analysis-links-total

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```
##
##                            0                 Female               Male
##                           73                  11315              14836
## Non binary/third gender
##                          114

##
## Female    Male
##  11315   14836

##
##                                          0
##                                         76
##                        Associate's degree
##                                       2826
##                        Bachelor's degree
##                                      10815
##                        Doctoral's degree
##                                        228
##     High school or equivalent (e.g., GED)
##                                       3270
##                       Less than high school
##                                         76
##                          Master's degree
##                                       2595
##        Professional degree (JD, MD etc.)
##                                        336
##              Some college but no degree
##                                       5517
## Trade, technical, or vocational training
##                                        599

##
## No Bachelor's degree    Bachelor's degree      Graduate degree
##                 8787                14240                 3159
```
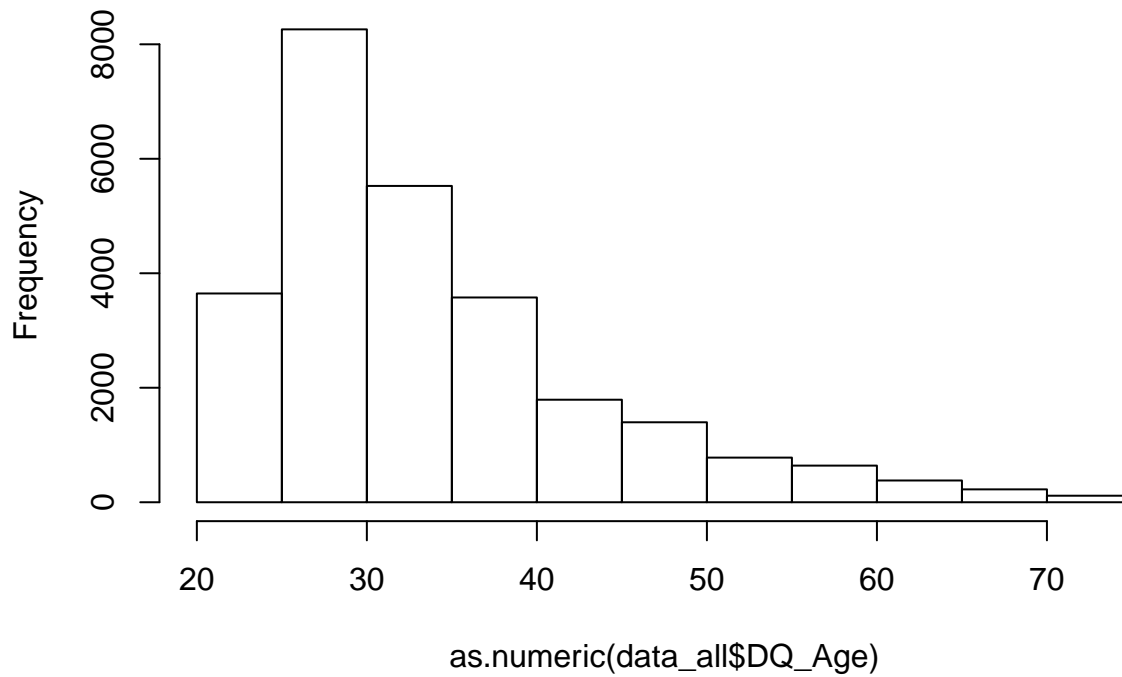
Histogram of as.numeric(data_all$DQ_Age)


```
##
##
##                                                3799
##                                          Accounting
##                                                 450
##                                         Advertising
##                                                 336
##               Aerospace / Aviation / Automotive
##                                                  70
##               Agriculture / Forestry / Fishing
##                                                 190
##                                       Biotechnology
##                                                 114
##               Business / Professional Services
##                                                1280
##      Business Sevices (Hotels, Lodging Places)
##                                                 190
##                                      Communications
##                                                 339
##          Computers (Hardware, Desktop Software)
##                                                2627
##               Construction / Home Improvement
##                                                 637
##                                          Consulting
##                                                 301
##                                           Education
```

```
##                                              1984
##                    Engineering / Architecture
##                                               634
##                    Entertainment / Recreation
##                                               608
##                  Finance / Banking / Insurance
##                                              1277
##                                  Food Service
##                                               906
##                         Government / Military
##                                               304
##                          Healthcare / Medical
##                                              1762
##                                      Internet
##                                               906
##                                         Legal
##                                               304
##                                 Manufacturing
##                                              1119
## Marketing / Market Research / Public Relations
##                                               564
##                   Media / Printing / Publishing
##                                               526
##                                    Non-Profit
##                                               339
##                       Pharmaceutical / Chemical
##                                                76
##                                   Real Estate
##                                               412
##                             Research / Science
##                                               114
##                                        Retail
##                                              2259
##                                       Student
##                                               602
##                            Telecommunications
##                                               602
##                    Transportation / Distribution
##                                               409
##                                     Wholesale
##                                               298

##
##      Technical occupations Non-technical occupations
##                       4167                     22171

##
## False  True
## 19628  6710

##
## False  True
## 22432  3906

##
##      inmail     banner    browser no warning
```

```
##      15276       3800       3762       3500

##
##    on load   on click no warning
##      11438      11400       3500

##
##        no        yes no warning
##      15314       7524       3500

##
##          no warning  on-load, no forced     on-load, forced
##                3500                 3914                3724
## on-click, no forced    on-click, forced               banner
##                3838                 3800                3800
##             browser
##                3762

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
#ANOVA on benign links click-through rates
library(dplyr)
data_benign_ctr <- data_benign_only %>%
  select(username, non_phish_ctr, condition_group.f) %>%
  distinct(username, non_phish_ctr, condition_group.f)

library(pastecs)
```

```
##
## Attaching package: 'pastecs'

## The following objects are masked from 'package:dplyr':
##
##     first, last
```

```r
stat.desc(data_benign_ctr$non_phish_ctr, norm = TRUE)
```

```
##                           nbr.val                           nbr.null
## 701.000000000000000000000000000  153.000000000000000000000000000
##                            nbr.na                                min
##   0.000000000000000000000000000    0.000000000000000000000000000
##                               max                              range
##   1.000000000000000000000000000    1.000000000000000000000000000
##                               sum                             median
## 352.464285714285722406202694401    0.571428571428571396850770725 0
##                              mean                            SE.mean
##   0.502802119421234983143165209 2    0.014645520976415166147788227 1
##                      CI.mean.0.95                                var
##   0.028754411187639831309903470 9    0.150358390554102244740519722 7
##                           std.dev                           coef.var
```

4
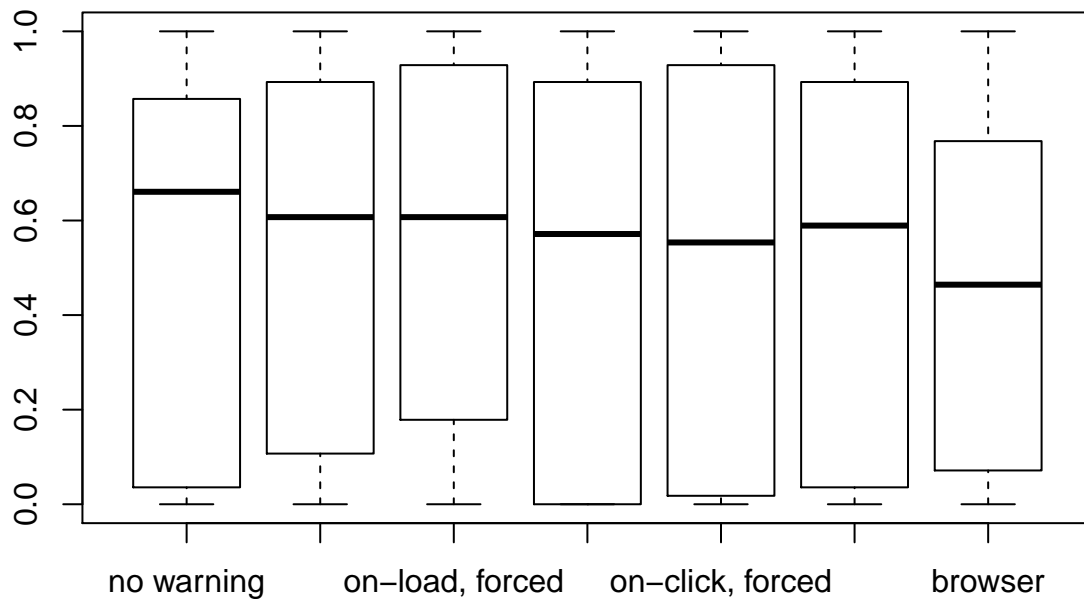
```
##    0.3877607387992010878896564918    0.7711994914531076217301119868
##                        skewness                          skew.2SE
##   -0.139054365311543376255099247    -0.753120467954046746150709168
##                        kurtosis                          kurt.2SE
##   -1.645189194219279782416265334    -4.461471901376322435339716321
##                      normtest.W                        normtest.p
##    0.846470755461132817742964107    0.00000000000000000000000001712
```

```r
by(data_benign_ctr$non_phish_ctr, data_benign_ctr$condition_group.f, stat.desc, norm = TRUE)
```

```
## data_benign_ctr$condition_group.f: no warning
##          nbr.val          nbr.null           nbr.na              min
## 100.000000000000  23.000000000000    0.000000000000    0.000000000000
##              max             range              sum           median
##   1.000000000000    1.000000000000   50.571428571429    0.660714285714
##             mean           SE.mean      CI.mean.0.95              var
##   0.505714285714    0.038758165896    0.076904609783    0.150219542362
##          std.dev          coef.var         skewness          skew.2SE
##   0.387581658960    0.766404410373   -0.241538363236   -0.500328495197
##         kurtosis          kurt.2SE       normtest.W        normtest.p
##  -1.655109016848   -1.730087070107    0.832416412524    0.000000002799
## -----------------------------------------------------------
## data_benign_ctr$condition_group.f: on-load, no forced
##         nbr.val          nbr.null           nbr.na              min
## 103.00000000000   21.00000000000    0.00000000000    0.00000000000
##             max             range              sum           median
##   1.00000000000    1.00000000000   55.39285714286    0.60714285714
##            mean           SE.mean      CI.mean.0.95              var
##   0.53779472954    0.03732278805    0.07402957313    0.14347802228
##         std.dev          coef.var         skewness          skew.2SE
##   0.37878492879    0.70432993851   -0.29936873959   -0.62908947454
##        kurtosis          kurt.2SE       normtest.W        normtest.p
##  -1.52927871572   -1.62127893773    0.85506364074    0.00000001273
## -----------------------------------------------------------
## data_benign_ctr$condition_group.f: on-load, forced
##       nbr.val        nbr.null          nbr.na             min            max
## 98.0000000000  13.0000000000   0.0000000000    0.0000000000   1.0000000000
##         range             sum          median            mean        SE.mean
##  1.0000000000  52.5357142857    0.6071428571    0.5360787172   0.0381748876
##  CI.mean.0.95             var         std.dev        coef.var       skewness
##  0.0757665845   0.1428175599    0.3779121061    0.7049563692  -0.1831481746
##      skew.2SE        kurtosis        kurt.2SE      normtest.W     normtest.p
## -0.3756747183  -1.6366497443   -1.6943849168    0.8549486419   0.0000000232
## -----------------------------------------------------------
## data_benign_ctr$condition_group.f: on-click, no forced
##        nbr.val         nbr.null          nbr.na             min            max
## 101.0000000000   27.0000000000    0.0000000000    0.0000000000   1.0000000000
##          range             sum          median            mean        SE.mean
##   1.0000000000  49.7142857143    0.5714285714    0.4922206506   0.0394368443
##   CI.mean.0.95             var         std.dev        coef.var       skewness
##   0.0782415759   0.1570817337    0.3963353803    0.8051986031  -0.1102878085
##       skew.2SE        kurtosis        kurt.2SE      normtest.W     normtest.p
##  -0.2295596492   -1.6861960079   -1.7709732068    0.8371629626   0.0000000036
## -----------------------------------------------------------
## data_benign_ctr$condition_group.f: on-click, forced
```

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```
##           nbr.val           nbr.null            nbr.na                min
## 100.0000000000000  25.0000000000000   0.0000000000000    0.0000000000000
##               max             range               sum             median
##   1.0000000000000   1.0000000000000  48.8571428571429    0.5535714285714
##              mean           SE.mean       CI.mean.0.95                var
##   0.4885714285714   0.0415284659211   0.0824014860539    0.1724613481756
##           std.dev          coef.var          skewness           skew.2SE
##   0.4152846592106   0.8499978404895  -0.0312577834094   -0.0647481399098
##          kurtosis          kurt.2SE         normtest.W         normtest.p
##  -1.8020868681700  -1.8837231614919   0.8047705618197    0.0000000003478
## ----------------------------------------------------------
## data_benign_ctr$condition_group.f: banner
##           nbr.val           nbr.null            nbr.na                min
## 100.000000000000   24.000000000000    0.000000000000     0.000000000000
##               max             range               sum             median
##   1.000000000000    1.000000000000   50.750000000000     0.589285714286
##              mean           SE.mean       CI.mean.0.95                var
##   0.507500000000    0.039618149419    0.078611003667     0.156959776335
##           std.dev          coef.var          skewness           skew.2SE
##   0.396181494185    0.780653190513   -0.174532170351    -0.361530222302
##          kurtosis          kurt.2SE         normtest.W         normtest.p
##  -1.687450150857   -1.763893289041    0.831937022794     0.000000002695
## ----------------------------------------------------------
## data_benign_ctr$condition_group.f: browser
##       nbr.val        nbr.null          nbr.na              min             max
## 99.0000000000  20.0000000000   0.0000000000     0.0000000000    1.0000000000
##         range             sum          median             mean         SE.mean
##   1.0000000000  44.6428571429   0.4642857143     0.4509379509    0.0366538149
##  CI.mean.0.95             var         std.dev         coef.var        skewness
##   0.0727383027   0.1330067123   0.3647008531     0.8087606119    0.0757739482
##       skew.2SE        kurtosis        kurt.2SE       normtest.W      normtest.p
##   0.1561958941  -1.5666559456  -1.6297934981     0.8777874779    0.0000001641
```

```r
boxplot(data_benign_ctr$non_phish_ctr~data_benign_ctr$condition_group.f)
```

```r
#one way anova
benign_ctr_model <- lm(non_phish_ctr~condition_group.f, data=data_benign_ctr)
summary(benign_ctr_model)
```

```
##
## Call:
## lm(formula = non_phish_ctr ~ condition_group.f, data = data_benign_ctr)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -0.5378 -0.4509  0.0693  0.3854  0.5491
##
## Coefficients:
##                                    Estimate Std. Error t value
## (Intercept)                         0.50571    0.03884   13.02
## condition_group.fon-load, no forced  0.03208    0.05453    0.59
## condition_group.fon-load, forced     0.03036    0.05521    0.55
## condition_group.fon-click, no forced -0.01349    0.05480   -0.25
## condition_group.fon-click, forced    -0.01714    0.05493   -0.31
## condition_group.fbanner              0.00179    0.05493    0.03
## condition_group.fbrowser            -0.05478    0.05507   -0.99
##                                                   Pr(>|t|)
## (Intercept)                        <0.0000000000000002 ***
## condition_group.fon-load, no forced                0.56
## condition_group.fon-load, forced                   0.58
## condition_group.fon-click, no forced               0.81
```

```
## condition_group.fon-click, forced                      0.76
## condition_group.fbanner                                0.97
## condition_group.fbrowser                               0.32
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.388 on 694 degrees of freedom
## Multiple R-squared:  0.00509,    Adjusted R-squared:  -0.00351
## F-statistic: 0.592 on 6 and 694 DF,  p-value: 0.737
```

```r
anova(benign_ctr_model)
```

```
## Analysis of Variance Table
##
## Response: non_phish_ctr
##                    Df Sum Sq Mean Sq F value Pr(>F)
## condition_group.f   6    0.5  0.0893    0.59   0.74
## Residuals         694  104.7  0.1509
```

```r
#calculate the effect size
library(heplots)
```

```
## Loading required package: car
```

```
## Loading required package: carData
```

```
##
## Attaching package: 'car'
```

```
## The following object is masked from 'package:dplyr':
##
##     recode
```

```r
etasq(benign_ctr_model, anova = TRUE)
```

```
## Anova Table (Type II tests)
##
## Response: non_phish_ctr
##                  Partial eta^2 Sum Sq  Df F value Pr(>F)
## condition_group.f      0.00509    0.5   6    0.59   0.74
## Residuals                       104.7 694
```

```r
lsr::etaSquared(benign_ctr_model)
```

```
##                      eta.sq eta.sq.part
## condition_group.f 0.005088    0.005088
```

```
## Loading required package: Matrix
```

```
## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients
```

```
## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control
## $checkConv, : Model failed to converge with max|grad| = 0.0023394 (tol =
## 0.001, component 1)
```

```
## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, : Model is nearly uniden
##  - Rescale variables?
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
```

```
## Formula:
## click_action.f ~ (placement.f + activation.f + forced_attention.f)^2 +
##     warnings_seen + cyber_quiz_score + PE_score + brand_usage +
##     gender.f + education.f + age + occupation.f + (1 | ref_id.f) +
##     (1 | adj_link_id.f)
##    Data: data_benign_only
##
##     AIC      BIC   logLik deviance df.resid
##   28931    29075   -14447    28895    22158
##
## Scaled residuals:
##    Min     1Q Median     3Q    Max
## -2.106 -0.914 -0.436  0.914  3.437
##
## Random effects:
##  Groups        Name       Variance     Std.Dev.
##  adj_link_id.f (Intercept) 0.1925954420 0.438857
##  ref_id.f      (Intercept) 0.0000000205 0.000143
## Number of obs: 22176, groups:  adj_link_id.f, 32; ref_id.f, 10
##
## Fixed effects:
##                                          Estimate Std. Error z value
## (Intercept)                             -1.134303   0.118487   -9.57
## placement.fbanner                        0.017429   0.052265    0.33
## placement.fbrowser                      -0.028780   0.053195   -0.54
## placement.fno warning                    0.146564   0.056484    2.59
## activation.fon click                    -0.096570   0.052592   -1.84
## forced_attention.fyes                   -0.071832   0.052277   -1.37
## warnings_seen                            0.024515   0.013972    1.75
## cyber_quiz_score                         0.111799   0.005504   20.31
## PE_score                                -0.043493   0.008638   -5.03
## brand_usage                              0.030681   0.029597    1.04
## gender.fMale                            -0.487255   0.029080  -16.76
## education.fBachelor's degree             0.000888   0.031199    0.03
## education.fGraduate degree              -0.408485   0.049108   -8.32
## age                                      0.005495   0.001448    3.80
## occupation.fNon-technical occupations    0.411991   0.040047   10.29
## activation.fon click:forced_attention.fyes 0.120190 0.074337   1.62
##                                                        Pr(>|z|)
## (Intercept)                             < 0.0000000000000002 ***
## placement.fbanner                                       0.73878
## placement.fbrowser                                      0.58850
## placement.fno warning                                   0.00947 **
## activation.fon click                                    0.06633 .
## forced_attention.fyes                                   0.16942
## warnings_seen                                           0.07933 .
## cyber_quiz_score                        < 0.0000000000000002 ***
## PE_score                                        0.00000048 ***
## brand_usage                                             0.29991
## gender.fMale                            < 0.0000000000000002 ***
## education.fBachelor's degree                            0.97729
## education.fGraduate degree              < 0.0000000000000002 ***
## age                                                     0.00015 ***
## occupation.fNon-technical occupations   < 0.0000000000000002 ***
```

```
## activation.fon click:forced_attention.fyes            0.10592
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

##
## Correlation matrix not shown by default, as p = 16 > 12.
## Use print(x, correlation=TRUE)  or
##   vcov(x)      if you need it

## fit warnings:
## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients
## convergence code: 0
## Model failed to converge with max|grad| = 0.0023394 (tol = 0.001, component 1)
## Model is nearly unidentifiable: very large eigenvalue
##  - Rescale variables?

## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula:
## click_action.f ~ (placement.f + activation.f + forced_attention.f)^2 +
##     warnings_seen + cyber_quiz_score + PE_score + brand_usage +
##     gender.f + education.f + age + occupation.f + (1 | ref_id.f) +
##     (1 | adj_link_id.f)
##    Data: data_benign_only
##      AIC      BIC   logLik deviance df.resid
##    28931    29075   -14447    28895    22158
## Random effects:
##  Groups        Name        Std.Dev.
##  adj_link_id.f (Intercept) 0.438857
##  ref_id.f      (Intercept) 0.000143
## Number of obs: 22176, groups:  adj_link_id.f, 32; ref_id.f, 10
## Fixed Effects:
##                             (Intercept)
##                               -1.134303
##                       placement.fbanner
##                                0.017429
##                      placement.fbrowser
##                               -0.028780
##                    placement.fno warning
##                                0.146564
##                      activation.fon click
##                               -0.096570
##                    forced_attention.fyes
##                               -0.071832
##                          warnings_seen
##                                0.024515
##                       cyber_quiz_score
##                                0.111799
##                               PE_score
##                               -0.043493
##                             brand_usage
##                                0.030681
##                           gender.fMale
##                               -0.487255
```

```
##               education.fBachelor's degree
##                                   0.000888
##                   education.fGraduate degree
##                                  -0.408485
##                                        age
##                                   0.005495
##      occupation.fNon-technical occupations
##                                   0.411991
## activation.fon click:forced_attention.fyes
##                                   0.120190
## fit warnings:
## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients
## convergence code 0; 2 optimizer warnings; 0 lme4 warnings

##                                                Est        LL        UL
## (Intercept)                              -1.1343032 -1.366538 -0.902068
## placement.fbanner                         0.0174292 -0.085011  0.119869
## placement.fbrowser                       -0.0287796 -0.133043  0.075483
## placement.fno warning                     0.1465640  0.035855  0.257273
## activation.fon click                     -0.0965703 -0.199651  0.006510
## forced_attention.fyes                    -0.0718317 -0.174294  0.030631
## warnings_seen                             0.0245154 -0.002870  0.051900
## cyber_quiz_score                          0.1117991  0.101012  0.122586
## PE_score                                 -0.0434931 -0.060424 -0.026562
## brand_usage                               0.0306811 -0.027329  0.088691
## gender.fMale                             -0.4872547 -0.544252 -0.430257
## education.fBachelor's degree              0.0008882 -0.060262  0.062038
## education.fGraduate degree               -0.4084854 -0.504736 -0.312234
## age                                       0.0054954  0.002658  0.008333
## occupation.fNon-technical occupations     0.4119914  0.333499  0.490483
## activation.fon click:forced_attention.fyes  0.1201903 -0.025511  0.265892

##                                             Est     LL     UL
## (Intercept)                              0.3216 0.2550 0.4057
## placement.fbanner                        1.0176 0.9185 1.1273
## placement.fbrowser                       0.9716 0.8754 1.0784
## placement.fno warning                    1.1578 1.0365 1.2934
## activation.fon click                     0.9079 0.8190 1.0065
## forced_attention.fyes                    0.9307 0.8400 1.0311
## warnings_seen                            1.0248 0.9971 1.0533
## cyber_quiz_score                         1.1183 1.1063 1.1304
## PE_score                                 0.9574 0.9414 0.9738
## brand_usage                              1.0312 0.9730 1.0927
## gender.fMale                             0.6143 0.5803 0.6503
## education.fBachelor's degree             1.0009 0.9415 1.0640
## education.fGraduate degree               0.6647 0.6037 0.7318
## age                                      1.0055 1.0027 1.0084
## occupation.fNon-technical occupations    1.5098 1.3958 1.6331
## activation.fon click:forced_attention.fyes 1.1277 0.9748 1.3046

## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients

## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula:
```

```
## hover_action.f ~ (placement.f + activation.f + forced_attention.f)^2 +
##     warnings_seen + cyber_quiz_score + PE_score + brand_usage +
##     gender.f + education.f + age + occupation.f + (1 | ref_id.f) +
##     (1 | adj_link_id.f)
##   Data: data_benign_only
##
##      AIC      BIC   logLik deviance df.resid
##    17361    17506    -8663    17325    22158
##
## Scaled residuals:
##     Min     1Q  Median     3Q     Max
## -11.453  0.163   0.285  0.461   3.539
##
## Random effects:
##  Groups        Name        Variance     Std.Dev.
##  adj_link_id.f (Intercept) 0.8839118565 0.940166
##  ref_id.f      (Intercept) 0.0000000112 0.000106
## Number of obs: 22176, groups:  adj_link_id.f, 32; ref_id.f, 10
##
## Fixed effects:
##                                           Estimate Std. Error z value
## (Intercept)                               -0.30102    0.20319   -1.48
## placement.fbanner                          0.56686    0.07371    7.69
## placement.fbrowser                        -0.14119    0.07523   -1.88
## placement.fno warning                      0.41725    0.07528    5.54
## activation.fon click                       0.40149    0.07316    5.49
## forced_attention.fyes                     -0.14241    0.06823   -2.09
## warnings_seen                              0.13290    0.01943    6.84
## cyber_quiz_score                           0.24952    0.00734   34.00
## PE_score                                  -0.08187    0.01073   -7.63
## brand_usage                               -0.00219    0.03101   -0.07
## gender.fMale                              -0.00803    0.03971   -0.20
## education.fBachelor's degree              -0.06905    0.04435   -1.56
## education.fGraduate degree                -0.12138    0.06489   -1.87
## age                                       -0.00744    0.00197   -3.77
## occupation.fNon-technical occupations      0.24515    0.05465    4.49
## activation.fon click:forced_attention.fyes -0.09231   0.10153   -0.91
##                                                         Pr(>|z|)
## (Intercept)                                              0.13849
## placement.fbanner                        0.000000000000015 ***
## placement.fbrowser                                       0.06054 .
## placement.fno warning                    0.000000029792848 ***
## activation.fon click                     0.000000040673425 ***
## forced_attention.fyes                                    0.03686 *
## warnings_seen                            0.000000000007892 ***
## cyber_quiz_score                      < 0.0000000000000002 ***
## PE_score                                 0.000000000000024 ***
## brand_usage                                              0.94377
## gender.fMale                                             0.83975
## education.fBachelor's degree                             0.11947
## education.fGraduate degree                               0.06140 .
## age                                                      0.00016 ***
## occupation.fNon-technical occupations    0.000007249790876 ***
## activation.fon click:forced_attention.fyes              0.36322
```

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

##
## Correlation matrix not shown by default, as p = 16 > 12.
## Use print(x, correlation=TRUE)  or
##   vcov(x)       if you need it

## fit warnings:
## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients

## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula:
## hover_action.f ~ (placement.f + activation.f + forced_attention.f)^2 +
##     warnings_seen + cyber_quiz_score + PE_score + brand_usage +
##     gender.f + education.f + age + occupation.f + (1 | ref_id.f) +
##     (1 | adj_link_id.f)
##    Data: data_benign_only
##      AIC      BIC   logLik deviance df.resid
##    17361    17506    -8663    17325    22158
## Random effects:
##  Groups         Name        Std.Dev.
##  adj_link_id.f (Intercept) 0.940166
##  ref_id.f      (Intercept) 0.000106
## Number of obs: 22176, groups:  adj_link_id.f, 32; ref_id.f, 10
## Fixed Effects:
##                               (Intercept)
##                                  -0.30102
##                         placement.fbanner
##                                   0.56686
##                        placement.fbrowser
##                                  -0.14119
##                       placement.fno warning
##                                   0.41725
##                         activation.fon click
##                                   0.40149
##                      forced_attention.fyes
##                                  -0.14241
##                             warnings_seen
##                                   0.13290
##                          cyber_quiz_score
##                                   0.24952
##                                  PE_score
##                                  -0.08187
##                               brand_usage
##                                  -0.00219
##                               gender.fMale
##                                  -0.00803
##               education.fBachelor's degree
##                                  -0.06905
##                education.fGraduate degree
##                                  -0.12138
##                                       age
```

```
##                                     -0.00744
##      occupation.fNon-technical occupations
##                                      0.24515
## activation.fon click:forced_attention.fyes
##                                     -0.09231
## fit warnings:
## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients

##                                                    Est       LL        UL
## (Intercept)                               -0.301016 -0.69927  0.097237
## placement.fbanner                          0.566864  0.42240  0.711331
## placement.fbrowser                        -0.141186 -0.28863  0.006257
## placement.fno warning                      0.417246  0.26970  0.564793
## activation.fon click                       0.401487  0.25810  0.544877
## forced_attention.fyes                     -0.142412 -0.27614 -0.008687
## warnings_seen                              0.132904  0.09482  0.170985
## cyber_quiz_score                           0.249522  0.23514  0.263905
## PE_score                                  -0.081870 -0.10291 -0.060831
## brand_usage                               -0.002187 -0.06296  0.058586
## gender.fMale                              -0.008029 -0.08586  0.069798
## education.fBachelor's degree              -0.069047 -0.15597  0.017872
## education.fGraduate degree                -0.121385 -0.24857  0.005800
## age                                       -0.007443 -0.01131 -0.003578
## occupation.fNon-technical occupations      0.245152  0.13805  0.352258
## activation.fon click:forced_attention.fyes -0.092312 -0.29130  0.106680

##                                                    Est    LL     UL
## (Intercept)                               0.7401 0.4969 1.1021
## placement.fbanner                         1.7627 1.5256 2.0367
## placement.fbrowser                        0.8683 0.7493 1.0063
## placement.fno warning                     1.5178 1.3096 1.7591
## activation.fon click                      1.4940 1.2945 1.7244
## forced_attention.fyes                     0.8673 0.7587 0.9914
## warnings_seen                             1.1421 1.0995 1.1865
## cyber_quiz_score                          1.2834 1.2651 1.3020
## PE_score                                  0.9214 0.9022 0.9410
## brand_usage                               0.9978 0.9390 1.0603
## gender.fMale                              0.9920 0.9177 1.0723
## education.fBachelor's degree              0.9333 0.8556 1.0180
## education.fGraduate degree                0.8857 0.7799 1.0058
## age                                       0.9926 0.9888 0.9964
## occupation.fNon-technical occupations     1.2778 1.1480 1.4223
## activation.fon click:forced_attention.fyes 0.9118 0.7473 1.1126

##
## Attaching package: 'lmerTest'

## The following object is masked from 'package:lme4':
##
##      lmer

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

## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## hover_time ~ (placement.f + activation.f + forced_attention.f)^2 +
##     warnings_seen + cyber_quiz_score + PE_score + brand_usage +
##     gender.f + education.f + age + occupation.f + (1 | ref_id.f) +
##     (1 | adj_link_id.f)
##   Data: data_benign_only
##
## REML criterion at convergence: 435219
##
## Scaled residuals:
##    Min     1Q Median     3Q    Max
## -1.01  -0.32  -0.16   0.09  74.92
##
## Random effects:
##  Groups        Name        Variance Std.Dev.
##  adj_link_id.f (Intercept)   221442  471
##  ref_id.f      (Intercept)    62776  251
##  Residual                  19621997 4430
## Number of obs: 22176, groups:  adj_link_id.f, 32; ref_id.f, 10
##
## Fixed effects:
##                                          Estimate Std. Error       df
## (Intercept)                               241.108    222.731   88.979
## placement.fbanner                         280.778    110.975 22129.083
## placement.fbrowser                       -433.510    112.645 22129.186
## placement.fno warning                     -68.441    119.610 22134.805
## activation.fon click                      504.522    111.684 22129.001
## forced_attention.fyes                      76.626    111.221 22129.001
## warnings_seen                            -210.463     29.622 22145.390
## cyber_quiz_score                          119.070     11.375 22129.127
## PE_score                                    0.648     17.877 22129.002
## brand_usage                               -46.631     60.471 22129.033
## gender.fMale                             -105.732     61.550 22129.001
## education.fBachelor's degree              -69.736     66.461 22129.001
## education.fGraduate degree               -327.122    102.663 22129.007
## age                                        25.686      3.083 22129.041
## occupation.fNon-technical occupations     359.003     83.942 22129.002
## activation.fon click:forced_attention.fyes -504.403   157.849 22129.006
##                                          t value       Pr(>|t|)
## (Intercept)                                 1.08        0.28195
## placement.fbanner                           2.53        0.01141
## placement.fbrowser                         -3.85        0.00012
## placement.fno warning                      -0.57        0.56719
## activation.fon click                        4.52  0.0000062929776
## forced_attention.fyes                       0.69        0.49086
## warnings_seen                              -7.10  0.0000000000012
## cyber_quiz_score                           10.47 < 0.0000000000000002
## PE_score                                    0.04        0.97106
## brand_usage                                -0.77        0.44064
## gender.fMale                               -1.72        0.08585
## education.fBachelor's degree               -1.05        0.29406
## education.fGraduate degree                 -3.19        0.00144
```

```
## age                                   8.33 < 0.0000000000000002
## occupation.fNon-technical occupations      4.28      0.0000190398246
## activation.fon click:forced_attention.fyes   -3.20              0.00140
##
## (Intercept)
## placement.fbanner                           *
## placement.fbrowser                         ***
## placement.fno warning
## activation.fon click                       ***
## forced_attention.fyes
## warnings_seen                              ***
## cyber_quiz_score                           ***
## PE_score
## brand_usage
## gender.fMale                                .
## education.fBachelor's degree
## education.fGraduate degree                 **
## age                                        ***
## occupation.fNon-technical occupations      ***
## activation.fon click:forced_attention.fyes **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## Correlation matrix not shown by default, as p = 16 > 12.
## Use print(x, correlation=TRUE)  or
##   vcov(x)     if you need it
##
## fit warnings:
## fixed-effect model matrix is rank deficient so dropping 17 columns / coefficients
##
## Missing cells for: placement.fbrowser:activation.fon load, placement.fno warning:activation.fon load
## Interpret type III hypotheses with care.
##
## Type III Analysis of Variance Table with Satterthwaite's method
##                                 Sum Sq    Mean Sq NumDF DenDF F value
## placement.f                   477428201  159142734     3 22132    8.11
## activation.f                  199557605  199557605     1 22129   10.17
## forced_attention.f             96735447   96735447     1 22129    4.93
## warnings_seen                 990494463  990494463     1 22145   50.48
## cyber_quiz_score             2149935041 2149935041     1 22129  109.57
## PE_score                          25818      25818     1 22129    0.00
## brand_usage                    11667847   11667847     1 22129    0.59
## gender.f                       57901886   57901886     1 22129    2.95
## education.f                   201299673  100649837     2 22129    5.13
## age                          1362423037 1362423037     1 22129   69.43
## occupation.f                  358905418  358905418     1 22129   18.29
## activation.f:forced_attention.f 200362554  200362554     1 22129   10.21
## placement.f:activation.f
## placement.f:forced_attention.f
##                                          Pr(>F)
## placement.f                      0.0000214333518 ***
## activation.f                             0.0014 **
## forced_attention.f                       0.0264 *
## warnings_seen                    0.0000000000012 ***
## cyber_quiz_score            < 0.0000000000000002 ***
```

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```
## PE_score                                        0.9711
## brand_usage                                      0.4406
## gender.f                                         0.0858 .
## education.f                                      0.0059 **
## age                               < 0.0000000000000002 ***
## occupation.f                             0.0000190398246 ***
## activation.f:forced_attention.f                 0.0014 **
## placement.f:activation.f
## placement.f:forced_attention.f
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## [1] 0.02857
```