

WM Winters Attribution Multiple Regression Analysis

Danny Moncada (monca016), MSBA

```
suppressWarnings(suppressPackageStartupMessages({
  library(dplyr)
}))

wm <- read.csv("WMWintersAttributionData.csv", header = T)
attach(wm)

## Summarize data set
summary(wm)
```

```
##      Orderid      Orderdatetime      Saleamount      Newcustomer
## Min.   :11634052  5/10/2012 17:12:  19  Min.   :  19.09  N:4549
## 1st Qu.:11666533  5/16/2012 16:59:  16  1st Qu.: 160.20  Y:5570
## Median :11702134  5/16/2012 14:23:  15  Median : 239.31
## Mean   :11701689  5/28/2012 17:20:  15  Mean   : 238.34
## 3rd Qu.:11729875  5/3/2012  1:15 :  15  3rd Qu.: 326.92
## Max.   :11777540  5/4/2012 18:08 :  15  Max.   :1402.09
##              (Other)      :10024
##      Position      Positiondatetime      Groupname
## Min.   :0.000  5/1/2012 20:38 :    9  CPM      :5903
## 1st Qu.:1.000  5/19/2012 22:12:    8  BUZZ AFFILIATE :1809
## Median :2.000  5/21/2012 11:58:    7  SEARCH GOOGLE BRAND :1082
## Mean   :2.406  5/26/2012 16:09:    7  CJ      : 708
## 3rd Qu.:4.000  3/29/2012  1:05 :    6  SEARCH MSN BRAND   : 238
## Max.   :9.000  5/14/2012  2:23 :    6  SEARCH GOOGLE NON-BRAND: 136
##              (Other)      :10076  (Other)      : 243
##              Networkname      Networkid      Brand
## Mediawhiz      :1943  n62974792:1943  N      :8692
## Armonix        :1846  nar7467  :1846  NULL:   79
## Buzz CPA Affiliate :1368  buzz23   :1368  Y      :1348
## Acerno         : 828  acerno   : 828
## G: Medifast Brand Terms > Medifast > : 801  cj22     : 708
## Commission Junction : 708  adr      : 578
## (Other)         :2625  (Other)   :2848
##      Positionname      Orderdatetime.1      Positiontime
## ASSIST      :1715  5/16/2012: 593  5/15/2012: 485
## CONVERTER :2170  5/22/2012: 530  5/17/2012: 484
## ORIGINATOR:2169  5/21/2012: 506  5/21/2012: 460
## ROSTER     :4065  5/17/2012: 491  5/14/2012: 442
##              5/2/2012 : 475  5/16/2012: 421
##              5/7/2012 : 469  5/22/2012: 397
##              (Other)  :7055  (Other)   :7430
## Time.to.Convert...Days.
## Min.   :  0.00
## 1st Qu.:  0.00
## Median :  0.00
## Mean   : 11.94
## 3rd Qu.:  6.00
```

```
## Max. :198.00
##
```

```
# convert to table, not 100% sure this is necessary
```

```
wm_df <- tbl_df(wm)
```

```
## Group by customer
```

```
wm_cust <- wm_df %>% group_by(Orderid, Newcustomer)
```

```
wm_cust_sum <- summarize(wm_cust, NumTouches = n(), Sales = round(mean(Saleamount),2),
                          TotalConvDays = round(max(Time.to.Convert..Days.),1),
                          DolPerTouch = round(max(Saleamount)/n(),2))
```

```
summary(wm_cust_sum)
```

```
##      Orderid      Newcustomer  NumTouches      Sales
## Min. :11634052  N: 874      Min. : 2.000  Min. : 19.09
## 1st Qu.:11666522  Y:1296    1st Qu.: 3.000  1st Qu.: 162.78
## Median :11701822      Median : 4.000  Median : 254.25
## Mean :11701648      Mean : 4.663  Mean : 243.05
## 3rd Qu.:11729662    3rd Qu.: 6.000  3rd Qu.: 330.00
## Max. :11777540      Max. :10.000  Max. :1402.09
## TotalConvDays      DolPerTouch
## Min. : 0.00  Min. : 2.16
## 1st Qu.: 0.00  1st Qu.: 31.57
## Median : 1.00  Median : 54.17
## Mean : 15.53  Mean : 67.90
## 3rd Qu.: 3.00  3rd Qu.: 88.78
## Max. :198.00  Max. :341.50
```

```
#run a reg to see if # of days is different for new or existing customer
```

```
cust_reg1 <- lm(TotalConvDays ~ as.factor(Newcustomer), data = wm_cust_sum)
summary(cust_reg1)
```

```
##
```

```
## Call:
```

```
## lm(formula = TotalConvDays ~ as.factor(Newcustomer), data = wm_cust_sum)
```

```
##
```

```
## Residuals:
```

```
##      Min      1Q  Median      3Q      Max
## -29.395 -16.395  -6.184  -5.184  190.816
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      29.395      1.240   23.70  <2e-16 ***
## as.factor(Newcustomer)Y -23.210      1.605  -14.46  <2e-16 ***
```

```
## ---
```

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

```
##
```

```
## Residual standard error: 36.66 on 2168 degrees of freedom
```

```
## Multiple R-squared:  0.08802, Adjusted R-squared:  0.0876
```

```
## F-statistic: 209.2 on 1 and 2168 DF, p-value: < 2.2e-16
```

```
#run a reg to see if # of days impacts total sales
cust_ref2 <- lm(Sales ~ TotalConvDays, data = wm_cust_sum)
summary(cust_ref2)
```

```
##
## Call:
## lm(formula = Sales ~ TotalConvDays, data = wm_cust_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -227.27  -81.36   11.27   83.64 1155.95
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   246.35674     2.76885   88.974 < 2e-16 ***
## TotalConvDays -0.21290     0.06689   -3.183  0.00148 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 119.6 on 2168 degrees of freedom
## Multiple R-squared:  0.004651,    Adjusted R-squared:  0.004192
## F-statistic: 10.13 on 1 and 2168 DF,  p-value: 0.001479
```

```
#run a reg to see if New or Existing customers affect total sales
cust_ref3 <- lm(Sales ~ as.factor(Newcustomer), data = wm_cust_sum)
summary(cust_ref3)
```

```
##
## Call:
## lm(formula = Sales ~ as.factor(Newcustomer), data = wm_cust_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -249.52  -90.63   -4.61   70.22 1133.48
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)       205.141      3.914   52.41 <2e-16 ***
## as.factor(Newcustomer)Y  63.474      5.065   12.53 <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 115.7 on 2168 degrees of freedom
## Multiple R-squared:  0.06755,    Adjusted R-squared:  0.06712
## F-statistic: 157.1 on 1 and 2168 DF,  p-value: < 2.2e-16
```

```
##Group by new/existing
wm_N_E <- wm_cust_sum %>% group_by(Newcustomer)
wm_N_E_sum <- summarize(wm_N_E, NumCustomers = n(), Sales = round(sum(Sales),2),
                        AvgTouch = round(mean(NumTouches),2),
                        AvgConvDays = round(mean(TotalConvDays),1),
                        DolPerCustomer = round(Sales/n(),2))
summary(wm_cust_sum)
```

```
##      Orderid      Newcustomer  NumTouches      Sales
## Min.   :11634052  N: 874      Min.    : 2.000  Min.    : 19.09
## 1st Qu.:11666522  Y:1296      1st Qu.: 3.000  1st Qu.: 162.78
## Median :11701822      Median : 4.000  Median : 254.25
## Mean   :11701648      Mean   : 4.663  Mean   : 243.05
## 3rd Qu.:11729662      3rd Qu.: 6.000  3rd Qu.: 330.00
## Max.   :11777540      Max.    :10.000  Max.    :1402.09
## TotalConvDays      DolPerTouch
## Min.    : 0.00  Min.    : 2.16
## 1st Qu.: 0.00  1st Qu.: 31.57
## Median : 1.00  Median : 54.17
## Mean   : 15.53  Mean   : 67.90
## 3rd Qu.: 3.00  3rd Qu.: 88.78
## Max.   :198.00  Max.    :341.50
```

```
N_E_reg <- lm(Sales ~ as.factor(Newcustomer), data = wm_cust_sum)
summary(N_E_reg)
```

```
##
## Call:
## lm(formula = Sales ~ as.factor(Newcustomer), data = wm_cust_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -249.52  -90.63   -4.61   70.22 1133.48
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      205.141      3.914   52.41  <2e-16 ***
## as.factor(Newcustomer)Y    63.474      5.065   12.53  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 115.7 on 2168 degrees of freedom
## Multiple R-squared:  0.06755,    Adjusted R-squared:  0.06712
## F-statistic: 157.1 on 1 and 2168 DF,  p-value: < 2.2e-16
```

```
Touches_anova <- aov(Sales ~ as.factor(NumTouches), data = wm_cust_sum)
summary(Touches_anova)
```

```
##              Df    Sum Sq Mean Sq F value Pr(>F)
## as.factor(NumTouches)    8   264475    33059    2.314  0.018 *
## Residuals              2161 30869865    14285
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Touches_reg <- lm(Sales ~ NumTouches + as.factor(Newcustomer), data = wm_cust_sum)
summary(Touches_reg)
```

```
##
## Call:
## lm(formula = Sales ~ NumTouches + as.factor(Newcustomer), data = wm_cust_sum)
```

```
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -247.83  -89.29   -1.94   68.73 1136.15
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      213.335      6.909  30.878  <2e-16 ***
## NumTouches        -1.574      1.094  -1.439    0.15
## as.factor(Newcustomer)Y    62.046      5.160  12.024  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 115.7 on 2167 degrees of freedom
## Multiple R-squared:  0.06844,    Adjusted R-squared:  0.06758
## F-statistic: 79.6 on 2 and 2167 DF,  p-value: < 2.2e-16
```

```
## run a reg to see if # of days is different for new or existing customer
rcust_reg1 <- lm(TotalConvDays ~ as.factor(Newcustomer), data = wm_cust_sum)
summary(rcust_reg1)
```

```
##
## Call:
## lm(formula = TotalConvDays ~ as.factor(Newcustomer), data = wm_cust_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -29.395 -16.395  -6.184  -5.184 190.816
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      29.395      1.240  23.70  <2e-16 ***
## as.factor(Newcustomer)Y -23.210      1.605 -14.46  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 36.66 on 2168 degrees of freedom
## Multiple R-squared:  0.08802,    Adjusted R-squared:  0.0876
## F-statistic: 209.2 on 1 and 2168 DF,  p-value: < 2.2e-16
```

```
## run a reg to see if # of days impacts total sales
cust_ref2 <- lm(Sales ~ TotalConvDays, data = wm_cust_sum)
summary(cust_ref2)
```

```
##
## Call:
## lm(formula = Sales ~ TotalConvDays, data = wm_cust_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -227.27  -81.36   11.27   83.64 1155.95
##
## Coefficients:
```

```
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   246.35674    2.76885  88.974 < 2e-16 ***
## TotalConvDays -0.21290    0.06689  -3.183  0.00148 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 119.6 on 2168 degrees of freedom
## Multiple R-squared:  0.004651,    Adjusted R-squared:  0.004192
## F-statistic: 10.13 on 1 and 2168 DF,  p-value: 0.001479
```

```
## run a reg to see if New or Existing customers affect total sales
cust_ref3 <- lm(Sales ~ as.factor(Newcustomer), data = wm_cust_sum)
summary(cust_ref3)
```

```
##
## Call:
## lm(formula = Sales ~ as.factor(Newcustomer), data = wm_cust_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -249.52  -90.63   -4.61   70.22 1133.48
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)      205.141      3.914   52.41 <2e-16 ***
## as.factor(Newcustomer)Y    63.474      5.065   12.53 <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 115.7 on 2168 degrees of freedom
## Multiple R-squared:  0.06755,    Adjusted R-squared:  0.06712
## F-statistic: 157.1 on 1 and 2168 DF,  p-value: < 2.2e-16
```

```
##Group by NumTouches
wm_touches <- wm_cust_sum %>% group_by(NumTouches, Newcustomer)
wm_touches_sum <- summarize(wm_touches, NumOrders = n(),
                           Sales = round(sum(Saleamount),2))
summary(wm_touches_sum)
```

```
##   NumTouches Newcustomer  NumOrders      Sales
##   Min.      : 2  N:9      Min.      : 33.00   Min.      :2411767
##   1st Qu.: 4  Y:9      1st Qu.: 59.75   1st Qu.:2411767
##   Median : 6                Median :102.50   Median :2411767
##   Mean    : 6                Mean    :120.56   Mean    :2411767
##   3rd Qu.: 8                3rd Qu.:138.00   3rd Qu.:2411767
##   Max.    :10                Max.    :329.00   Max.    :2411767
```

```
touches_reg <- lm(NumOrders ~ as.factor(Newcustomer), data = wm_touches_sum)
summary(touches_reg)
```

```
##
## Call:
```

```
## lm(formula = NumOrders ~ as.factor(Newcustomer), data = wm_touches_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -111.000  -45.611   -9.111   26.889  185.000
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)       97.11      26.22   3.704  0.00193 **
## as.factor(Newcustomer)Y    46.89      37.08   1.264  0.22418
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 78.66 on 16 degrees of freedom
## Multiple R-squared:  0.09085,    Adjusted R-squared:  0.03403
## F-statistic: 1.599 on 1 and 16 DF,  p-value: 0.2242
```

##Group by Business

```
wm_group <- wm_df %>% group_by(Groupname)
wm_group_sum <- summarize(wm_group, NumCustomers = n(),
                          TotalSales = sum(Saleamount),
                          AvgSales = round(mean(Saleamount),2),
                          AvgConvDays = round(mean(Time.to.Convert..Days.),1), MinConvDays = round(min(
                          MaxConvDays = round(max(Time.to.Convert..Days.),0))

summary(wm_group_sum)
```

```
##           Groupname  NumCustomers    TotalSales    AvgSales
## BUZZ AFFILIATE    :1    Min.   :    1.00    Min.   :    171    Min.   :171.0
## CJ                :1    1st Qu.:   15.75    1st Qu.:   4499    1st Qu.:227.7
## CPM               :1    Median :    78.50    Median :   18129    Median :249.1
## DIRECT MAIL       :1    Mean    :  722.79    Mean    :  172269    Mean    :248.2
## OTHER             :1    3rd Qu.:   590.50    3rd Qu.:  151405    3rd Qu.:261.2
## PRINT - MAGAZINES:1    Max.    :5903.00    Max.    :1343474    Max.    :326.3
## (Other)           :8
##   AvgConvDays    MinConvDays    MaxConvDays
##   Min.   :  0.300    Min.   :  0.00    Min.   :  1.0
##   1st Qu.:  8.475    1st Qu.:  0.00    1st Qu.:112.5
##   Median : 12.300    Median :  0.00    Median :154.5
##   Mean    : 26.229    Mean    : 11.71    Mean    :132.9
##   3rd Qu.: 24.850    3rd Qu.:  0.00    3rd Qu.:180.5
##   Max.    :137.000    Max.    :129.00    Max.    :198.0
##
```

run a reg to see if # of customers per group affects sales

```
group_reg1 <- lm(TotalSales ~ as.factor(NumCustomers), data = wm_group_sum)
summary(group_reg1)
```

```
##
## Call:
## lm(formula = TotalSales ~ as.factor(NumCustomers), data = wm_group_sum)
##
## Residuals:
```

```
##          1          2          3          4          5          6
## 1.066e-14 -1.196e-14 -3.320e-15 1.684e-14 -1.274e-15 -1.256e-15
##          7          8          9         10         11         12
## -2.477e-14 -1.407e-15 -9.249e-16 -8.202e-16 -1.017e+02 1.017e+02
##          13         14
## -9.309e-16 -1.062e-15
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)         171.0      143.8   1.189 0.445160
## as.factor(NumCustomers)3      706.2      176.1   4.010 0.155595
## as.factor(NumCustomers)15     4134.3      203.4  20.330 0.031289 *
## as.factor(NumCustomers)18     4910.0      203.4  24.145 0.026352 *
## as.factor(NumCustomers)46     9673.3      203.4  47.568 0.013382 *
## as.factor(NumCustomers)70    16961.4      203.4  83.406 0.007632 **
## as.factor(NumCustomers)87    18953.7      203.4  93.203 0.006830 **
## as.factor(NumCustomers)136   30830.2      203.4 151.604 0.004199 **
## as.factor(NumCustomers)238   60141.7      203.4 295.740 0.002153 **
## as.factor(NumCustomers)708  181598.2      203.4 892.989 0.000713 ***
## as.factor(NumCustomers)1082 263430.5      203.4 1295.390 0.000491 ***
## as.factor(NumCustomers)1809 474024.5      203.4 2330.962 0.000273 ***
## as.factor(NumCustomers)5903 1343302.7      203.4 6605.541 9.64e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 143.8 on 1 degrees of freedom
## Multiple R-squared:      1, Adjusted R-squared:      1
## F-statistic: 6.941e+06 on 12 and 1 DF, p-value: 0.0002966
```

```
## run a reg to see if # of days is different for groups
group_reg2 <- lm(AvgConvDays ~ as.factor(Groupname), data = wm_group_sum)
summary(group_reg2)
```

```
##
## Call:
## lm(formula = AvgConvDays ~ as.factor(Groupname), data = wm_group_sum)
##
## Residuals:
## ALL 14 residuals are 0: no residual degrees of freedom!
##
## Coefficients:
##              Estimate Std. Error t value
## (Intercept)          8.7         NA      NA
## as.factor(Groupname)CJ      -0.3         NA      NA
## as.factor(Groupname)CPM       1.4         NA      NA
## as.factor(Groupname)DIRECT MAIL 26.3         NA      NA
## as.factor(Groupname)OTHER     50.2         NA      NA
## as.factor(Groupname)PRINT - MAGAZINES -1.4         NA      NA
## as.factor(Groupname)SEARCH GOOGLE BRAND 15.1         NA      NA
## as.factor(Groupname)SEARCH GOOGLE NON-BRAND 5.8         NA      NA
## as.factor(Groupname)SEARCH MSN BRAND 16.5         NA      NA
## as.factor(Groupname)SEARCH MSN NON-BRAND 0.9         NA      NA
## as.factor(Groupname)SEARCH YAHOO BRAND 128.3         NA      NA
## as.factor(Groupname)Social    -8.4         NA      NA
```



```
## as.factor(Groupname)TV -0.5 NA NA
## as.factor(Groupname)Uncategorized 11.5 NA NA
## Pr(>|t|)
## (Intercept) NA
## as.factor(Groupname)CJ NA
## as.factor(Groupname)CPM NA
## as.factor(Groupname)DIRECT MAIL NA
## as.factor(Groupname)OTHER NA
## as.factor(Groupname)PRINT - MAGAZINES NA
## as.factor(Groupname)SEARCH GOOGLE BRAND NA
## as.factor(Groupname)SEARCH GOOGLE NON-BRAND NA
## as.factor(Groupname)SEARCH MSN BRAND NA
## as.factor(Groupname)SEARCH MSN NON-BRAND NA
## as.factor(Groupname)SEARCH YAHOO BRAND NA
## as.factor(Groupname)Social NA
## as.factor(Groupname)TV NA
## as.factor(Groupname)Uncategorized NA
##
## Residual standard error: NaN on 0 degrees of freedom
## Multiple R-squared: 1, Adjusted R-squared: NaN
## F-statistic: NaN on 13 and 0 DF, p-value: NA
```

```
## run a reg to see if # of days impacts total sales
group_ref3 <- lm(TotalSales ~ AvgConvDays, data = wm_group_sum)
summary(group_ref3)
```

```
##
## Call:
## lm(formula = TotalSales ~ AvgConvDays, data = wm_group_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -226796 -186892 -133740  42062 1136678
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   228417     125207   1.824  0.0931 .
## AvgConvDays    -2141       2920  -0.733  0.4775
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 370600 on 12 degrees of freedom
## Multiple R-squared:  0.04287, Adjusted R-squared: -0.03689
## F-statistic: 0.5375 on 1 and 12 DF, p-value: 0.4775
```

```
## run a reg to see if group has an impact on sales
group_ref4 <- lm(TotalSales ~ as.factor(Groupname), data = wm_group_sum)
summary(group_ref4)
```

```
##
## Call:
## lm(formula = TotalSales ~ as.factor(Groupname), data = wm_group_sum)
##
```

```
## Residuals:
## ALL 14 residuals are 0: no residual degrees of freedom!
##
## Coefficients:
##
##              Estimate Std. Error t value
## (Intercept)      474196         NA      NA
## as.factor(Groupname)CJ      -292426         NA      NA
## as.factor(Groupname)CPM       869278         NA      NA
## as.factor(Groupname)DIRECT MAIL    -474025         NA      NA
## as.factor(Groupname)OTHER      -464351         NA      NA
## as.factor(Groupname)PRINT - MAGAZINES -469890         NA      NA
## as.factor(Groupname)SEARCH GOOGLE BRAND -210594         NA      NA
## as.factor(Groupname)SEARCH GOOGLE NON-BRAND -443194         NA      NA
## as.factor(Groupname)SEARCH MSN BRAND -413883         NA      NA
## as.factor(Groupname)SEARCH MSN NON-BRAND -469114         NA      NA
## as.factor(Groupname)SEARCH YAHOO BRAND -473420         NA      NA
## as.factor(Groupname)Social      -473217         NA      NA
## as.factor(Groupname)TV          -457063         NA      NA
## as.factor(Groupname)Uncategorized -455071         NA      NA
##
##              Pr(>|t|)
## (Intercept)              NA
## as.factor(Groupname)CJ              NA
## as.factor(Groupname)CPM              NA
## as.factor(Groupname)DIRECT MAIL      NA
## as.factor(Groupname)OTHER            NA
## as.factor(Groupname)PRINT - MAGAZINES NA
## as.factor(Groupname)SEARCH GOOGLE BRAND NA
## as.factor(Groupname)SEARCH GOOGLE NON-BRAND NA
## as.factor(Groupname)SEARCH MSN BRAND NA
## as.factor(Groupname)SEARCH MSN NON-BRAND NA
## as.factor(Groupname)SEARCH YAHOO BRAND NA
## as.factor(Groupname)Social          NA
## as.factor(Groupname)TV              NA
## as.factor(Groupname)Uncategorized    NA
##
## Residual standard error: NaN on 0 degrees of freedom
## Multiple R-squared:      1, Adjusted R-squared:      NaN
## F-statistic:      NaN on 13 and 0 DF,  p-value: NA
```

```
## Look into Min and Max of days or something
group_ref5 <- lm(TotalSales ~ MaxConvDays, data = wm_group_sum)
summary(group_ref5)
```

```
##
## Call:
## lm(formula = TotalSales ~ MaxConvDays, data = wm_group_sum)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -259116 -191486  -84466   51562 1051607
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -133043     217963  -0.610   0.553
```

```
## MaxConvDays      2297      1485    1.547    0.148
##
## Residual standard error: 345900 on 12 degrees of freedom
## Multiple R-squared:  0.1662, Adjusted R-squared:  0.09676
## F-statistic: 2.393 on 1 and 12 DF,  p-value: 0.1479

##Group by Business by PositionName
wm_interaction <- wm_df %>% group_by(Groupname, Positionname)
wm_interaction_sum <- summarize(wm_interaction, NumCustomers = n(),
                               TotalSales = sum(Saleamount), AvgSales = round(mean(Saleamount),2),
                               AvgConvDays = round(mean(Time.to.Convert..Days.),1), MinConvDays = round(min(
                               MaxConvDays = round(max(Time.to.Convert..Days.),0))
```