Balance Checks

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```r
# Balance Checks

## Load Data -

setwd("C:/Users/19204/OneDrive/Desktop/Lab Work")
imm <- read.csv("immigration_2019_clean.csv")

##View(imm)

## Packages -

##install.packages("cobalt")
library(cobalt)
```

```
## Warning: package 'cobalt' was built under R version 4.0.3

##  cobalt (Version 4.2.4, Build Date: 2020-11-05 17:30:21 UTC)
```

```r
##install.packages("MatchIt")
library(MatchIt)
```

```
## Warning: package 'MatchIt' was built under R version 4.0.3

##
## Attaching package: 'MatchIt'
```

```
## The following object is masked from 'package:cobalt':
##
##     lalonde
```

```r
##install.packages("WeightIt")
library(WeightIt)
```

```
## Warning: package 'WeightIt' was built under R version 4.0.3
```

```r
# Treatment Variables

imm$treatment <- imm$condition != "control"

# Age Balance Check (Distributional Balance)

age <- subset(imm, select = c(age))
age_W.out <- weightit(treatment ~ age, data = imm,
                      method = "ps", estimand = "ATT")
```

```
## Assuming 'FALSE' is the treated level. If not, supply an argument to 'focal'.
```

```r
bal.tab(age_W.out)
```

```
## Call
##  weightit(formula = treatment ~ age, data = imm, method = "ps",
##      estimand = "ATT")
##
## Balance Measures
##                 Type Diff.Adj
## prop.score Distance  -0.1060
## age          Contin.   0.1065
##
## Effective sample sizes
##            FALSE   TRUE
## Unadjusted   194 406.
## Adjusted     194 404.78
```

```r
bal_plot_age <- bal.plot(age_W.out, var.name = "age")

# Sex Balance Check

sex <- subset(imm, select = c(male))
sex_W.out <- weightit(treatment ~ sex, data = imm,
                      method = "ps", estimand = "ATT")
```

```
## Assuming 'FALSE' is the treated level. If not, supply an argument to 'focal'.
```

```
## Warning: Missing values are present in the covariates. See ?WeightIt::method_ps
## for information on how these are handled.
```

```r
bal.tab(sex_W.out)
```

```
## Warning: Missing values exist in the covariates. Displayed values omit these
## observations.
```

```
## Call
##  weightit(formula = treatment ~ sex, data = imm, method = "ps",
##      estimand = "ATT")
##
## Balance Measures
##                 Type Diff.Adj
## prop.score Distance  -0.4244
## male         Binary   0.2126
## male:<NA>    Binary  -0.0007
##
## Effective sample sizes
##            FALSE   TRUE
## Unadjusted   194 406.
## Adjusted     194 388.83
```

```r
bal_plot_sex <- bal.plot(sex_W.out, var.name = "male")
```

```
## Warning: Missing values exist in the covariates. Displayed values omit these
## observations.
```

```r
# College Balance Check

college <- subset(imm, select = c(college))
```

```r
college_W.out <- weightit(treatment ~ college, data = imm,
                          method = "ps", estimand = "ATT")

## Assuming 'FALSE' is the treated level. If not, supply an argument to 'focal'.

bal.tab(college_W.out)

## Call
##  weightit(formula = treatment ~ college, data = imm, method = "ps",
##      estimand = "ATT")
##
## Balance Measures
##                                   Type Diff.Adj
## prop.score_0.300000000000036 Distance   0.2328
## prop.score_0.351851851851894 Distance  -0.2328
## college                        Binary   0.1154
##
## Effective sample sizes
##             FALSE   TRUE
## Unadjusted   194 406.
## Adjusted     194 400.73

bal_plot_college <- bal.plot(college_W.out, var.name = "college")

# PID Balance Check

PID <- subset(imm, select = c(pid_rep))
PID_W.out <- weightit(treatment ~ pid_rep, data = imm,
                      method = "ps", estimand = "ATT")

## Assuming 'FALSE' is the treated level. If not, supply an argument to 'focal'.

bal.tab(PID_W.out)

## Call
##  weightit(formula = treatment ~ pid_rep, data = imm, method = "ps",
##      estimand = "ATT")
##
## Balance Measures
##                 Type Diff.Adj
## prop.score Distance  -0.0261
## pid_rep      Contin.  -0.0262
##
## Effective sample sizes
##             FALSE   TRUE
## Unadjusted   194 406.
## Adjusted     194 405.93

bal_plot_PID <- bal.plot(PID_W.out, var.name = "pid_rep")

# Ideology Balance Check

ideo <- subset(imm, select = c(ideol_con))
ideo_W.out <- weightit(treatment ~ ideol_con, data = imm,
                       method = "ps", estimand = "ATT")

## Assuming 'FALSE' is the treated level. If not, supply an argument to 'focal'.
```

```
## Warning: Missing values are present in the covariates. See ?WeightIt::method_ps
## for information on how these are handled.
```

```
bal.tab(ideo_W.out)
```

```
## Warning: Missing values exist in the covariates. Displayed values omit these
## observations.
```

```
## Call
##  weightit(formula = treatment ~ ideol_con, data = imm, method = "ps",
##      estimand = "ATT")
##
## Balance Measures
##                      Type Diff.Adj
## prop.score       Distance  -0.1303
## ideol_con         Contin.  -0.0646
## ideol_con:<NA>     Binary  -0.0080
##
## Effective sample sizes
##              FALSE    TRUE
## Unadjusted     194 406.
## Adjusted       194 405.02
```
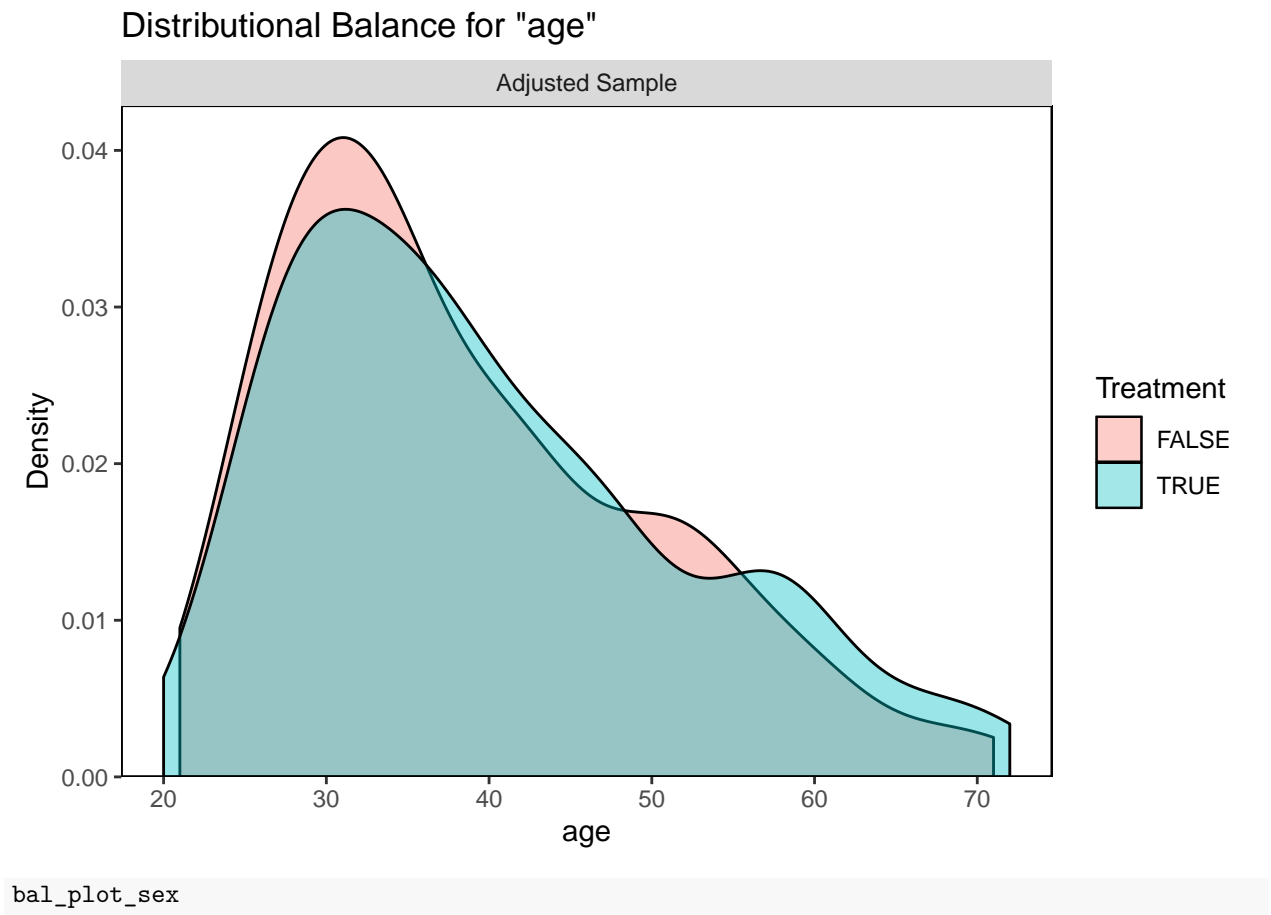
```
bal_plot_ideo <- bal.plot(ideo_W.out, var.name = "ideol_con")
```
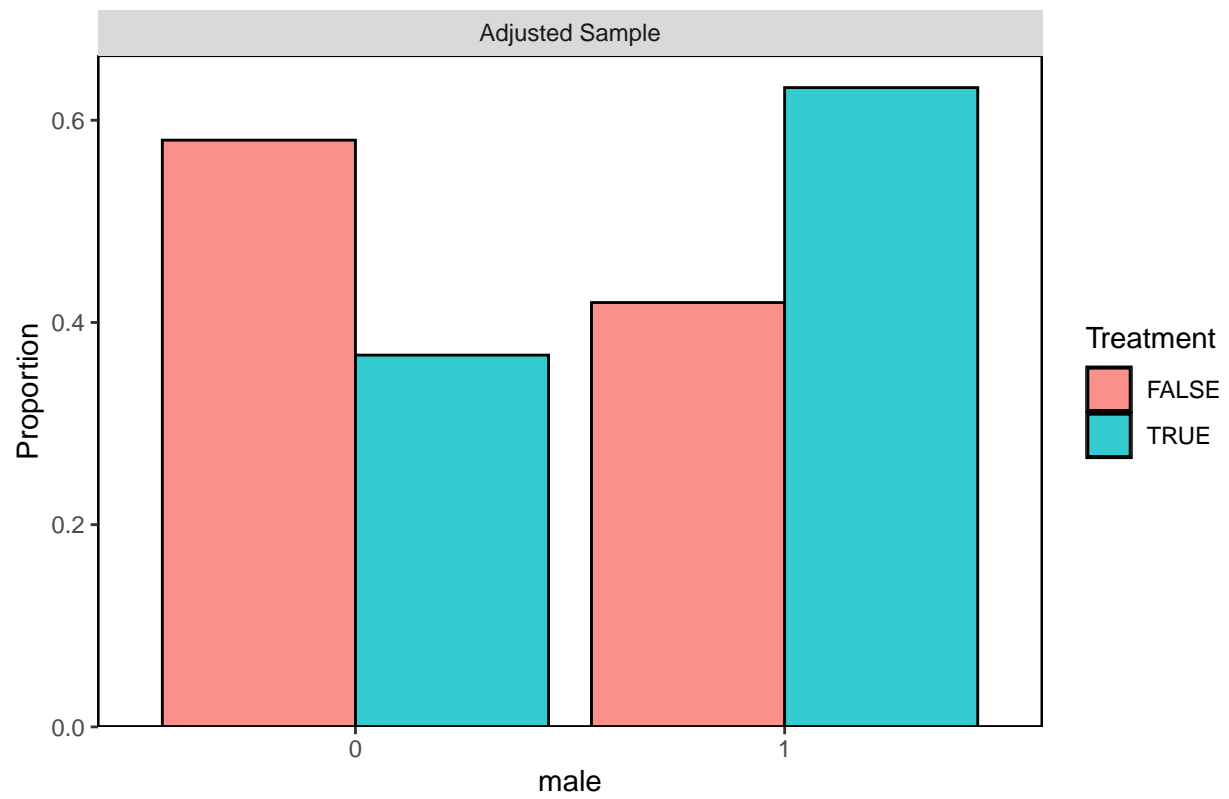
```
## Warning: Missing values exist in the covariates. Displayed values omit these
## observations.
```
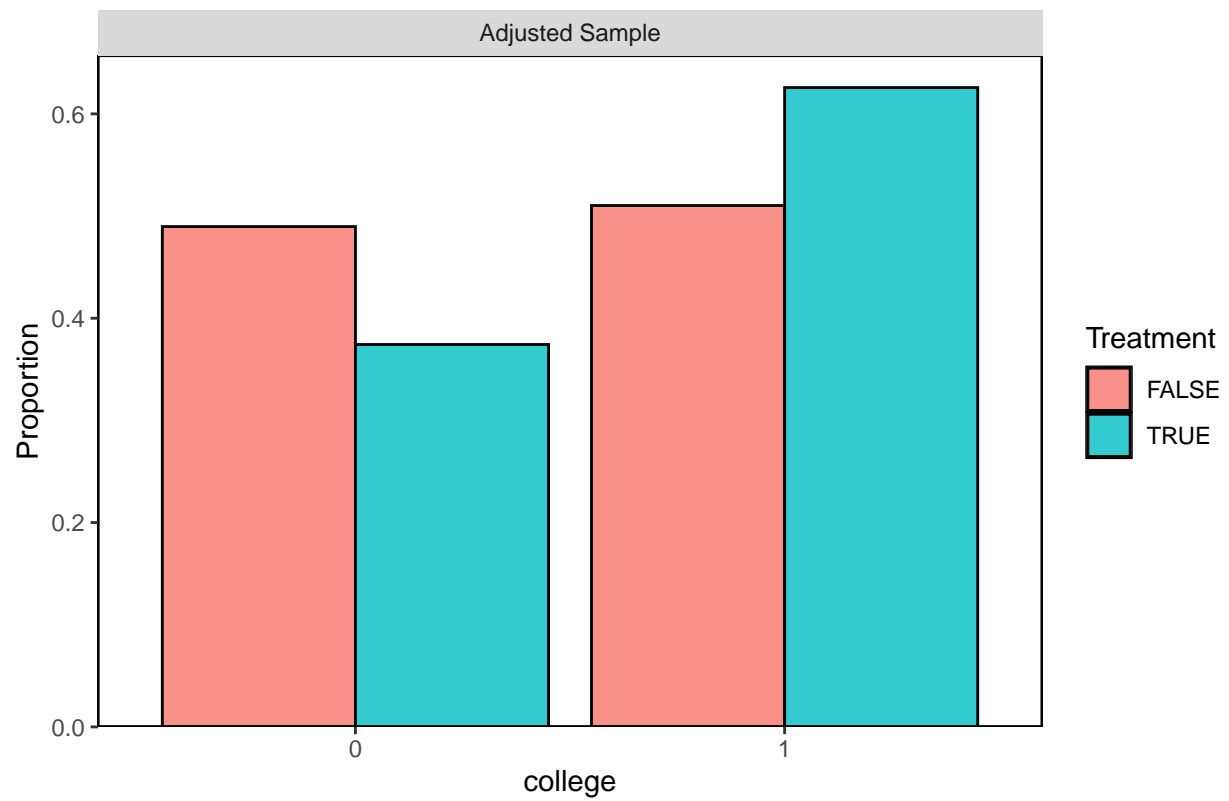
```
# Graphs
```
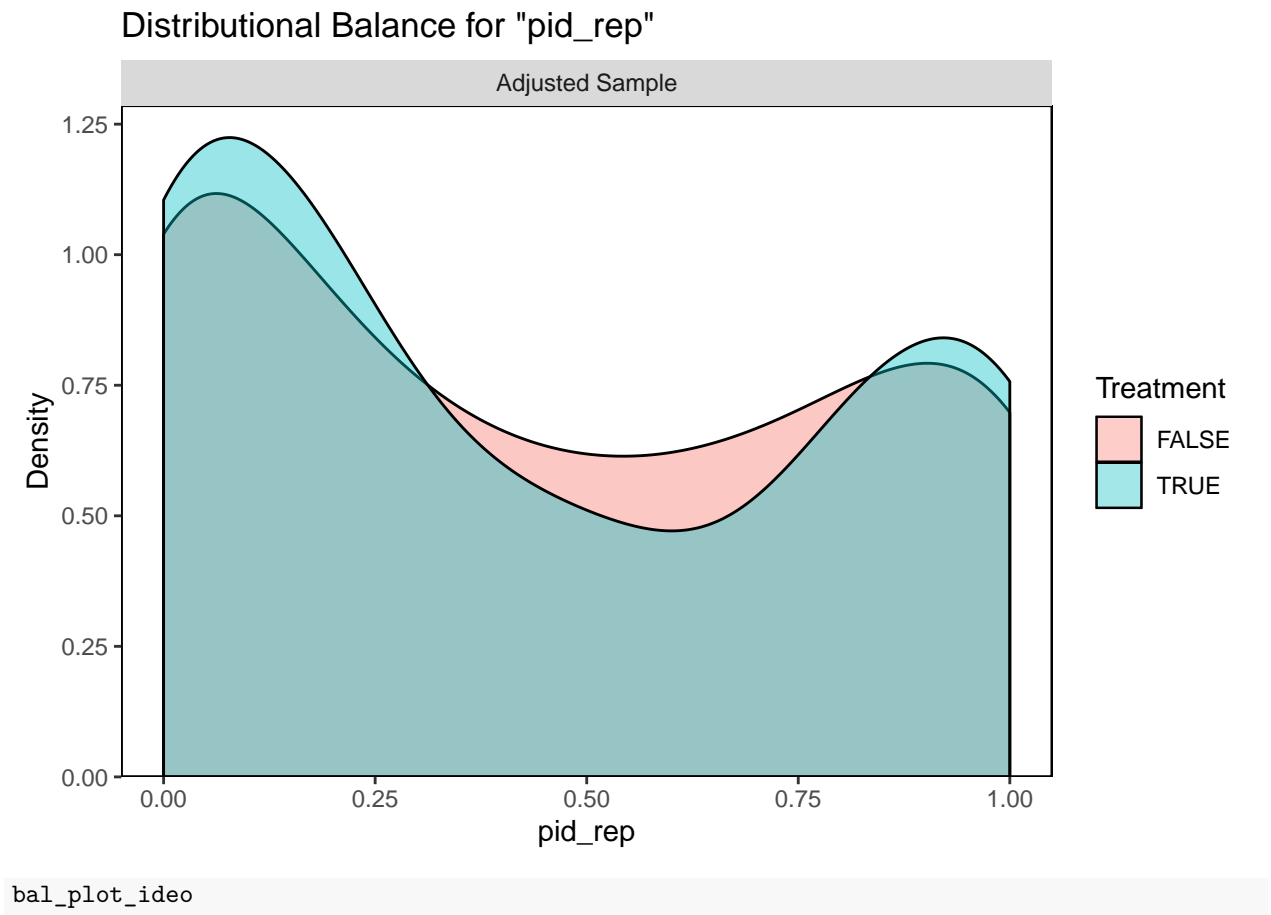
```
bal_plot_age
```

Distributional Balance for "age"


```
bal_plot_sex
```

Distributional Balance for "male"

bal_plot_college

Distributional Balance for "college"

bal_plot_PID
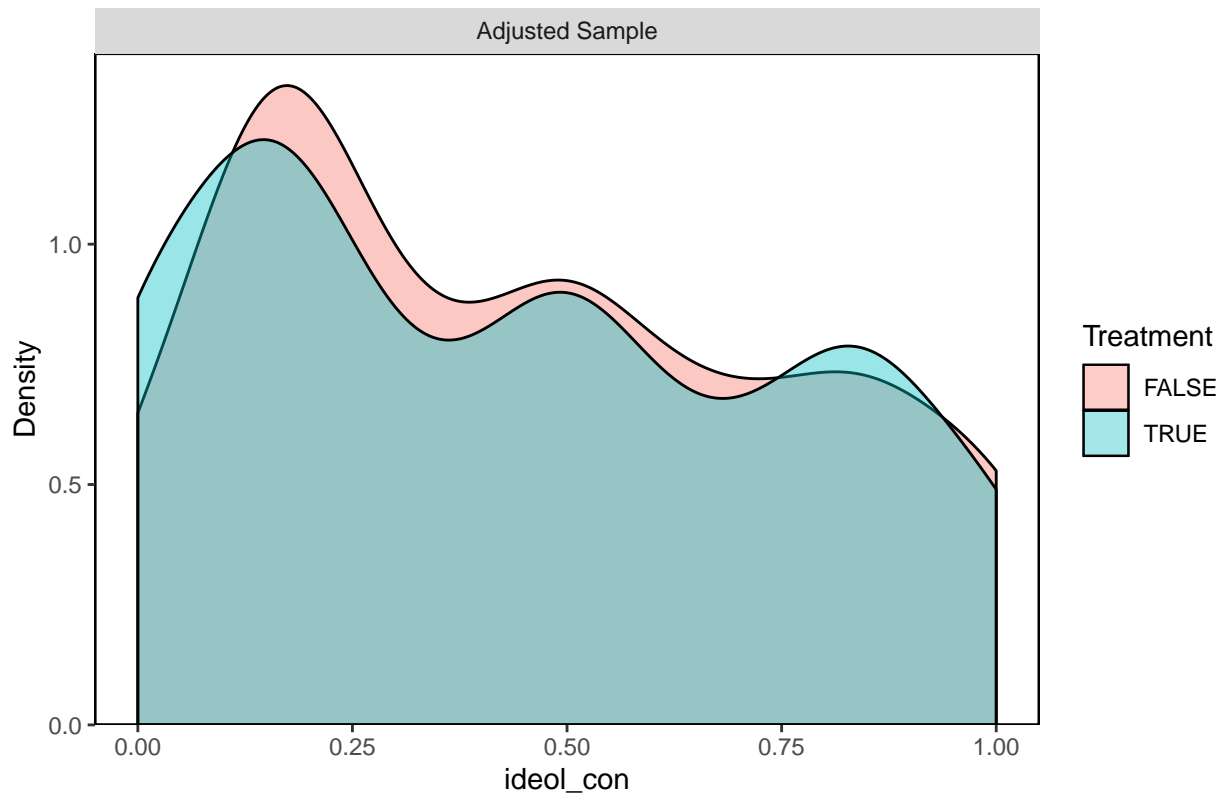
Distributional Balance for "pid_rep"


```
bal_plot_ideo
```

Distributional Balance for "ideol_con"


```r
# Love Plot Attempt

(W1 <- weightit(treatment ~ age + college + pid_rep + sex + ideol_con, data = imm,
                method = "ps", estimand = "ATT",
                link = "probit"))
```

```
## Assuming 'FALSE' is the treated level. If not, supply an argument to 'focal'.

## Warning: Missing values are present in the covariates. See ?WeightIt::method_ps
## for information on how these are handled.

## A weightit object
##  - method: "ps" (propensity score weighting)
##  - number of obs.: 600
##  - sampling weights: none
##  - treatment: 2-category
##  - estimand: ATT (focal: FALSE)
##  - covariates: age, college, pid_rep, male, ideol_con
```

```r
bal.tab(W1, var.name = "test")
```

```
## Warning: Missing values exist in the covariates. Displayed values omit these
## observations.

## Call
##  weightit(formula = treatment ~ age + college + pid_rep + sex +
##      ideol_con, data = imm, method = "ps", estimand = "ATT", link = "probit")
##
## Balance Measures
```

```
##                   Type  Diff.Adj
## prop.score     Distance  -0.5046
## age             Contin.   0.0955
## college          Binary   0.1140
## pid_rep         Contin.  -0.0169
## male             Binary   0.2118
## male:<NA>        Binary  -0.0010
## ideol_con       Contin.  -0.0619
## ideol_con:<NA>   Binary  -0.0078
##
## Effective sample sizes
##              FALSE    TRUE
## Unadjusted    194 406.
## Adjusted      194 382.66
```

```r
love.plot(W1, thresholds = c(cor = .1), abs = TRUE,
          var.order = "unadjusted", line = TRUE)
```

```
## Warning: Missing values exist in the covariates. Displayed values omit these
## observations.
```

```
## Warning: Standardized mean differences and raw mean differences are present in the same plot.
## Use the 'stars' argument to distinguish between them and appropriately label the x-axis.
```


Covariate Balance
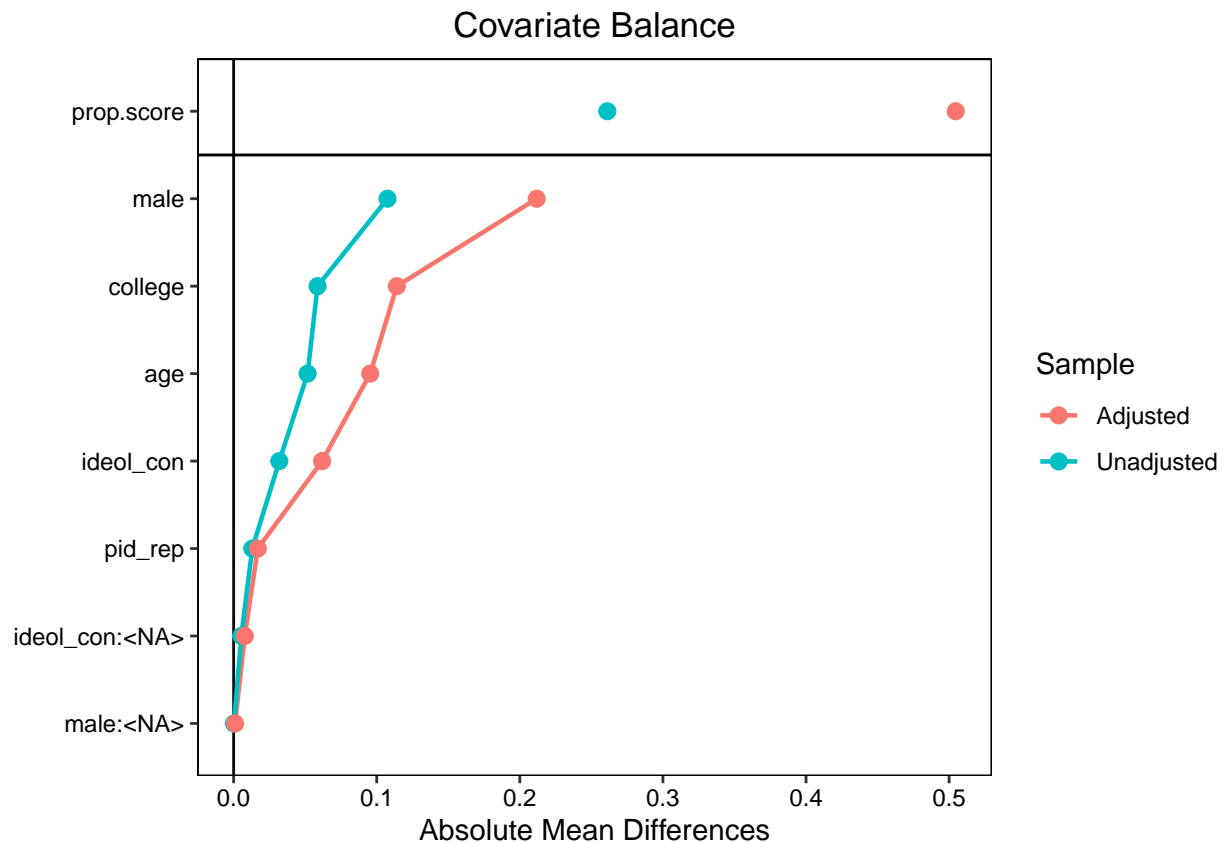
```r
love_test <- love.plot(W1, binary = "std", thresholds = c(m = .1))
```

```
## Warning: Missing values exist in the covariates. Displayed values omit these
## observations.
```