Example analysis

Linear model, smoking is the exposure, birthweight in grams the outcome

```
data <- AF::clslowbwt
head(data)
```

```
  id birth  smoke     race age lwt  bwt    low lbw smoker
1  1     1 1. Yes 3. Other  28 120 2865  0. No   0      1
2  1     2 1. Yes 3. Other  33 141 2609  0. No   0      1
3  2     1  0. No 1. White  29 130 2613  0. No   0      0
4  2     2  0. No 1. White  34 151 3125  0. No   0      0
5  2     3  0. No 1. White  37 144 2481 1. Yes   1      0
6  3     1 1. Yes 2. Black  31 187 1841 1. Yes   1      1
```

```
## propensity score fit

pwfit <- glm(smoker ~ race * age * lwt + I(age^2) + I(lwt^2), data = data,
             family = "binomial")
phat <- predict(pwfit, type = "response")

data$weight <- data$smoker / phat + (1 - data$smoker) / (1 - phat)
## outcome model

outfit <- glm(bwt ~ smoker * (race + age + lwt) + I(age^2) + I(lwt^2),
              data = data, family = "gaussian", weights = weight)

## dummy data, where we set X to 0 and 1

data0 <- data1 <- data
data0$smoker <- 0
data1$smoker <- 1
```

```r
## predicted couterfactuals
Yhat0 <- predict(outfit, newdata = data0, type = "response")
Yhat1 <- predict(outfit, newdata = data1, type = "response")

ATEmean <- mean(Yhat1 - Yhat0)
ATEmean
```

```
[1] -223.6736
```

Bootstrap for confidence interval, not echoed

```
      2.5%      97.5%
-485.73018   29.81936
```

Logistic model, smoking is the exposure, low birthweight (birth weight $<$ 2500g) the outcome

```r
## propensity score fit

pwfit <- glm(smoker ~ race * age * lwt + I(age^2) + I(lwt^2), data = data,
             family = "binomial")
phat <- predict(pwfit, type = "response")

data$weight <- data$smoker / phat + (1 - data$smoker) / (1 - phat)
## outcome model

outfit <- glm(lbw ~ smoker * (race + age + lwt) + I(age^2) + I(lwt^2),
              data = data, family = "binomial", weights = weight)
```

```
Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```r
## dummy data, where we set X to 0 and 1

data0 <- data1 <- data
data0$smoker <- 0
data1$smoker <- 1

## predicted couterfactuals
```

```r
Yhat0 <- predict(outfit, newdata = data0, type = "response")
Yhat1 <- predict(outfit, newdata = data1, type = "response")

ATEmean <- mean(Yhat1 - Yhat0)
ATEmean
```

```
[1] 0.134932
```

```r
RRmean <- mean(Yhat1) / mean(Yhat0)
RRmean
```

```
[1] 1.478392
```

Bootstrap for confidence interval, not echoed

```
      2.5%      97.5%
-0.0188878  0.2783308
```

```
     2.5%     97.5%
0.9394744 2.2549131
```