

9.a

```
> # 데이터 확인
> summary(d_21)
```

| TOTEXP21 | | PHQ242 | | K6SUM42 | | AGE21X | | SEX | | RACETHX | |
|-----------|---------|-----------|--------|-----------|--------|-----------|-------|-----------|-------|-----------|-------|
| Min. : | 0 | Min. : | 0.0000 | Min. : | 0.000 | Min. : | 18.00 | Min. : | 1.000 | Min. : | 1.000 |
| 1st Qu. : | 613 | 1st Qu. : | 0.0000 | 1st Qu. : | 0.000 | 1st Qu. : | 38.00 | 1st Qu. : | 1.000 | 1st Qu. : | 2.000 |
| Median : | 2702 | Median : | 0.0000 | Median : | 2.000 | Median : | 56.00 | Median : | 2.000 | Median : | 2.000 |
| Mean : | 9779 | Mean : | 0.7083 | Mean : | 3.091 | Mean : | 53.75 | Mean : | 1.549 | Mean : | 2.125 |
| 3rd Qu. : | 9144 | 3rd Qu. : | 1.0000 | 3rd Qu. : | 4.000 | 3rd Qu. : | 69.00 | 3rd Qu. : | 2.000 | 3rd Qu. : | 2.000 |
| Max. : | 1667510 | Max. : | 6.0000 | Max. : | 24.000 | Max. : | 85.00 | Max. : | 2.000 | Max. : | 5.000 |

| INSCOV21 | | POVCAT21 | | MIDX | | STRKDX | | HIBPDX | | DIABDX_M18 | |
|-----------|-------|-----------|-------|-----------|---------|-----------|---------|-----------|--------|------------|--------|
| Min. : | 1.000 | Min. : | 1.000 | Min. : | 0.00000 | Min. : | 0.00000 | Min. : | 0.0000 | Min. : | 0.0000 |
| 1st Qu. : | 1.000 | 1st Qu. : | 3.000 | 1st Qu. : | 0.00000 | 1st Qu. : | 0.00000 | 1st Qu. : | 0.0000 | 1st Qu. : | 0.0000 |
| Median : | 1.000 | Median : | 4.000 | Median : | 0.00000 | Median : | 0.00000 | Median : | 0.0000 | Median : | 0.0000 |
| Mean : | 1.473 | Mean : | 3.713 | Mean : | 0.04864 | Mean : | 0.05368 | Mean : | 0.4098 | Mean : | 0.1507 |
| 3rd Qu. : | 2.000 | 3rd Qu. : | 5.000 | 3rd Qu. : | 0.00000 | 3rd Qu. : | 0.00000 | 3rd Qu. : | 1.0000 | 3rd Qu. : | 0.0000 |
| Max. : | 3.000 | Max. : | 5.000 | Max. : | 1.00000 | Max. : | 1.00000 | Max. : | 1.0000 | Max. : | 1.0000 |

| ASTHDX | | CANCERDX | | CHOLDX | | PERWT21F | | MTILL | |
|-----------|--------|-----------|--------|-----------|--------|-----------|----------|-----------|---------|
| Min. : | 0.0000 | Min. : | 0.0000 | Min. : | 0.0000 | Min. : | 229.3 | Min. : | 0.00000 |
| 1st Qu. : | 0.0000 | 1st Qu. : | 0.0000 | 1st Qu. : | 0.0000 | 1st Qu. : | 5621.1 | 1st Qu. : | 0.00000 |
| Median : | 0.0000 | Median : | 0.0000 | Median : | 0.0000 | Median : | 9051.8 | Median : | 0.00000 |
| Mean : | 0.1508 | Mean : | 0.1447 | Mean : | 0.3889 | Mean : | 11424.2 | Mean : | 0.09446 |
| 3rd Qu. : | 0.0000 | 3rd Qu. : | 0.0000 | 3rd Qu. : | 1.0000 | 3rd Qu. : | 14519.0 | 3rd Qu. : | 0.00000 |
| Max. : | 1.0000 | Max. : | 1.0000 | Max. : | 1.0000 | Max. : | 106959.2 | Max. : | 1.00000 |


```
> head(d_21)
# A tibble: 6 x 17
  TOTEXP21 PHQ242 K6SUM42 AGE21X SEX RACETHX INSCOV21 POVCAT21 MIDX STRKDX HIBPDX DIABDX_M18 ASTHDX CANCERDX
    <dbl>   <dbl>   <dbl>   <dbl> <dbl>+1b> <dbl>+1b> <dbl>+1b> <dbl>+1b> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1   9813     0     0    81 2 [2 FE... 2 [2 N... 2 [2 PU... 3 [3 LO... 0 0 1 1 0 0
2   3156     4     9    85 2 [2 FE... 1 [1 H... 2 [2 PU... 3 [3 LO... 0 0 0 0 0 0
3   2592     3     2    59 2 [2 FE... 2 [2 N... 2 [2 PU... 3 [3 LO... 0 0 1 0 0 1
4  34930     1     2    73 1 [1 MA... 2 [2 N... 2 [2 PU... 3 [3 LO... 0 0 1 0 0 1
5    794     0     3    21 1 [1 MA... 2 [2 N... 2 [2 PU... 3 [3 LO... 0 0 0 0 0 0
6    208     0     2    21 1 [1 MA... 2 [2 N... 2 [2 PU... 3 [3 LO... 0 0 0 0 1 0
# 3 more variables: CHOLDX <dbl>, PERWT21F <dbl>, MTILL <dbl>
```

9.b

```
> # 결과 요약 출력
> summary(fit1)
```

Call:

```
glm(formula = TOTEXP21 ~ MTILL, family = Gamma(link = "log"),
    data = d_21, weights = PERWT21F)
```

Coefficients:

| | Estimate | Std. Error | t value | Pr(> t) |
|-------------|----------|------------|---------|--------------|
| (Intercept) | 9.02856 | 0.02536 | 355.968 | < 2e-16 *** |
| MTILL | 0.52892 | 0.08843 | 5.981 | 2.27e-09 *** |

 Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for Gamma family taken to be 100387.9)

Null deviance: 974903658 on 14883 degrees of freedom
 Residual deviance: 970737442 on 14882 degrees of freedom
 AIC: 3013802417

Number of Fisher Scoring iterations: 21

```
>
```

9.c

```
> summary(fit2)
```

Call:

```
glm(formula = MTILL ~ AGE21X + SEX + RACETHX + INSCOV21 + POVCAT21 +  
    MIDX + STRKDX + HIBPDX + DIABDX_M18 + ASTHDX + CANCERDX +  
    CHOLDX, family = binomial(link = "logit"), data = d_21)
```

Coefficients:

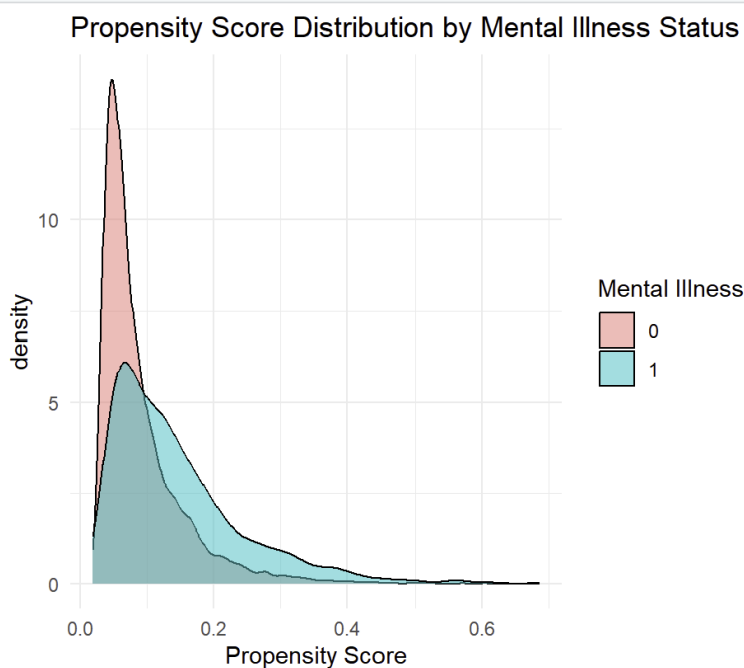
| | Estimate | Std. Error | z value | Pr(> z) | |
|-------------|-----------|------------|---------|----------|-----|
| (Intercept) | -1.714092 | 0.200057 | -8.568 | < 2e-16 | *** |
| AGE21X | -0.014359 | 0.002045 | -7.022 | 2.18e-12 | *** |
| SEX | 0.214858 | 0.059708 | 3.598 | 0.00032 | *** |
| RACETHX | 0.083440 | 0.031266 | 2.669 | 0.00761 | ** |
| INSCOV21 | 0.089361 | 0.050971 | 1.753 | 0.07958 | . |
| POVCAT21 | -0.289487 | 0.021074 | -13.737 | < 2e-16 | *** |
| MIDX | 0.513713 | 0.110233 | 4.660 | 3.16e-06 | *** |
| STRKDX | 0.616847 | 0.102051 | 6.045 | 1.50e-09 | *** |
| HIBPDX | 0.393295 | 0.072817 | 5.401 | 6.62e-08 | *** |
| DIABDX_M18 | 0.224855 | 0.077065 | 2.918 | 0.00353 | ** |
| ASTHDX | 0.571930 | 0.068668 | 8.329 | < 2e-16 | *** |
| CANCERDX | 0.029779 | 0.087019 | 0.342 | 0.73219 | |
| CHOLDX | 0.308901 | 0.070797 | 4.363 | 1.28e-05 | *** |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 9309.8 on 14883 degrees of freedom
Residual deviance: 8628.8 on 14871 degrees of freedom
AIC: 8654.8

Number of Fisher Scoring iterations: 5



9.d

```
> summary(fit4)
```

Call:

```
matchit(formula = MTILL ~ AGE21X + SEX + RACETHX + INSCOV21 +
  POVCAT21 + MIDX + STRKDX + HIBPDX + DIABDX_M18 + ASTHDX +
  CANCERDX + CHOLDX, data = d_21, method = "nearest", distance = "logit")
```

Summary of Balance for All Data:

| | Means Treated | Means Control | Std. Mean Diff. | Var. Ratio | eCDF Mean | eCDF Max |
|------------|---------------|---------------|-----------------|------------|-----------|----------|
| distance | 0.1439 | 0.0893 | 0.5579 | 2.3653 | 0.2141 | 0.3086 |
| AGE21X | 53.5960 | 53.7643 | -0.0090 | 1.0582 | 0.0109 | 0.0288 |
| SEX | 1.6095 | 1.5431 | 0.1361 | 0.9598 | 0.0332 | 0.0664 |
| RACETHX | 2.2134 | 2.1157 | 0.1055 | 1.1504 | 0.0195 | 0.0373 |
| INSCOV21 | 1.6302 | 1.4570 | 0.2994 | 0.8433 | 0.0735 | 0.1967 |
| POVCAT21 | 2.9900 | 3.7882 | -0.5271 | 1.2117 | 0.1596 | 0.2441 |
| MIDX | 0.0974 | 0.0436 | 0.1817 | . | 0.0539 | 0.0539 |
| STRKDX | 0.1174 | 0.0470 | 0.2185 | . | 0.0703 | 0.0703 |
| HIBPDX | 0.5349 | 0.3968 | 0.2768 | . | 0.1381 | 0.1381 |
| DIABDX_M18 | 0.2368 | 0.1417 | 0.2238 | . | 0.0951 | 0.0951 |
| ASTHDX | 0.2617 | 0.1393 | 0.2786 | . | 0.1225 | 0.1225 |
| CANCERDX | 0.1458 | 0.1445 | 0.0036 | . | 0.0013 | 0.0013 |
| CHOLDX | 0.4893 | 0.3785 | 0.2218 | . | 0.1109 | 0.1109 |

Summary of Balance for Matched Data:

| | Means Treated | Means Control | Std. Mean Diff. | Var. Ratio | eCDF Mean | eCDF Max | Std. Pair Dist. |
|------------|---------------|---------------|-----------------|------------|-----------|----------|-----------------|
| distance | 0.1439 | 0.1438 | 0.0015 | 1.0127 | 0.0001 | 0.0036 | 0.0024 |
| AGE21X | 53.5960 | 52.4018 | 0.0639 | 0.9425 | 0.0197 | 0.0498 | 0.8009 |
| SEX | 1.6095 | 1.6038 | 0.0117 | 0.9949 | 0.0028 | 0.0057 | 0.7112 |
| RACETHX | 2.2134 | 2.2148 | -0.0015 | 0.9716 | 0.0165 | 0.0420 | 0.8236 |
| INSCOV21 | 1.6302 | 1.6074 | 0.0394 | 0.8551 | 0.0247 | 0.0484 | 0.6717 |
| POVCAT21 | 2.9900 | 2.9339 | 0.0371 | 0.9245 | 0.0181 | 0.0384 | 0.5537 |
| MIDX | 0.0974 | 0.0903 | 0.0240 | . | 0.0071 | 0.0071 | 0.4749 |
| STRKDX | 0.1174 | 0.1174 | 0.0000 | . | 0.0000 | 0.0000 | 0.1550 |
| HIBPDX | 0.5349 | 0.5071 | 0.0556 | . | 0.0277 | 0.0277 | 0.6317 |
| DIABDX_M18 | 0.2368 | 0.2361 | 0.0017 | . | 0.0007 | 0.0007 | 0.6642 |
| ASTHDX | 0.2617 | 0.2411 | 0.0469 | . | 0.0206 | 0.0206 | 0.5582 |
| CANCERDX | 0.1458 | 0.1380 | 0.0222 | . | 0.0078 | 0.0078 | 0.5784 |
| CHOLDX | 0.4893 | 0.4758 | 0.0270 | . | 0.0135 | 0.0135 | 0.6303 |

Sample Sizes:

| | Control | Treated |
|-----------|---------|---------|
| All | 13478 | 1406 |
| Matched | 1406 | 1406 |
| Unmatched | 12072 | 0 |
| Discarded | 0 | 0 |

```
> summary(matched)
```

| TOTEXP21 | PHQ242 | K6SUM42 | AGE21X | SEX | RACETHX | INSCOV21 |
|----------------|---------------|----------------|------------|---------------|---------------|---------------|
| Min. : 0 | Min. :0.000 | Min. : 0.000 | Min. :18 | Min. :1.000 | Min. :1.000 | Min. :1.000 |
| 1st Qu.: 1024 | 1st Qu.:0.000 | 1st Qu.: 1.000 | 1st Qu.:36 | 1st Qu.:1.000 | 1st Qu.:2.000 | 1st Qu.:1.000 |
| Median : 4412 | Median :2.000 | Median : 6.000 | Median :56 | Median :2.000 | Median :2.000 | Median :2.000 |
| Mean : 13150 | Mean :2.212 | Mean : 7.397 | Mean :53 | Mean :1.607 | Mean :2.214 | Mean :1.619 |
| 3rd Qu.: 14797 | 3rd Qu.:4.000 | 3rd Qu.:12.000 | 3rd Qu.:68 | 3rd Qu.:2.000 | 3rd Qu.:3.000 | 3rd Qu.:2.000 |
| Max. :293034 | Max. :6.000 | Max. :24.000 | Max. :85 | Max. :2.000 | Max. :5.000 | Max. :3.000 |

| POVCAT21 | MIDX | STRKDX | HIBPDX | DIABDX_M18 | ASTHDX |
|---------------|-----------------|----------------|---------------|----------------|----------------|
| Min. :1.000 | Min. :0.00000 | Min. :0.0000 | Min. :0.000 | Min. :0.0000 | Min. :0.0000 |
| 1st Qu.:1.000 | 1st Qu.:0.00000 | 1st Qu.:0.0000 | 1st Qu.:0.000 | 1st Qu.:0.0000 | 1st Qu.:0.0000 |
| Median :3.000 | Median :0.00000 | Median :0.0000 | Median :1.000 | Median :0.0000 | Median :0.0000 |
| Mean :2.962 | Mean :0.09388 | Mean :0.1174 | Mean :0.521 | Mean :0.2365 | Mean :0.2514 |
| 3rd Qu.:4.000 | 3rd Qu.:0.00000 | 3rd Qu.:0.0000 | 3rd Qu.:1.000 | 3rd Qu.:0.0000 | 3rd Qu.:1.0000 |
| Max. :5.000 | Max. :1.00000 | Max. :1.0000 | Max. :1.000 | Max. :1.0000 | Max. :1.0000 |

| CANCERDX | CHOLDX | PERWT21F | MTILL | prop_score | distance |
|----------------|----------------|-----------------|-------------|-----------------|-----------------|
| Min. :0.0000 | Min. :0.0000 | Min. : 293.6 | Min. :0.0 | Min. :0.02291 | Min. :0.02291 |
| 1st Qu.:0.0000 | 1st Qu.:0.0000 | 1st Qu.: 4676.2 | 1st Qu.:0.0 | 1st Qu.:0.07129 | 1st Qu.:0.07129 |
| Median :0.0000 | Median :0.0000 | Median : 7918.5 | Median :0.5 | Median :0.11862 | Median :0.11862 |
| Mean :0.1419 | Mean :0.4826 | Mean :10123.6 | Mean :0.5 | Mean :0.14386 | Mean :0.14386 |
| 3rd Qu.:0.0000 | 3rd Qu.:1.0000 | 3rd Qu.:12914.3 | 3rd Qu.:1.0 | 3rd Qu.:0.18504 | 3rd Qu.:0.18504 |
| Max. :1.0000 | Max. :1.0000 | Max. :67762.5 | Max. :1.0 | Max. :0.68720 | Max. :0.68720 |

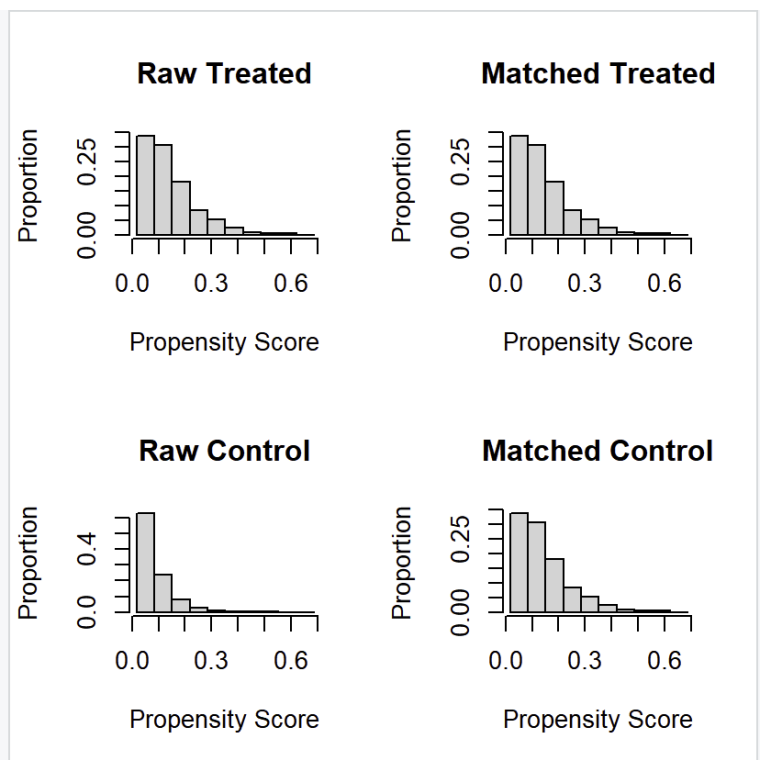
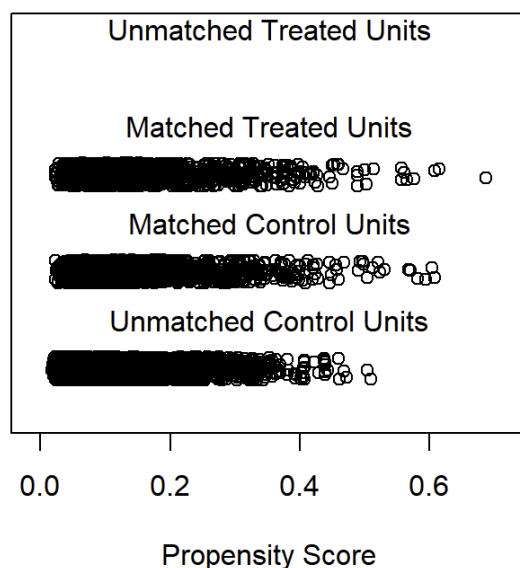
| weights | subclass |
|-----------|---------------|
| Min. :1 | 1 |
| 1st Qu.:1 | 2 |
| Median :1 | 3 |
| Mean :1 | 4 |
| 3rd Qu.:1 | 5 |
| Max. :1 | 6 |
| | (other) :2800 |

```

> cat("Absolute Difference:", absolute_diff, "\n")
Absolute Difference: 0.1332755
> cat("Relative Difference (%):", relative_diff, "\n")
Relative Difference (%): 25.19749
>

```

Distribution of Propensity Scores



10.a

```
> # 데이터 확인
> head(data)
# A tibble: 6 × 26
  store chain co_owned state southj centralj northj pa1 pa2 shore ncalls
  <dbl> <dbl>   <dbl> <dbl> <dbl>   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1    46     1     0     0     0     0     0     1     0     0     0
2    49     2     0     0     0     0     0     1     0     0     0
3   506     2     1     0     0     0     0     1     0     0     0
4    56     4     1     0     0     0     0     1     0     0     0
5    61     4     1     0     0     0     0     1     0     0     0
6    62     4     1     0     0     0     0     1     0     0     2
# 15 more variables: empft <dbl>, emppt <dbl>, nmgrs <dbl>, wage_st <dbl>,
# inctime <dbl>, firstinc <dbl>, meals <dbl>, open <dbl>, hoursopen <dbl>,
# pricesoda <dbl>, pricefry <dbl>, priceentree <dbl>, nregisters <dbl>,
# nregisters11 <dbl>, time <dbl>

> summary(data)
      store      chain      co_owned      state
Min.   : 1.0    Min.   :1.000    Min.   :0.0000    Min.   :0.0000
1st Qu.:119.0    1st Qu.:1.000    1st Qu.:0.0000    1st Qu.:1.0000
Median :237.5    Median :2.000    Median :0.0000    Median :1.0000
Mean   :246.5    Mean   :2.117    Mean   :0.3439    Mean   :0.8073
3rd Qu.:372.0    3rd Qu.:3.000    3rd Qu.:1.0000    3rd Qu.:1.0000
Max.   :522.0    Max.   :4.000    Max.   :1.0000    Max.   :1.0000

      southj      centralj      northj      pa1
Min.   :0.0000    Min.   :0.0000    Min.   :0.0000    Min.   :0.0000
1st Qu.:0.0000    1st Qu.:0.0000    1st Qu.:0.0000    1st Qu.:0.0000
Median :0.0000    Median :0.0000    Median :0.0000    Median :0.0000
Mean   :0.2268    Mean   :0.1537    Mean   :0.4268    Mean   :0.0878
3rd Qu.:0.0000    3rd Qu.:0.0000    3rd Qu.:1.0000    3rd Qu.:0.0000
Max.   :1.0000    Max.   :1.0000    Max.   :1.0000    Max.   :1.0000

      pa2      shore      ncalls      empft
Min.   :0.0000    Min.   :0.00000    Min.   :0.000    Min.   : 0.000
1st Qu.:0.0000    1st Qu.:0.00000    1st Qu.:0.000    1st Qu.: 2.000
Median :0.0000    Median :0.00000    Median :1.000    Median : 6.000
Mean   :0.1049    Mean   :0.08537    Mean   :1.447    Mean   : 8.239
3rd Qu.:0.0000    3rd Qu.:0.00000    3rd Qu.:2.000    3rd Qu.:12.000
Max.   :1.0000    Max.   :1.00000    Max.   :9.000    Max.   :60.000
NA's   :          NA's   :249    NA's   :18

      emppt      nmgrs      wage_st      inctime
Min.   : 0.00    Min.   : 0.000    Min.   :4.250    Min.   : 2.00
1st Qu.:11.00    1st Qu.: 3.000    1st Qu.:4.500    1st Qu.:13.00
Median :17.00    Median : 3.000    Median :5.000    Median :19.00
Mean   :18.75    Mean   : 3.452    Mean   :4.806    Mean   :20.08
3rd Qu.:25.00    3rd Qu.: 4.000    3rd Qu.:5.050    3rd Qu.:26.00
Max.   :60.00    Max.   :10.000    Max.   :6.250    Max.   :52.00
NA's   :14      NA's   :12      NA's   :41      NA's   :97
```

| firstinc | meals | open | hoursopen |
|----------------|---------------|----------------|---------------|
| Min. :0.0000 | Min. :0.000 | Min. : 0.000 | Min. : 7.00 |
| 1st Qu.:0.1500 | 1st Qu.:2.000 | 1st Qu.: 6.500 | 1st Qu.:12.00 |
| Median :0.2000 | Median :2.000 | Median : 7.000 | Median :15.00 |
| Mean :0.2214 | Mean :1.843 | Mean : 8.076 | Mean :14.45 |
| 3rd Qu.:0.2500 | 3rd Qu.:2.000 | 3rd Qu.:10.500 | 3rd Qu.:16.00 |
| Max. :1.0000 | Max. :3.000 | Max. :11.500 | Max. :24.00 |
| NA's :123 | NA's :11 | NA's :11 | NA's :11 |

| pricesoda | pricefry | priceentree | nregisters |
|---------------|----------------|---------------|---------------|
| Min. :0.410 | Min. :0.6700 | Min. :0.410 | Min. :1.000 |
| 1st Qu.:1.000 | 1st Qu.:0.8500 | 1st Qu.:0.940 | 1st Qu.:3.000 |
| Median :1.050 | Median :0.9400 | Median :1.030 | Median :3.000 |
| Mean :1.045 | Mean :0.9315 | Mean :1.338 | Mean :3.601 |
| 3rd Qu.:1.090 | 3rd Qu.:1.0100 | 3rd Qu.:1.843 | 3rd Qu.:4.000 |
| Max. :1.490 | Max. :1.3700 | Max. :3.950 | Max. :8.000 |
| NA's :30 | NA's :45 | NA's :36 | NA's :28 |

| nregisters11 | time |
|---------------|-------------|
| Min. :0.000 | Min. :0.0 |
| 1st Qu.:2.000 | 1st Qu.:0.0 |
| Median :3.000 | Median :0.5 |
| Mean :2.689 | Mean :0.5 |
| 3rd Qu.:3.000 | 3rd Qu.:1.0 |
| Max. :7.000 | Max. :1.0 |
| NA's :39 | |

```
> summary(data_1)
```

| store | chain | co_owned | state |
|---------------|---------------|----------------|----------------|
| Min. : 1.0 | Min. :1.000 | Min. :0.0000 | Min. :0.0000 |
| 1st Qu.:119.0 | 1st Qu.:1.000 | 1st Qu.:0.0000 | 1st Qu.:1.0000 |
| Median :238.0 | Median :2.000 | Median :0.0000 | Median :1.0000 |
| Mean :247.1 | Mean :2.107 | Mean :0.3458 | Mean :0.8065 |
| 3rd Qu.:373.0 | 3rd Qu.:3.000 | 3rd Qu.:1.0000 | 3rd Qu.:1.0000 |
| Max. :522.0 | Max. :4.000 | Max. :1.0000 | Max. :1.0000 |

| time | empft | emppt |
|----------------|---------------|---------------|
| Min. :0.0000 | Min. : 0.00 | Min. : 0.00 |
| 1st Qu.:0.0000 | 1st Qu.: 2.00 | 1st Qu.:11.00 |
| Median :0.0000 | Median : 6.00 | Median :17.00 |
| Mean :0.4956 | Mean : 8.23 | Mean :18.73 |
| 3rd Qu.:1.0000 | 3rd Qu.:12.00 | 3rd Qu.:25.00 |
| Max. :1.0000 | Max. :60.00 | Max. :60.00 |

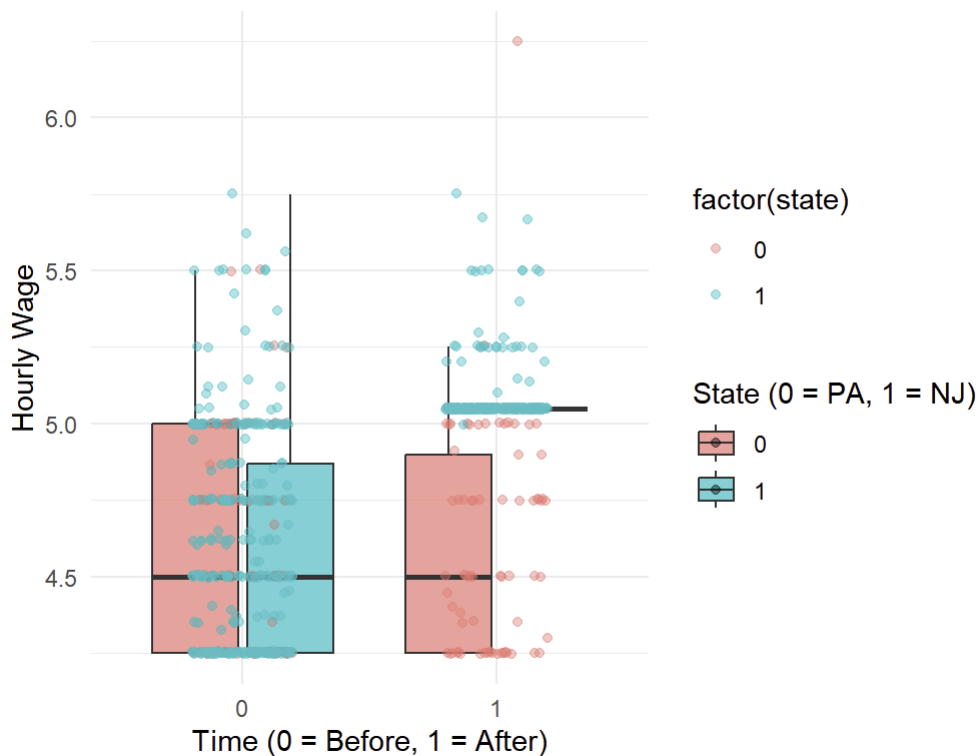
```
> head(data_1)
```

```
# A tibble: 6 × 7
```

| | store | chain | co_owned | state | time | empft | emppt |
|---|-------|-------|----------|-------|-------|-------|-------|
| | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> |
| 1 | 46 | 1 | 0 | 0 | 0 | 30 | 15 |
| 2 | 49 | 2 | 0 | 0 | 0 | 6.5 | 6.5 |
| 3 | 506 | 2 | 1 | 0 | 0 | 3 | 7 |
| 4 | 56 | 4 | 1 | 0 | 0 | 20 | 20 |
| 5 | 61 | 4 | 1 | 0 | 0 | 6 | 26 |
| 6 | 62 | 4 | 1 | 0 | 0 | 0 | 31 |

10.c

Hourly Wage Before and After Policy Implementation



10.d

```
> summary(did_model)
```

Call:

```
lm(formula = empft ~ time * state + chain + co_owned, data = data)
```

Residuals:

| Min | 1Q | Median | 3Q | Max |
|---------|--------|--------|-------|--------|
| -10.922 | -6.031 | -2.410 | 3.783 | 53.171 |

Coefficients:

| | Estimate | Std. Error | t value | Pr(> t) |
|-------------|----------|------------|---------|------------|
| (Intercept) | 11.2547 | 1.1022 | 10.211 | <2e-16 *** |
| time | -2.6806 | 1.3283 | -2.018 | 0.0439 * |
| state | -2.5122 | 1.0422 | -2.410 | 0.0162 * |
| chain | -0.3327 | 0.2727 | -1.220 | 0.2227 |
| co_owned | -0.9156 | 0.6311 | -1.451 | 0.1472 |
| time:state | 3.3949 | 1.4788 | 2.296 | 0.0220 * |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 8.268 on 796 degrees of freedom

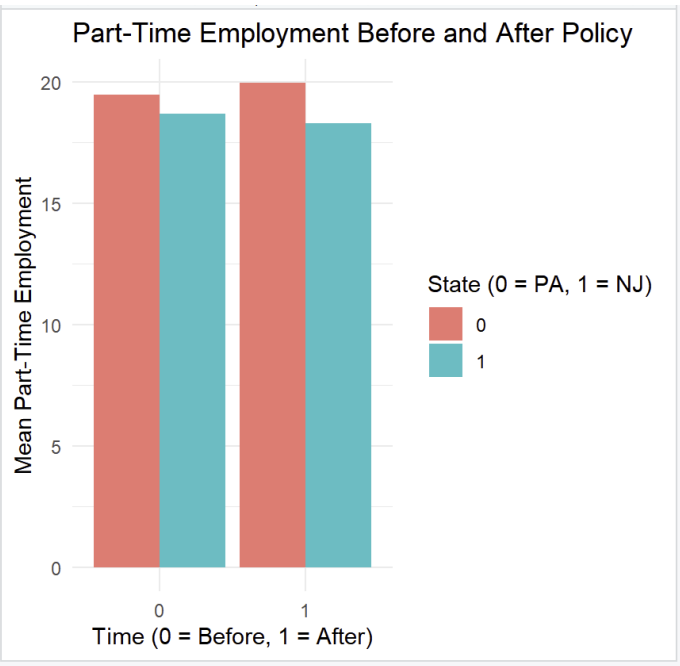
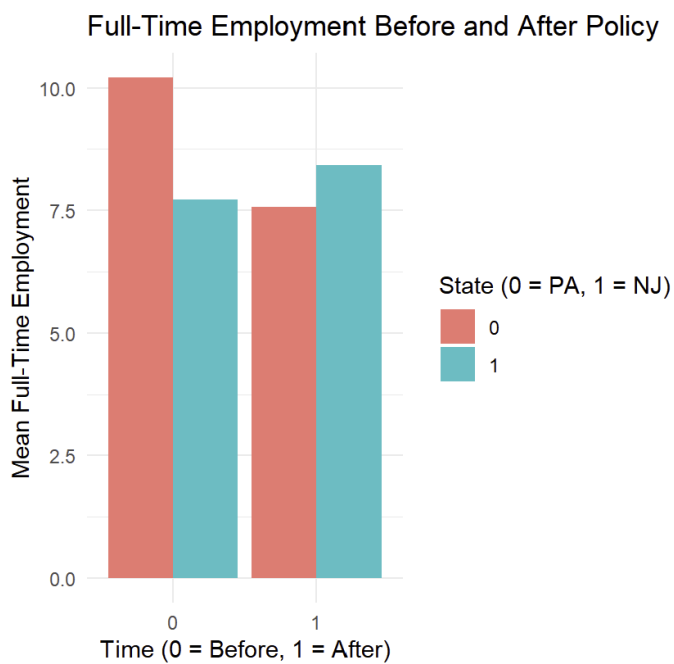
(결측으로 인하여 18개의 관측치가 삭제되었습니다.)

Multiple R-squared: 0.01369, Adjusted R-squared: 0.007495

F-statistic: 2.21 on 5 and 796 DF, p-value: 0.05152

10.e

```
> print(group_summary)
# A tibble: 4 × 4
# Groups:   state [2]
  state time mean_empft mean_emppt
<dbl> <dbl>    <dbl>    <dbl>
1     0     0      10.2      19.5
2     0     1       7.56     20.0
3     1     0       7.72     18.7
4     1     1       8.43     18.3
```




```

> # DiD 회귀 분석: 풀타임 고용
> did_ft = lm(empft ~ time * state, data = data_1)
> summary(did_ft)

Call:
lm(formula = empft ~ time * state, data = data_1)

Residuals:
    Min       1Q   Median       3Q      Max
-10.205  -6.425  -2.425   3.575  52.276

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  10.2051     0.9379  10.881  <2e-16 ***
time         -2.6402     1.3307  -1.984   0.0476 *
state        -2.4812     1.0441  -2.376   0.0177 *
time:state     3.3413     1.4818   2.255   0.0244 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 8.283 on 797 degrees of freedom
Multiple R-squared:  0.007874, Adjusted R-squared:  0.004139
F-statistic: 2.108 on 3 and 797 DF, p-value: 0.09771

```

```

> # DiD 회귀 분석: 파트타임 고용
> did_pt = lm(emppt ~ time * state, data = data_1)
> summary(did_pt)

Call:
lm(formula = emppt ~ time * state, data = data_1)

Residuals:
    Min       1Q   Median       3Q      Max
-19.955  -7.683  -1.955   6.317  41.705

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  19.4872     1.1780  16.542  <2e-16 ***
time          0.4674     1.6714   0.280   0.780
state        -0.8047     1.3114  -0.614   0.540
time:state   -0.8546     1.8611  -0.459   0.646
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 10.4 on 797 degrees of freedom
Multiple R-squared:  0.00256, Adjusted R-squared: -0.001195
F-statistic: 0.6817 on 3 and 797 DF, p-value: 0.5634

```