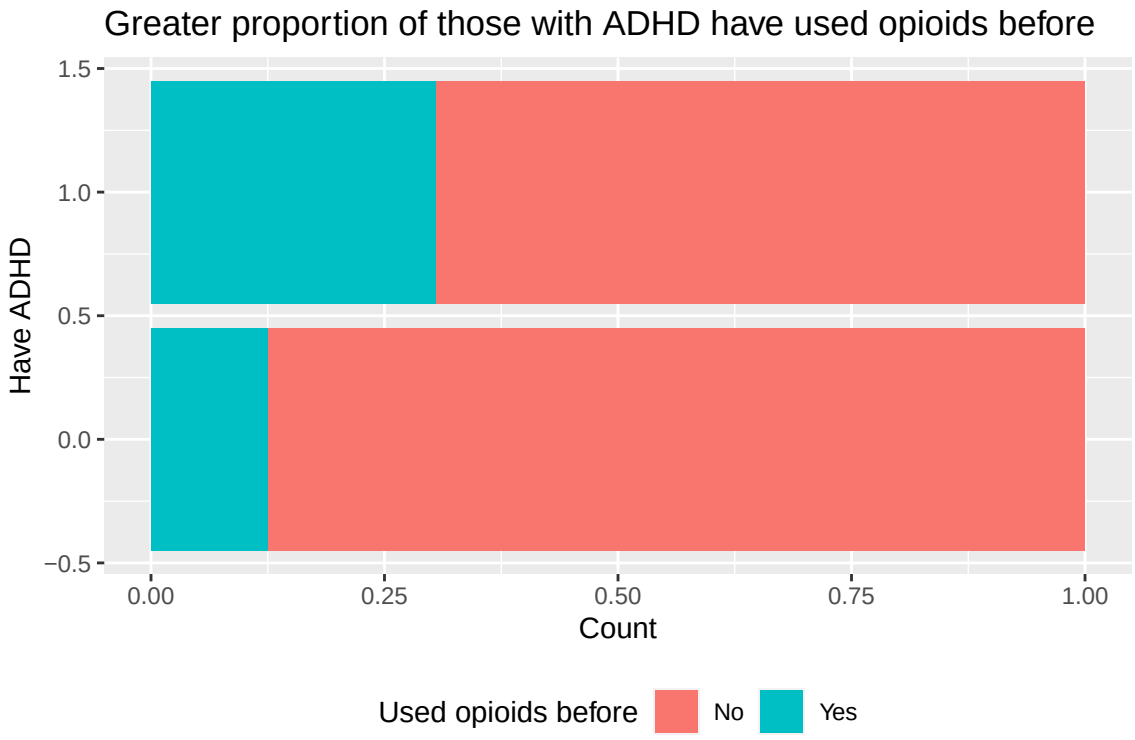
```
us18 %>% #anxiety
  drop_na(MENT_ANX, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_ANX, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have Anxiety",
       title = "Greater proportion of those with anxiety have used opioids before") +
  theme(legend.position = "bottom")
```



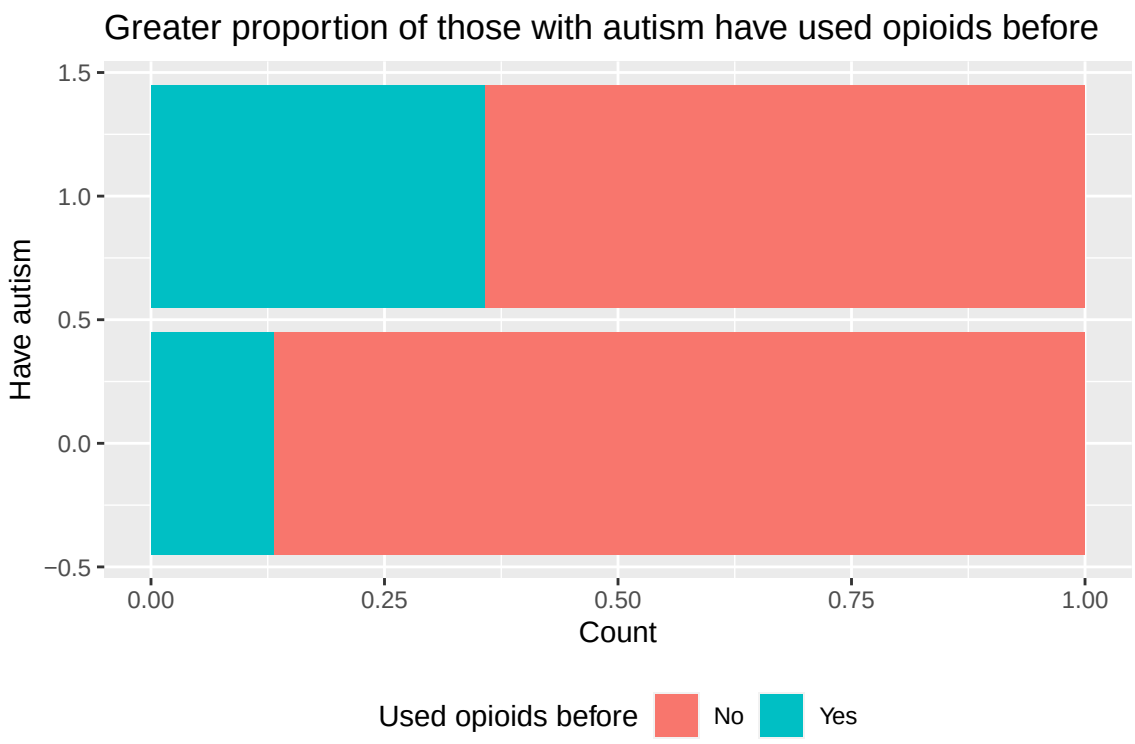

```
us18 %>% #adhd
  drop_na(MENT_ADHD, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_ADHD, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have ADHD",
       title = "Greater proportion of those with ADHD have used opioids before") +
  theme(legend.position = "bottom")
```



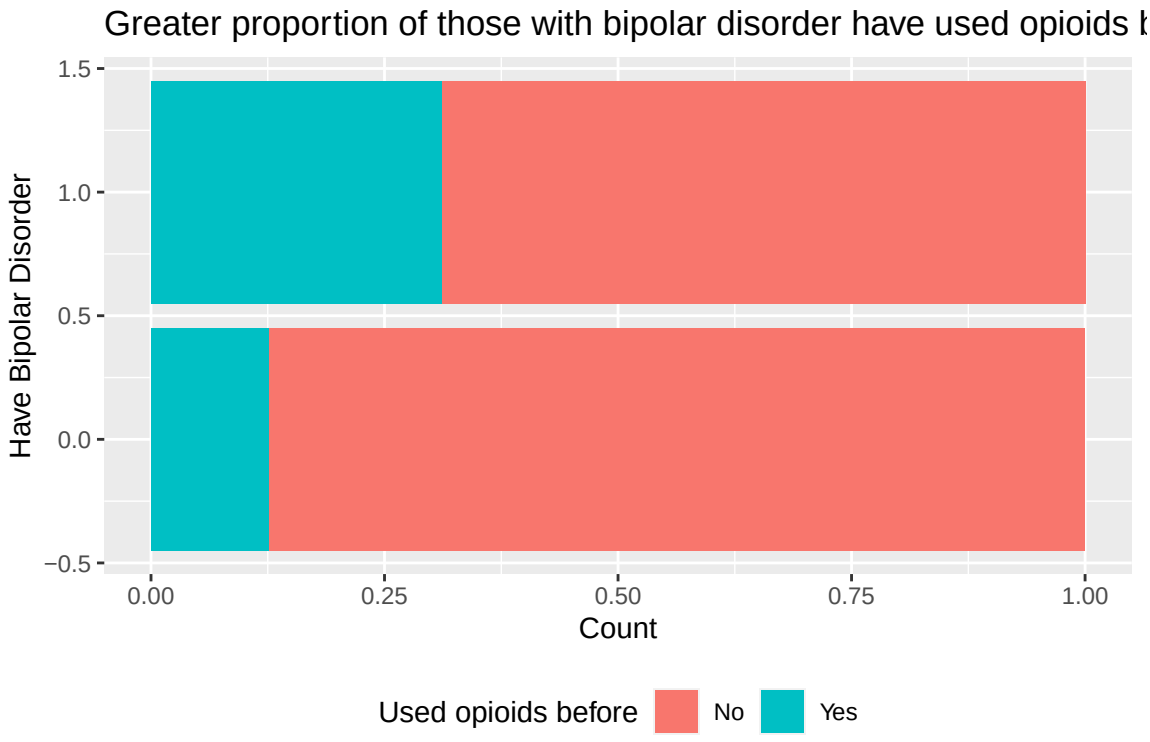

```
us18 %>% #autism
  drop_na(MENT_AUT, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_AUT, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have autism",
       title = "Greater proportion of those with autism have used opioids before") +
  theme(legend.position = "bottom")
```



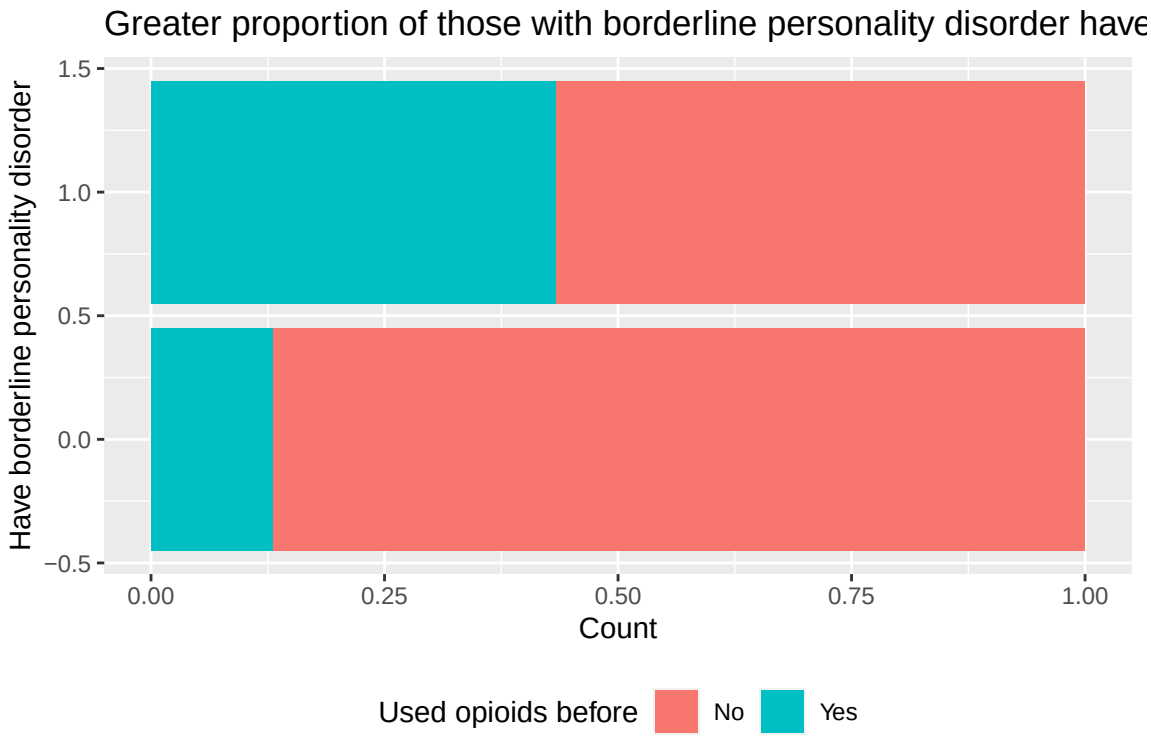

```
us18 %>% #bipolar disorder
  drop_na(MENT_BIP, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_BIP, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have Bipolar Disorder",
       title = "Greater proportion of those with bipolar disorder have used opioids before") +
  theme(legend.position = "bottom")
```



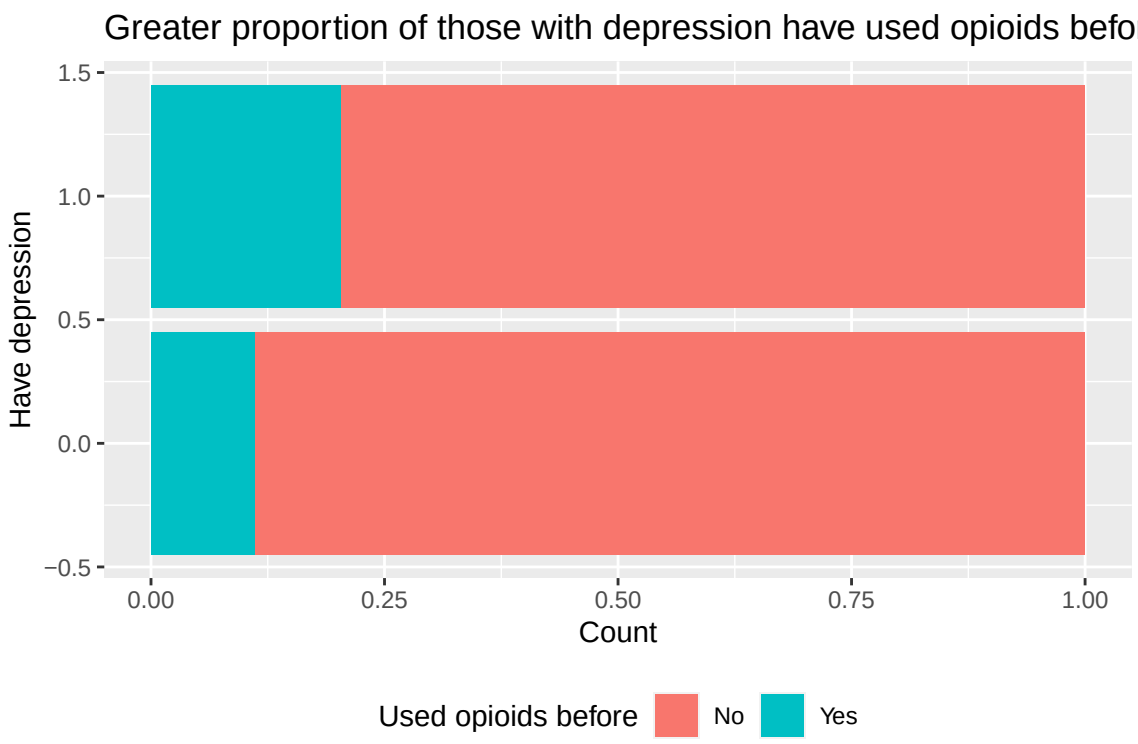

```
us18 %>% #borderline personality disorder
  drop_na(MENT_BPD, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_BPD, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have borderline personality disorder",
       title = "Greater proportion of those with borderline personality disorder have used opioids befo
  theme(legend.position = "bottom")
```



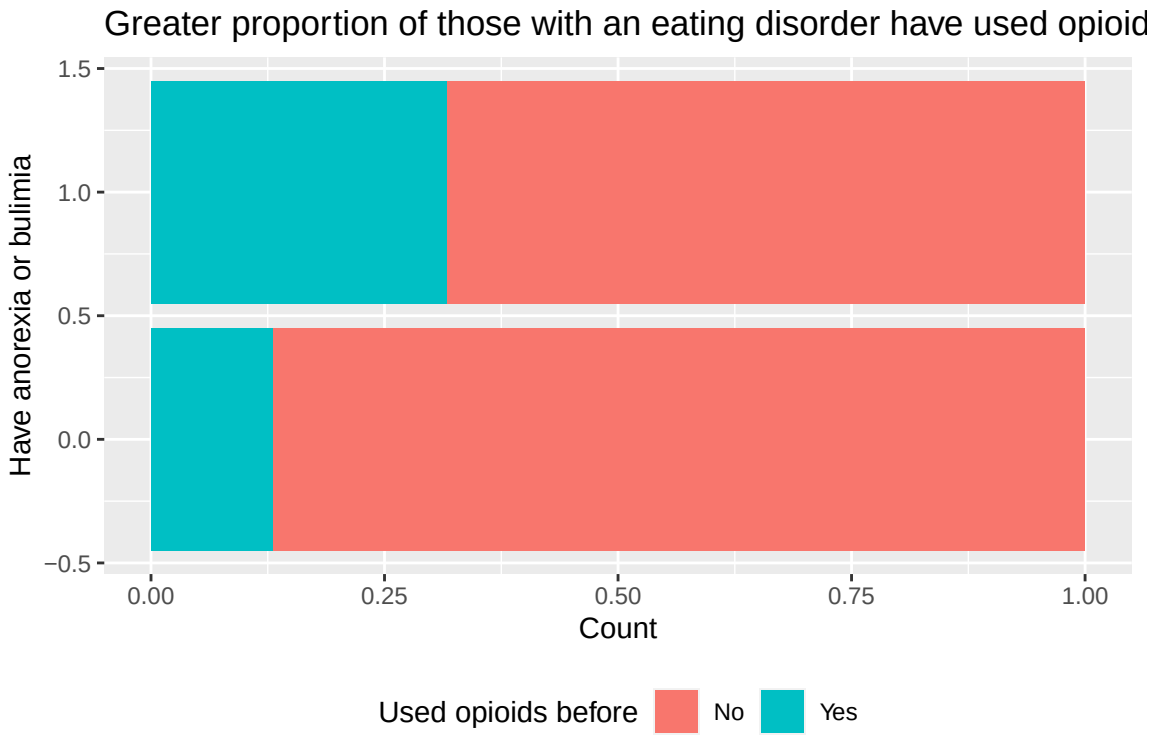

```
us18 %>% #depression
  drop_na(MENT_DEP, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_DEP, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have depression",
       title = "Greater proportion of those with depression have used opioids before") +
  theme(legend.position = "bottom")
```



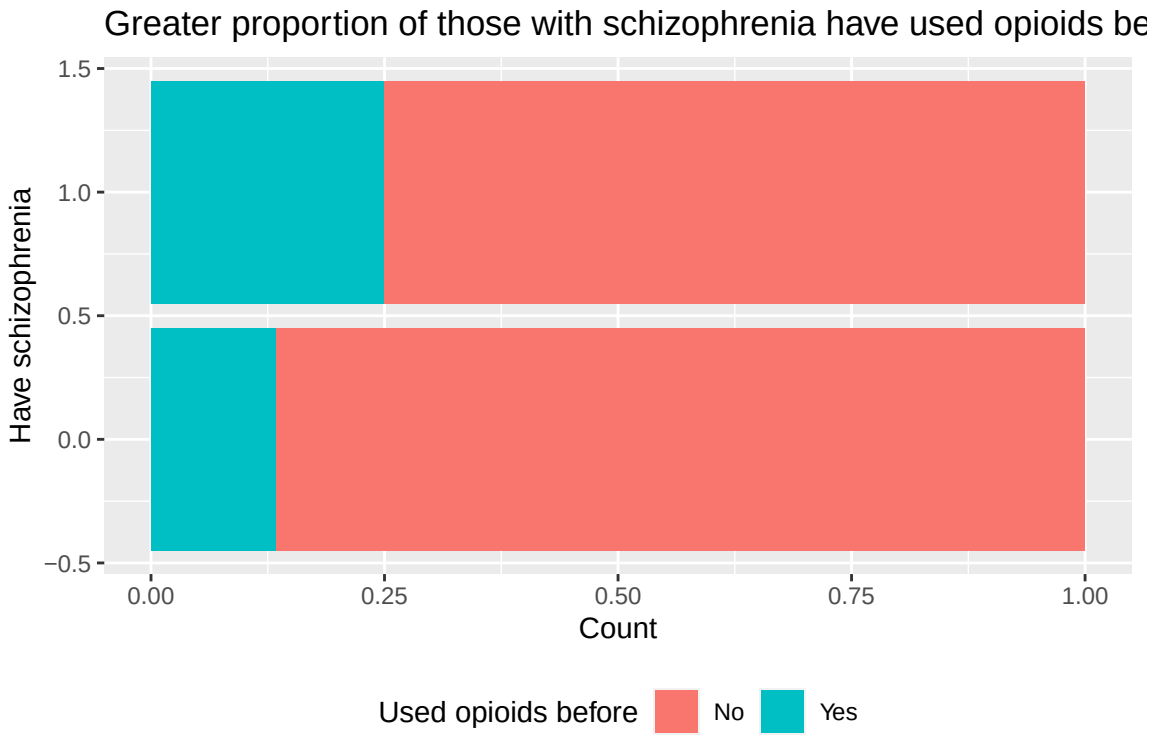

```
us18 %>% #eating disorder
  drop_na(MENT_EAT, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_EAT, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have anorexia or bulimia",
       title = "Greater proportion of those with an eating disorder have used opioids before") +
  theme(legend.position = "bottom")
```




```
us18 %>% #schizophrenia
  drop_na(MENT_SCH, OP_NMU_EVER) %>%
  mutate(opioids = ifelse(OP_NMU_EVER == 1, "Yes", "No")) %>%

  ggplot(aes(y = MENT_SCH, fill = opioids)) +
  geom_bar(position = "fill") +
  scale_fill_discrete(name = "Used opioids before") +
  labs(x = "Count", y = "Have schizophrenia",
       title = "Greater proportion of those with schizophrenia have used opioids before") +
  theme(legend.position = "bottom")
```


Greater proportion of those with schizophrenia have used opioids be
Have schizophrenia
1.5
1.0
0.5
0.0
−0.5
0.00
0.25
0.50
0.75
1.00
Count
Used opioids before
No
Yes