830-pj

Yuqing Zhang

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```
##   Prev.Length Match.Score Tile.Size Prev.Type Browse.Time x1 x2 x3 x4        y
## 1         100          80       0.1        TT    16.52052 -1 -1 -1 -1 16.52052
## 2         120          80       0.1        AC    22.78234 -1 -1  1  1 22.78234
## 3         100         100       0.1        AC    24.88174 -1  1 -1  1 24.88174
## 4         120         100       0.1        TT    19.35535 -1  1  1 -1 19.35535
## 5         100          80       0.3        AC    22.83119  1 -1 -1  1 22.83119
## 6         120          80       0.3        TT    20.21814  1 -1  1 -1 20.21814

##    Prev.Length   Match.Score     Tile.Size     Prev.Type          Browse.Time
##  Min.   :100   Min.   : 80   Min.   :0.1   Length:800         Min.   :13.23
##  1st Qu.:100   1st Qu.: 80   1st Qu.:0.1   Class :character   1st Qu.:18.95
##  Median :110   Median : 90   Median :0.2   Mode  :character   Median :20.69
##  Mean   :110   Mean   : 90   Mean   :0.2                      Mean   :21.09
##  3rd Qu.:120   3rd Qu.:100   3rd Qu.:0.3                      3rd Qu.:23.93
##  Max.   :120   Max.   :100   Max.   :0.3                      Max.   :27.19
##        x1             x2             x3             x4             y
##  Min.   :-1   Min.   :-1   Min.   :-1   Min.   :-1   Min.   :13.23
##  1st Qu.:-1   1st Qu.:-1   1st Qu.:-1   1st Qu.:-1   1st Qu.:18.95
##  Median : 0   Median : 0   Median : 0   Median : 0   Median :20.69
##  Mean   : 0   Mean   : 0   Mean   : 0   Mean   : 0   Mean   :21.09
##  3rd Qu.: 1   3rd Qu.: 1   3rd Qu.: 1   3rd Qu.: 1   3rd Qu.:23.93
##  Max.   : 1   Max.   : 1   Max.   : 1   Max.   : 1   Max.   :27.19

##
## Call:
## lm(formula = y ~ x1 * x2 * x3 * x4, data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0655 -0.7011  0.0174  0.7009  3.9004
##
## Coefficients: (8 not defined because of singularities)
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 21.08561    0.03614 583.516   <2e-16 ***
## x1           0.01811    0.03614   0.501    0.616
## x2           0.97304    0.03614  26.927   <2e-16 ***
## x3           0.94879    0.03614  26.257   <2e-16 ***
## x4           2.50967    0.03614  69.452   <2e-16 ***
## x1:x2       -0.03968    0.03614  -1.098    0.272
## x1:x3       -0.01815    0.03614  -0.502    0.616
## x2:x3       -0.55881    0.03614 -15.464   <2e-16 ***
## x1:x4            NA         NA      NA       NA
## x2:x4            NA         NA      NA       NA
## x3:x4            NA         NA      NA       NA
```

```
## x1:x2:x3           NA       NA       NA       NA
## x1:x2:x4           NA       NA       NA       NA
## x1:x3:x4           NA       NA       NA       NA
## x2:x3:x4           NA       NA       NA       NA
## x1:x2:x3:x4        NA       NA       NA       NA
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.022 on 792 degrees of freedom
## Multiple R-squared:  0.8911, Adjusted R-squared:  0.8901
## F-statistic: 925.6 on 7 and 792 DF,  p-value: < 2.2e-16

##
## Call:
## lm(formula = y ~ x2 + x3 + x4 + x2:x3, data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0455 -0.7102  0.0062  0.7061  3.9764
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 21.08561    0.03611  583.99   <2e-16 ***
## x2           0.97304    0.03611   26.95   <2e-16 ***
## x3           0.94879    0.03611   26.28   <2e-16 ***
## x4           2.50967    0.03611   69.51   <2e-16 ***
## x2:x3       -0.55881    0.03611  -15.48   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.021 on 795 degrees of freedom
## Multiple R-squared:  0.8908, Adjusted R-squared:  0.8903
## F-statistic:  1622 on 4 and 795 DF,  p-value: < 2.2e-16

## Analysis of Variance Table
##
## Model 1: y ~ x1 * x2 * x3 * x4
## Model 2: y ~ x2 + x3 + x4 + x2:x3
##   Res.Df    RSS Df Sum of Sq      F Pr(>F)
## 1    792 827.34
## 2    795 829.12 -3   -1.7856 0.5698  0.635

## Warning: package 'gplots' was built under R version 4.0.5

##
## Attaching package: 'gplots'

## The following object is masked from 'package:stats':
##
##     lowess

##  [1] "Prev.Length" "Match.Score" "Tile.Size"   "Prev.Type"   "Browse.Time"
##  [6] "x1"          "x2"          "x3"          "x4"          "y"

## Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
```
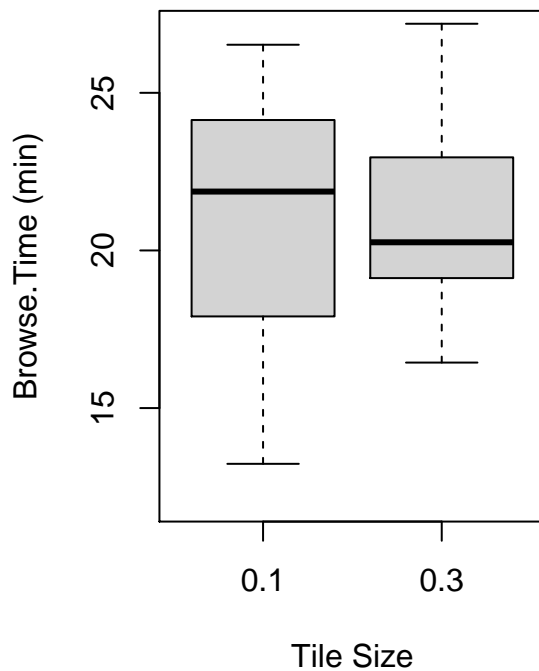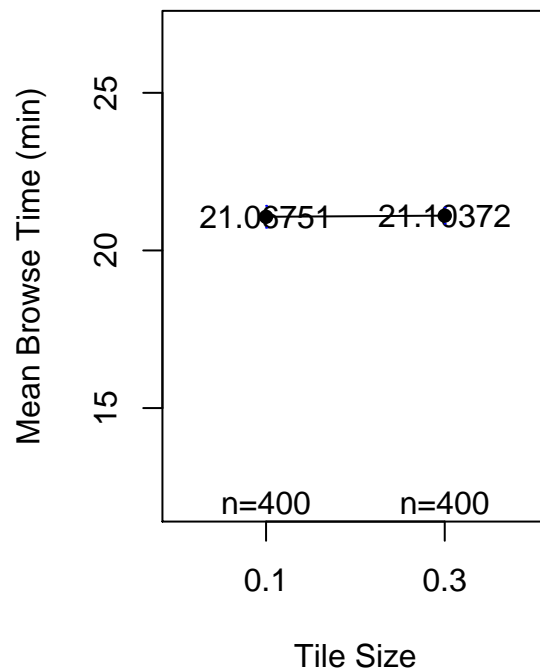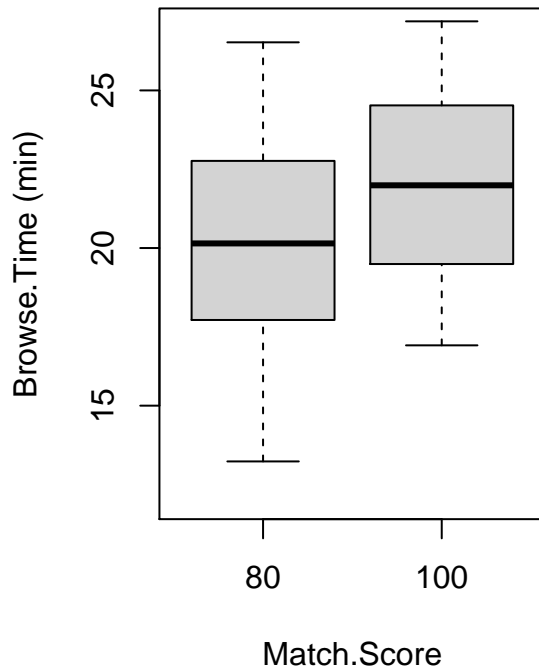
```
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped
```

Boxplot of Browse Time by Tile Si **Main Effect Plot for Tile Size**


```
## Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped
```
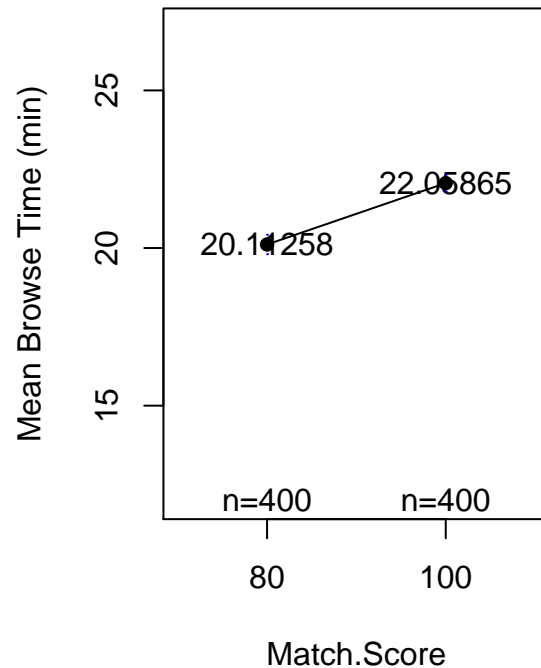
Boxplot of Browse Time by Match.S   Main Effect Plot for Match.Score
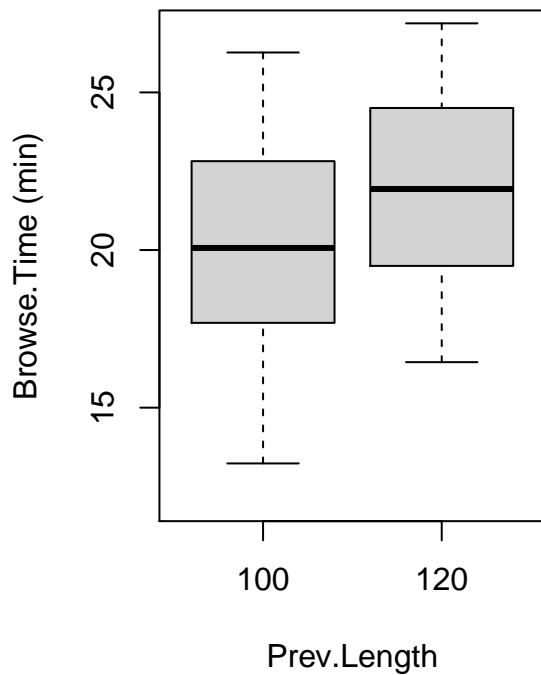


```
## Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped

## Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
## length arrow is of indeterminate angle and so skipped
```
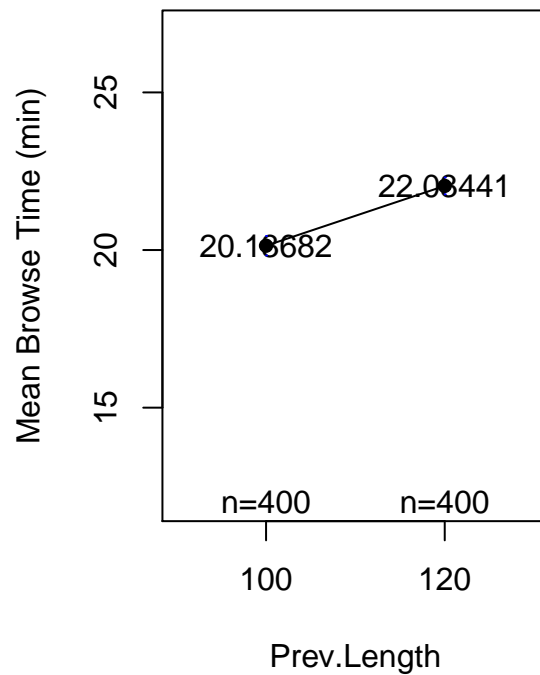
Boxplot of Browse Time by Prev.Length   **Main Effect Plot for Prev.Length**
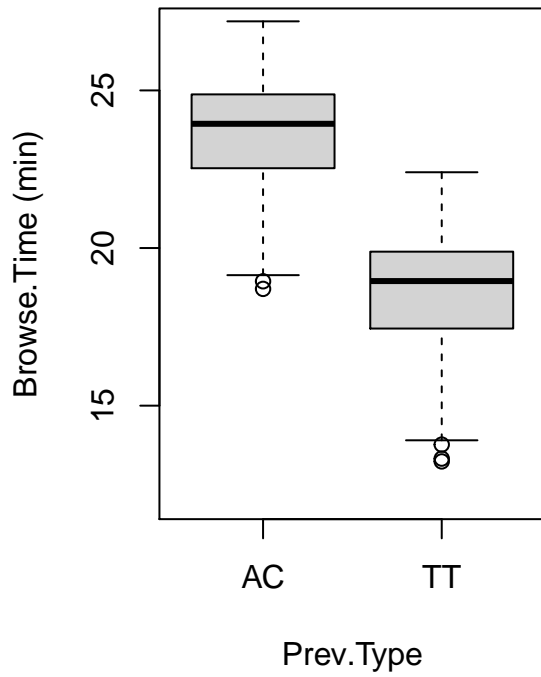

Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
length arrow is of indeterminate angle and so skipped

Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, : zero-
length arrow is of indeterminate angle and so skipped

Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
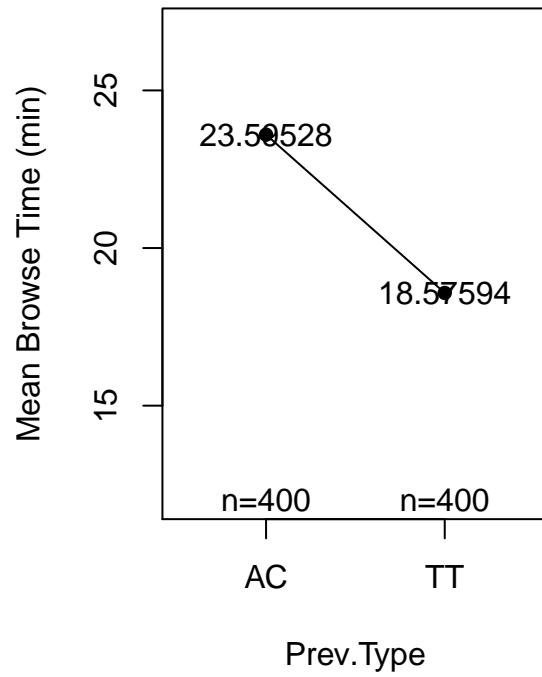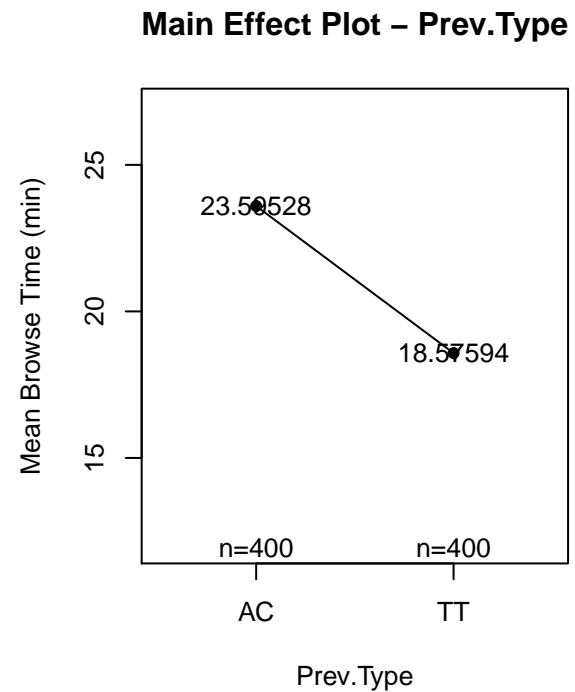## length arrow is of indeterminate angle and so skipped
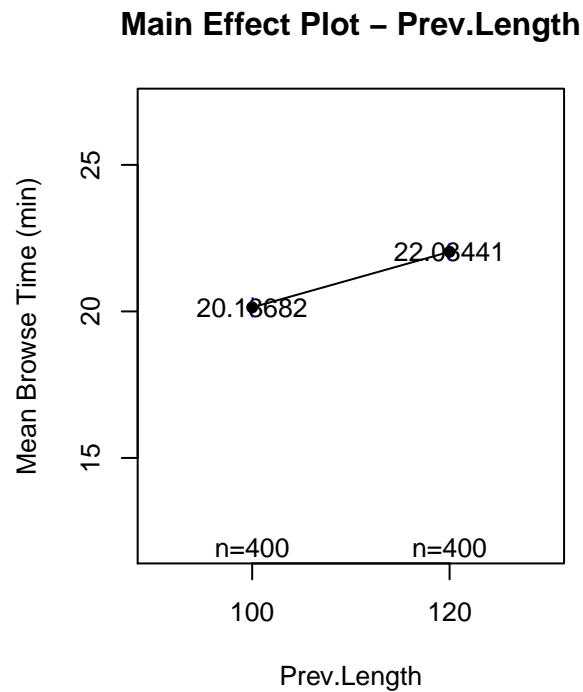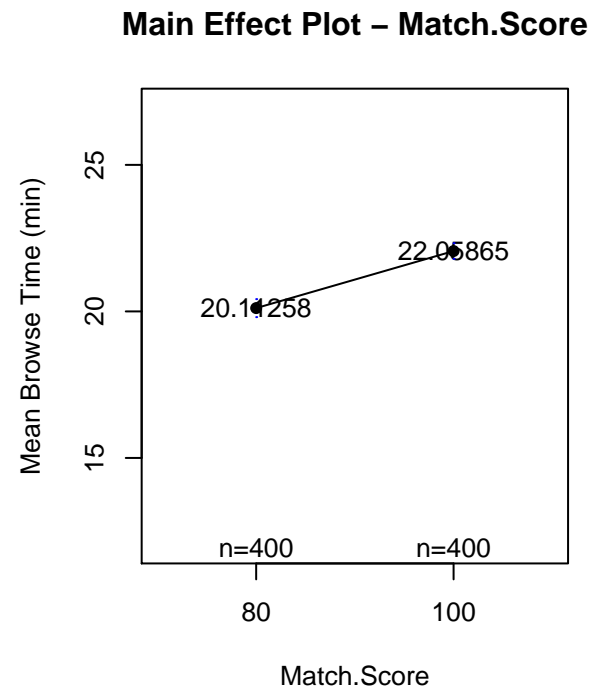
Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, : zero-
length arrow is of indeterminate angle and so skipped

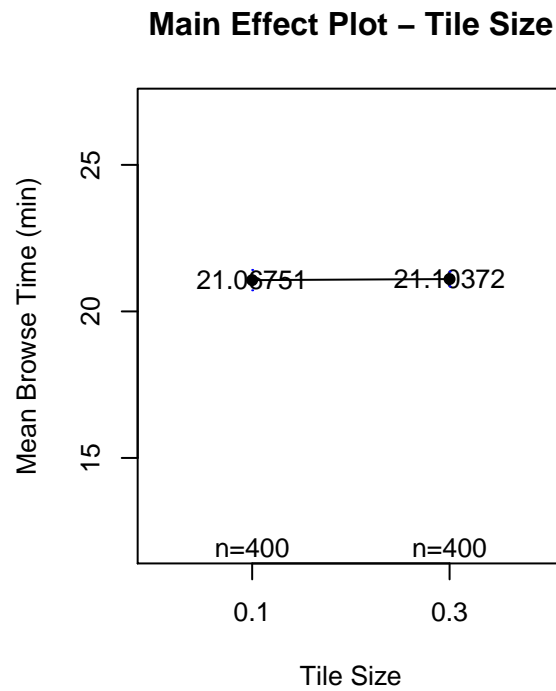**Boxplot of Browse Time by Prev.Type**   **Main Effect Plot for Prev.Type**

Main Effect Plot – Tile Size

Main Effect Plot – Match.Score

Main Effect Plot – Prev.Length

Main Effect Plot – Prev.Type


```
##   Prev.Length Match.Score Tile.Size Prev.Type Browse.Time x1 x2 x3 x4        y
## 1         100          80       0.1        TT    16.52052 -1 -1 -1 -1 16.52052
## 2         120          80       0.1        AC    22.78234 -1 -1  1  1 22.78234
## 3         100         100       0.1        AC    24.88174 -1  1 -1  1 24.88174
## 4         120         100       0.1        TT    19.35535 -1  1  1 -1 19.35535
```

```
## 5             100          80          0.3         AC     22.83119  1 -1 -1  1 22.83119
## 6             120          80          0.3         TT     20.21814  1 -1  1 -1 20.21814

##    Prev.Length   Match.Score    Tile.Size    Prev.Type         Browse.Time
##  Min.   :100   Min.   : 80   Min.   :0.1   Length:800      Min.   :13.23
##  1st Qu.:100   1st Qu.: 80   1st Qu.:0.1   Class :character  1st Qu.:18.95
##  Median :110   Median : 90   Median :0.2   Mode  :character  Median :20.69
##  Mean   :110   Mean   : 90   Mean   :0.2                     Mean   :21.09
##  3rd Qu.:120   3rd Qu.:100   3rd Qu.:0.3                     3rd Qu.:23.93
##  Max.   :120   Max.   :100   Max.   :0.3                     Max.   :27.19
##       x1            x2            x3            x4            y
##  Min.   :-1   Min.   :-1   Min.   :-1   Min.   :-1   Min.   :13.23
##  1st Qu.:-1   1st Qu.:-1   1st Qu.:-1   1st Qu.:-1   1st Qu.:18.95
##  Median : 0   Median : 0   Median : 0   Median : 0   Median :20.69
##  Mean   : 0   Mean   : 0   Mean   : 0   Mean   : 0   Mean   :21.09
##  3rd Qu.: 1   3rd Qu.: 1   3rd Qu.: 1   3rd Qu.: 1   3rd Qu.:23.93
##  Max.   : 1   Max.   : 1   Max.   : 1   Max.   : 1   Max.   :27.19

##
## Call:
## lm(formula = y ~ (x1 + x2 + x3 + x4)^4, data = data_ffd)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0655 -0.7011  0.0174  0.7009  3.9004
##
## Coefficients: (8 not defined because of singularities)
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 21.08561    0.03614 583.516  <2e-16 ***
## x1           0.01811    0.03614   0.501   0.616
## x2           0.97304    0.03614  26.927  <2e-16 ***
## x3           0.94879    0.03614  26.257  <2e-16 ***
## x4           2.50967    0.03614  69.452  <2e-16 ***
## x1:x2       -0.03968    0.03614  -1.098   0.272
## x1:x3       -0.01815    0.03614  -0.502   0.616
## x1:x4       -0.55881    0.03614 -15.464  <2e-16 ***
## x2:x3            NA         NA      NA      NA
## x2:x4            NA         NA      NA      NA
## x3:x4            NA         NA      NA      NA
## x1:x2:x3         NA         NA      NA      NA
## x1:x2:x4         NA         NA      NA      NA
## x1:x3:x4         NA         NA      NA      NA
## x2:x3:x4         NA         NA      NA      NA
## x1:x2:x3:x4      NA         NA      NA      NA
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.022 on 792 degrees of freedom
## Multiple R-squared:  0.8911, Adjusted R-squared:  0.8901
## F-statistic: 925.6 on 7 and 792 DF,  p-value: < 2.2e-16
```

x2 x3 x4 are significant