

Assignment 2

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Click 'Save As', and rename the document with your blackboard username. Fill in your name above. To allow this file to be knit, you might need to save it in a new location, as you do not have write permissions in the dropbox folder, and R does not work well with Chinese characters. Do not comment out the lines that produce output. Check your html file before submission to ensure it has all relevant output.

Ensure all answers are your own words and your own work. Do not delete anything below these instructions.

Before you submit, zip both the rmd and results html files. Submit this on blackboard.

Question 1A:

```
Facebook_data <- read.csv("C:\\Users\\92998\\Downloads\\Facebook Data.csv")

Reg <- lm(clickPerDollar~factor(adType)+factor(category)+factor(placement)+
factor(keywords)+factor(body)+ageMean, data = Facebook_data)
summary(Reg)
```

```
##
## Call:
## lm(formula = clickPerDollar ~ factor(adType) + factor(category) +
##     factor(placement) + factor(keywords) + factor(body) + ageMean,
##     data = Facebook_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -49.308  -8.690   0.158   8.500  44.908
##
## Coefficients:
##                                     Estimate
## (Intercept)                        56.042064
## factor(adType)Photo Post           7.395170
## factor(category)Department        -32.538466
## factor(category)eCom              -42.643506
## factor(category)General           -45.741606
## factor(category)High End          -42.101003
## factor(category)Retailer          -28.402593
## factor(placement)mobile           33.650630
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics -1.319535
## factor(keywords)#Amazon.com, #EBay -0.421027
## factor(keywords)#American Eagle Outfitters -0.200383
## factor(keywords)#Ann Taylor (clothing retailer) -3.288650
## factor(keywords)#Anthropologie     -1.223708
## factor(keywords)#Banana Republic (clothing retailer) -0.028768
## factor(keywords)#Bebe stores        0.013857
## factor(keywords)#Burlington Coat Factory 1.041831
## factor(keywords)#Dillard's          -0.629959
## factor(keywords)#Fashion            2.188222
## factor(keywords)#Gap (clothing retailer) -0.741172
## factor(keywords)#Kate Spade         0.460312
## factor(keywords)#Kmart              -2.242984
## factor(keywords)#Kohl's             -1.650176
## factor(keywords)#Lucky Brand Jeans  -0.167120
## factor(keywords)#Lululemon Athletica -1.740610
## factor(keywords)#Macy's             -0.575275
## factor(keywords)#Nordstrom          1.028788
## factor(keywords)#Old Navy           -2.283174
```

## factor(keywords)#Sears	0.211964
## factor(keywords)#Shopping	-0.395439
## factor(keywords)#Talbots	0.009305
## factor(keywords)#Urban Outfitters	-1.888074
## factor(keywords)#Zappos.com	1.017146
## factor(body)Click ""Like"" to become a fan of Retail Store X!	12.739781
## factor(body)Click ""Like"" to see what's new in our stores for Spring!!	13.409695
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!	-0.032314
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now!	12.035943
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!	0.506791
## ageMean	2.598849
##	Std. Error
## (Intercept)	1.589464
## factor(adType)Photo Post	1.100509
## factor(category)Department	0.626356
## factor(category)eCom	0.752949
## factor(category)General	0.868652
## factor(category)High End	0.600480
## factor(category)Retailer	0.597182
## factor(placement)mobile	0.414527
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics	0.842001
## factor(keywords)#Amazon.com, #EBay	1.835736
## factor(keywords)#American Eagle Outfitters	0.840617
## factor(keywords)#Ann Taylor (clothing retailer)	1.818274
## factor(keywords)#Anthropologie	2.056039
## factor(keywords)#Banana Republic (clothing retailer)	1.835800
## factor(keywords)#Bebe stores	1.912313
## factor(keywords)#Burlington Coat Factory	1.910495
## factor(keywords)#Dillard's	1.941313
## factor(keywords)#Fashion	1.891896
## factor(keywords)#Gap (clothing retailer)	1.963544
## factor(keywords)#Kate Spade	1.872479
## factor(keywords)#Kmart	1.943273
## factor(keywords)#Kohl's	2.022310
## factor(keywords)#Lucky Brand Jeans	0.796188
## factor(keywords)#Lululemon Athletica	0.823481
## factor(keywords)#Macy's	1.966444
## factor(keywords)#Nordstrom	1.996351
## factor(keywords)#Old Navy	1.988265

## factor(keywords)#Sears	1.850238
## factor(keywords)#Shopping	0.796718
## factor(keywords)#Talbots	1.800614
## factor(keywords)#Urban Outfitters	1.848668
## factor(keywords)#Zappos.com	2.051032
## factor(body)Click ""Like"" to become a fan of Retail Store X!	0.719009
## factor(body)Click ""Like"" to see what's new in our stores for Spring!!	0.645679
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!	0.642458
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now!	0.639719
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!	0.639257
## ageMean	0.020139
##	t value
## (Intercept)	35.258
## factor(adType)Photo Post	6.720
## factor(category)Department	-51.949
## factor(category)eCom	-56.635
## factor(category)General	-52.658
## factor(category)High End	-70.112
## factor(category)Retailer	-47.561
## factor(placement)mobile	81.178
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics	-1.567
## factor(keywords)#Amazon.com, #EBay	-0.229
## factor(keywords)#American Eagle Outfitters	-0.238
## factor(keywords)#Ann Taylor (clothing retailer)	-1.809
## factor(keywords)#Anthropologie	-0.595
## factor(keywords)#Banana Republic (clothing retailer)	-0.016
## factor(keywords)#Bebe stores	0.007
## factor(keywords)#Burlington Coat Factory	0.545
## factor(keywords)#Dillard's	-0.325
## factor(keywords)#Fashion	1.157
## factor(keywords)#Gap (clothing retailer)	-0.377
## factor(keywords)#Kate Spade	0.246
## factor(keywords)#Kmart	-1.154
## factor(keywords)#Kohl's	-0.816
## factor(keywords)#Lucky Brand Jeans	-0.210
## factor(keywords)#Lululemon Athletica	-2.114
## factor(keywords)#Macy's	-0.293
## factor(keywords)#Nordstrom	0.515
## factor(keywords)#Old Navy	-1.148

```

## factor(keywords)#Sears 0.115
## factor(keywords)#Shopping -0.496
## factor(keywords)#Talbots 0.005
## factor(keywords)#Urban Outfitters -1.021
## factor(keywords)#Zappos.com 0.496
## factor(body)Click ""Like"" to become a fan of Retail Store X! 17.719
## factor(body)Click ""Like"" to see what's new in our stores for Spring!! 20.768
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more! -0.050
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now! 18.814
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share! 0.793
## ageMean 129.046
## Pr(>|t|)
## (Intercept) < 2e-16
## factor(adType)Photo Post 2.05e-11
## factor(category)Department < 2e-16
## factor(category)eCom < 2e-16
## factor(category)General < 2e-16
## factor(category)High End < 2e-16
## factor(category)Retailer < 2e-16
## factor(placement)mobile < 2e-16
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics 0.1172
## factor(keywords)#Amazon.com, #EBay 0.8186
## factor(keywords)#American Eagle Outfitters 0.8116
## factor(keywords)#Ann Taylor (clothing retailer) 0.0706
## factor(keywords)#Anthropologie 0.5518
## factor(keywords)#Banana Republic (clothing retailer) 0.9875
## factor(keywords)#Bebe stores 0.9942
## factor(keywords)#Burlington Coat Factory 0.5856
## factor(keywords)#Dillard's 0.7456
## factor(keywords)#Fashion 0.2475
## factor(keywords)#Gap (clothing retailer) 0.7058
## factor(keywords)#Kate Spade 0.8058
## factor(keywords)#Kmart 0.2485
## factor(keywords)#Kohl's 0.4146
## factor(keywords)#Lucky Brand Jeans 0.8338
## factor(keywords)#Lululemon Athletica 0.0346
## factor(keywords)#Macy's 0.7699
## factor(keywords)#Nordstrom 0.6063
## factor(keywords)#Old Navy 0.2509

```

```
## factor(keywords)#Sears 0.9088
## factor(keywords)#Shopping 0.6197
## factor(keywords)#Talbots 0.9959
## factor(keywords)#Urban Outfitters 0.3072
## factor(keywords)#Zappos.com 0.6200
## factor(body)Click ""Like"" to become a fan of Retail Store X! < 2e-16
## factor(body)Click ""Like"" to see what's new in our stores for Spring!! < 2e-16
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more! 0.9599
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now! < 2e-16
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share! 0.4279
## ageMean < 2e-16
##
## (Intercept) ***
## factor(adType)Photo Post ***
## factor(category)Department ***
## factor(category)eCom ***
## factor(category)General ***
## factor(category)High End ***
## factor(category)Retailer ***
## factor(placement)mobile ***
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics
## factor(keywords)#Amazon.com, #EBay
## factor(keywords)#American Eagle Outfitters
## factor(keywords)#Ann Taylor (clothing retailer) .
## factor(keywords)#Anthropologie
## factor(keywords)#Banana Republic (clothing retailer)
## factor(keywords)#Bebe stores
## factor(keywords)#Burlington Coat Factory
## factor(keywords)#Dillard's
## factor(keywords)#Fashion
## factor(keywords)#Gap (clothing retailer)
## factor(keywords)#Kate Spade
## factor(keywords)#Kmart
## factor(keywords)#Kohl's
## factor(keywords)#Lucky Brand Jeans
## factor(keywords)#Lululemon Athletica *
## factor(keywords)#Macy's
## factor(keywords)#Nordstrom
## factor(keywords)#Old Navy
```

```
## factor(keywords)#Sears
## factor(keywords)#Shopping
## factor(keywords)#Talbots
## factor(keywords)#Urban Outfitters
## factor(keywords)#Zappos.com
## factor(body)Click ""Like"" to become a fan of Retail Store X! ***
## factor(body)Click ""Like"" to see what's new in our stores for Spring!! ***
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now! ***
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!
## ageMean ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.66 on 4393 degrees of freedom
## Multiple R-squared:  0.8874, Adjusted R-squared:  0.8864
## F-statistic: 935.5 on 37 and 4393 DF,  p-value: < 2.2e-16
```

```
factor(unique(Facebook_data$category))
```

```
## [1] High End    General    Cosmetics  Retailer   Department eCom
## Levels: Cosmetics Department eCom General High End Retailer
```

Question 1B:

```
Check_Factor <- Facebook_data[Facebook_data$date != '3/26/2013' ]
Check_Factor
```

```
## data frame with 0 columns and 4431 rows
```

```
# Reg1 <- lm(clickPerDollar~factor(adType)+factor(category)+factor(placement)+
# factor(keywords)+factor(body)+ageMean+factor(date), data = Facebook_data)
# From the error we can see contracts can be applied only to factors with 2 or more levels, in this case,
# data only has one level.
#Comment out the line that gives you an error so that you can compile it
```

Question 1C:

```
Check_baseline <- factor(unique(Facebook_data$category)) # to check out the baseline for category
Check_baseline
```

```
## [1] High End    General    Cosmetics  Retailer   Department eCom
## Levels: Cosmetics Department eCom General High End Retailer
```

Interpretation : Compared to baseline of Cosmetics affecting clickPerDollar as default, general category decrease average 45.74 dollars to clickPerDollar.

Question 1D:

Interpretation : Coefficient for Agemean is 2.59. Increase Agemean by 2.59 increase average 2.59 dollars for clickPerDollar.

Question 2A:

```
Reg_interaction <- summary(lm(clickPerDollar~factor(adType)+factor(category)+factor(placement)+
factor(keywords)+factor(body)+ageMean + category*ageMean, data = Facebook_data))
Reg_interaction
```



```
##
## Call:
## lm(formula = clickPerDollar ~ factor(adType) + factor(category) +
##     factor(placement) + factor(keywords) + factor(body) + ageMean +
##     category * ageMean, data = Facebook_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -49.486  -8.448   0.115   8.315  40.463
##
## Coefficients: (5 not defined because of singularities)
##                                     Estimate
## (Intercept)                        63.40769
## factor(adType)Photo Post           6.90072
## factor(category)Department        -48.69836
## factor(category)eCom              -28.29490
## factor(category)General           -60.24087
## factor(category)High End          -48.37628
## factor(category)Retailer          -41.47216
## factor(placement)mobile           33.70072
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics -1.03603
## factor(keywords)#Amazon.com, #EBay -0.17489
## factor(keywords)#American Eagle Outfitters -0.53998
## factor(keywords)#Ann Taylor (clothing retailer) -2.61852
## factor(keywords)#Anthropologie      -0.97063
## factor(keywords)#Banana Republic (clothing retailer) 0.26258
## factor(keywords)#Bebe stores        -0.93493
## factor(keywords)#Burlington Coat Factory -0.05584
## factor(keywords)#Dillard's          -0.19698
## factor(keywords)#Fashion            1.16567
## factor(keywords)#Gap (clothing retailer) -1.09804
## factor(keywords)#Kate Spade         -0.56293
## factor(keywords)#Kmart              -1.89209
## factor(keywords)#Kohl's             -1.58733
## factor(keywords)#Lucky Brand Jeans  -0.33976
## factor(keywords)#Lululemon Athletica -1.58411
## factor(keywords)#Macy's             -1.52601
## factor(keywords)#Nordstrom          0.42475
## factor(keywords)#Old Navy           -2.11457
```

## factor(keywords)#Sears	-0.79619
## factor(keywords)#Shopping	-0.82844
## factor(keywords)#Talbots	-0.60640
## factor(keywords)#Urban Outfitters	-1.92284
## factor(keywords)#Zappos.com	0.63366
## factor(body)Click ""Like"" to become a fan of Retail Store X!	12.85738
## factor(body)Click ""Like"" to see what's new in our stores for Spring!!	13.57649
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!	0.04642
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now!	12.33622
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!	0.76565
## ageMean	2.41940
## categoryDepartment	NA
## categoryeCom	NA
## categoryGeneral	NA
## categoryHigh End	NA
## categoryRetailer	NA
## ageMean:categoryDepartment	0.41373
## ageMean:categoryeCom	-0.36125
## ageMean:categoryGeneral	0.36446
## ageMean:categoryHigh End	0.15944
## ageMean:categoryRetailer	0.33229
##	Std. Error
## (Intercept)	2.35279
## factor(adType)Photo Post	1.08904
## factor(category)Department	2.62516
## factor(category)eCom	3.16328
## factor(category)General	3.62007
## factor(category)High End	2.60135
## factor(category)Retailer	2.55089
## factor(placement)mobile	0.40874
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics	0.83067
## factor(keywords)#Amazon.com, #EBay	1.81236
## factor(keywords)#American Eagle Outfitters	0.83005
## factor(keywords)#Ann Taylor (clothing retailer)	1.79856
## factor(keywords)#Anthropologie	2.02792
## factor(keywords)#Banana Republic (clothing retailer)	1.81504
## factor(keywords)#Bebe stores	1.88802
## factor(keywords)#Burlington Coat Factory	1.88892
## factor(keywords)#Dillard's	1.91666

## factor(keywords)#Fashion	1.87234
## factor(keywords)#Gap (clothing retailer)	1.93727
## factor(keywords)#Kate Spade	1.85369
## factor(keywords)#Kmart	1.91758
## factor(keywords)#Kohl's	1.99651
## factor(keywords)#Lucky Brand Jeans	0.78491
## factor(keywords)#Lululemon Athletica	0.81202
## factor(keywords)#Macy's	1.94621
## factor(keywords)#Nordstrom	1.97275
## factor(keywords)#Old Navy	1.96599
## factor(keywords)#Sears	1.82637
## factor(keywords)#Shopping	0.78747
## factor(keywords)#Talbots	1.78597
## factor(keywords)#Urban Outfitters	1.82410
## factor(keywords)#Zappos.com	2.02548
## factor(body)Click ""Like"" to become a fan of Retail Store X!	0.70920
## factor(body)Click ""Like"" to see what's new in our stores for Spring!!	0.63666
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!	0.63366
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now!	0.63166
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!	0.63101
## ageMean	0.04655
## categoryDepartment	NA
## categoryeCom	NA
## categoryGeneral	NA
## categoryHigh End	NA
## categoryRetailer	NA
## ageMean:categoryDepartment	0.06502
## ageMean:categoryeCom	0.07777
## ageMean:categoryGeneral	0.08822
## ageMean:categoryHigh End	0.06367
## ageMean:categoryRetailer	0.06309
##	t value
## (Intercept)	26.950
## factor(adType)Photo Post	6.337
## factor(category)Department	-18.551
## factor(category)eCom	-8.945
## factor(category)General	-16.641
## factor(category)High End	-18.597
## factor(category)Retailer	-16.258

## factor(placement)mobile	82.451
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics	-1.247
## factor(keywords)#Amazon.com, #EBay	-0.096
## factor(keywords)#American Eagle Outfitters	-0.651
## factor(keywords)#Ann Taylor (clothing retailer)	-1.456
## factor(keywords)#Anthropologie	-0.479
## factor(keywords)#Banana Republic (clothing retailer)	0.145
## factor(keywords)#Bebe stores	-0.495
## factor(keywords)#Burlington Coat Factory	-0.030
## factor(keywords)#Dillard's	-0.103
## factor(keywords)#Fashion	0.623
## factor(keywords)#Gap (clothing retailer)	-0.567
## factor(keywords)#Kate Spade	-0.304
## factor(keywords)#Kmart	-0.987
## factor(keywords)#Kohl's	-0.795
## factor(keywords)#Lucky Brand Jeans	-0.433
## factor(keywords)#Lululemon Athletica	-1.951
## factor(keywords)#Macy's	-0.784
## factor(keywords)#Nordstrom	0.215
## factor(keywords)#Old Navy	-1.076
## factor(keywords)#Sears	-0.436
## factor(keywords)#Shopping	-1.052
## factor(keywords)#Talbots	-0.340
## factor(keywords)#Urban Outfitters	-1.054
## factor(keywords)#Zappos.com	0.313
## factor(body)Click ""Like"" to become a fan of Retail Store X!	18.129
## factor(body)Click ""Like"" to see what's new in our stores for Spring!!	21.324
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!	0.073
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now!	19.530
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!	1.213
## ageMean	51.974
## categoryDepartment	NA
## categoryeCom	NA
## categoryGeneral	NA
## categoryHigh End	NA
## categoryRetailer	NA
## ageMean:categoryDepartment	6.363
## ageMean:categoryeCom	-4.645
## ageMean:categoryGeneral	4.131

## ageMean:categoryHigh End	2.504
## ageMean:categoryRetailer	5.267
##	Pr(> t)
## (Intercept)	< 2e-16
## factor(adType)Photo Post	2.59e-10
## factor(category)Department	< 2e-16
## factor(category)eCom	< 2e-16
## factor(category)General	< 2e-16
## factor(category)High End	< 2e-16
## factor(category)Retailer	< 2e-16
## factor(placement)mobile	< 2e-16
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics	0.2124
## factor(keywords)#Amazon.com, #EBay	0.9231
## factor(keywords)#American Eagle Outfitters	0.5154
## factor(keywords)#Ann Taylor (clothing retailer)	0.1455
## factor(keywords)#Anthropologie	0.6322
## factor(keywords)#Banana Republic (clothing retailer)	0.8850
## factor(keywords)#Bebe stores	0.6205
## factor(keywords)#Burlington Coat Factory	0.9764
## factor(keywords)#Dillard's	0.9181
## factor(keywords)#Fashion	0.5336
## factor(keywords)#Gap (clothing retailer)	0.5709
## factor(keywords)#Kate Spade	0.7614
## factor(keywords)#Kmart	0.3238
## factor(keywords)#Kohl's	0.4266
## factor(keywords)#Lucky Brand Jeans	0.6651
## factor(keywords)#Lululemon Athletica	0.0511
## factor(keywords)#Macy's	0.4330
## factor(keywords)#Nordstrom	0.8295
## factor(keywords)#Old Navy	0.2822
## factor(keywords)#Sears	0.6629
## factor(keywords)#Shopping	0.2928
## factor(keywords)#Talbots	0.7342
## factor(keywords)#Urban Outfitters	0.2919
## factor(keywords)#Zappos.com	0.7544
## factor(body)Click ""Like"" to become a fan of Retail Store X!	< 2e-16
## factor(body)Click ""Like"" to see what's new in our stores for Spring!!	< 2e-16
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!	0.9416
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now!	< 2e-16

## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!	0.2251
## ageMean	< 2e-16
## categoryDepartment	NA
## categoryeCom	NA
## categoryGeneral	NA
## categoryHigh End	NA
## categoryRetailer	NA
## ageMean:categoryDepartment	2.18e-10
## ageMean:categoryeCom	3.50e-06
## ageMean:categoryGeneral	3.67e-05
## ageMean:categoryHigh End	0.0123
## ageMean:categoryRetailer	1.45e-07
##	
## (Intercept)	***
## factor(adType)Photo Post	***
## factor(category)Department	***
## factor(category)eCom	***
## factor(category)General	***
## factor(category)High End	***
## factor(category)Retailer	***
## factor(placement)mobile	***
## factor(keywords)#Almay, #Clinique, #CoverGirl, #Maybelline, #Sephora, mac cosmetics	
## factor(keywords)#Amazon.com, #EBay	
## factor(keywords)#American Eagle Outfitters	
## factor(keywords)#Ann Taylor (clothing retailer)	
## factor(keywords)#Anthropologie	
## factor(keywords)#Banana Republic (clothing retailer)	
## factor(keywords)#Bebe stores	
## factor(keywords)#Burlington Coat Factory	
## factor(keywords)#Dillard's	
## factor(keywords)#Fashion	
## factor(keywords)#Gap (clothing retailer)	
## factor(keywords)#Kate Spade	
## factor(keywords)#Kmart	
## factor(keywords)#Kohl's	
## factor(keywords)#Lucky Brand Jeans	
## factor(keywords)#Lululemon Athletica	.
## factor(keywords)#Macy's	
## factor(keywords)#Nordstrom	

```
## factor(keywords)#Old Navy
## factor(keywords)#Sears
## factor(keywords)#Shopping
## factor(keywords)#Talbots
## factor(keywords)#Urban Outfitters
## factor(keywords)#Zappos.com
## factor(body)Click ""Like"" to become a fan of Retail Store X! ***
## factor(body)Click ""Like"" to see what's new in our stores for Spring!! ***
## factor(body)Need inspiration for your spring wardrobe? ""Like"" us for more!
## factor(body)Share your favorite fresh Spring looks on our Facebook page. Click ""Like"" now! ***
## factor(body)What's your favorite Spring fashion trend? ""Like"" us and share!
## ageMean ***
## categoryDepartment
## categoryeCom
## categoryGeneral
## categoryHigh End
## categoryRetailer
## ageMean:categoryDepartment ***
## ageMean:categoryeCom ***
## ageMean:categoryGeneral ***
## ageMean:categoryHigh End *
## ageMean:categoryRetailer ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.48 on 4388 degrees of freedom
## Multiple R-squared:  0.8907, Adjusted R-squared:  0.8897
## F-statistic: 851.7 on 42 and 4388 DF,  p-value: < 2.2e-16
```

Interpretation: Compared to coefficient of AgeMean which is 2.41. In the interaction between ageMean and cateogoryecom, in crease marginal effect of ageMean increase ($2.41 - 0.36 = 2.05$) 2.05 clierPerDollar.

Question 2B:

Interpretation: The coefficient of eCom in 2a is -28.69 instead of -42.643506 in 1a. Beucase interaction captual ecom on c lickPerdollar change when the ageMean equal to 0.