Data Science Project Examining Identity Theft with the 2016 Identity Theft Supplement

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Executive Summary

Data analysis was conducted to see if certain predictor variables were associated with past year identity theft. The data used in this analysis came from the 2016 Identity Theft Supplement (ITS) to the National Crime Victimization Survey (NCVS). The results of this analysis found that the majority of the predictors used (demographics, victim of identity theft prior to the past year, victim of a data breach, and using preventative behaviors) were related to past year identity theft.

```
#adding libraries
library(dplyr)
```

```
##
## 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
```

```
library(ggplot2)
```

Loading Data

Data were downloaded from the 2016 ITS study page on the National Archives of Criminal Justice Data to a data subfolder in the project on R-Studio, unzipped, loaded into R-Studio and renamed with a shorter name. Due to the size of the datafile, the memory limit had to be increased prior to loading the data in R-Studio.

```
## [1] 20000
```

Data Wrangling

There were 125,165 total persons in the 2016 ITS. Only completed telephone and personal interviewswere used in the analysis which left 96,130 interviews or observations in the dataset.

```
##                          Number
## (1) Personal interview    57119
## (2) Telephone interview   39011
## (5) ITS Noninterview      29035
## Total                    125165
```

```
##                          Number
## (1) Personal interview    57119
## (2) Telephone interview   39011
## (5) ITS Noninterview          0
## Total                     96130
```

Created variables that would be used in analysis from the larger ITS dataset.

Individual variables creatd in the previous step were combined into a smaller dataset and larger dataset was removed.

Look at created dataset.

```
## 'data.frame':    96130 obs. of  22 variables:
##  $ sex                 : Factor w/ 3 levels "(1) Male","(2) Female",..: 2 1 1 1 1 2 1 1 2 2 ...
##  $ race                : Factor w/ 21 levels "(01) White only",..: 1 2 6 1 1 1 1 1 1 1 ...
##  $ hispanic            : Factor w/ 3 levels "(1) Yes","(2) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ income              : Factor w/ 14 levels "(01) Less than $5,000",..: 14 14 14 14 4 13 13 13 13 1
##  $ age                 : num  46 50 22 78 50 30 29 62 60 74 ...
##  $ pastyearbankacct    : Factor w/ 5 levels "(01) Yes","(02) No",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ existing_bank       : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ currentccacct       : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 1 1 1 1 2 1 1 ...
##  $ pastyearccacct      : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 NA NA NA NA 2 NA NA ...
##  $ existing_credit_card: Factor w/ 5 levels "(01) Yes","(02) No",..: NA NA NA 2 2 2 2 NA 2 2 ...
##  $ other_existing_accts: Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ open_new_acct       : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ personal_info       : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ OUTSIDE_PAST_YEAR   : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 1 2 2 1 2 2 2 2 ...
##  $ CHCKD_CR_PAST_YR    : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 1 2 2 1 1 2 2 1 ...
##  $ CHNG_PASSWORDS      : Factor w/ 5 levels "(01) Yes","(02) No",..: 1 1 2 2 2 1 1 2 2 2 ...
##  $ PURCHASE_IDTHFT_INS : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ SHRED_DOCS          : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 1 1 1 1 1 1 1 2 ...
##  $ VERIFY_CHARGES      : Factor w/ 5 levels "(01) Yes","(02) No",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ PROTECT_COMPUTER    : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ PURCHASE_IDTHFT_PROT: Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ notify_breach       : Factor w/ 5 levels "(01) Yes","(02) No",..: 2 2 2 2 2 2 2 2 2 2 ...
```

```
##           sex                                race              hispanic
##  (1) Male   :44908   (01) White only           :79770   (1) Yes    :12131
##  (2) Female :51222   (02) Black only           :10051   (2) No     :83999
##  (8) Residue:    0   (04) Asian only           : 4160   (8) Residue:    0
##                      (03) Am Ind/AK native only:  656
```

```
##                      (07) White-Amer Ind       :  530
##                      (06) White-Black          :  304
##                      (Other)                   :  659
##                      income           age              pastyearbankacct
##  (14) $75,000 and over  :33662   Min.   :16.00   (01) Yes       :85793
##  (13) $50,000 to $74,999:17342   1st Qu.:34.00   (02) No        :10337
##  (12) $40,000 to $49,999: 9330   Median :50.00   (08) Residue   :    0
##  (10) $30,000 to $34,999: 5811   Mean   :49.26   (98) Refused   :    0
##  (11) $35,000 to $39,999: 5316   3rd Qu.:63.00   (99) Don't know:    0
##  (08) $20,000 to $24,999: 5137   Max.   :90.00
##  (Other)                :19532
##         existing_bank           currentccacct           pastyearccacct
##  (01) Yes       : 4665   (01) Yes       :69446   (01) Yes       : 1003
##  (02) No        :81128   (02) No        :26670   (02) No        :25681
##  (08) Residue   :    0   (08) Residue   :    0   (08) Residue   :    0
##  (98) Refused   :    0   (98) Refused   :   10   (98) Refused   :    0
##  (99) Don't know:    0   (99) Don't know:    4   (99) Don't know:    0
##  NA's           :10337                           NA's           :69446
##
##       existing_credit_card      other_existing_accts         open_new_acct
##  (01) Yes       : 5460     (01) Yes       :  815     (01) Yes       :  589
##  (02) No        :64989     (02) No        :95315     (02) No        :95541
##  (08) Residue   :    0     (08) Residue   :    0     (08) Residue   :    0
##  (98) Refused   :    0     (98) Refused   :    0     (98) Refused   :    0
##  (99) Don't know:    0     (99) Don't know:    0     (99) Don't know:    0
##  NA's           :25681
##
##         personal_info         OUTSIDE_PAST_YEAR        CHCKD_CR_PAST_YR
##  (01) Yes       :  473   (01) Yes       :12267   (01) Yes       :44385
##  (02) No        :95657   (02) No        :83692   (02) No        :51344
##  (08) Residue   :    0   (08) Residue   :   48   (08) Residue   :   80
##  (98) Refused   :    0   (98) Refused   :   39   (98) Refused   :  158
##  (99) Don't know:    0   (99) Don't know:   84   (99) Don't know:  163
##
##
##         CHNG_PASSWORDS       PURCHASE_IDTHFT_INS           SHRED_DOCS
##  (01) Yes       :36861   (01) Yes       :12149    (01) Yes       :67772
##  (02) No        :58670   (02) No        :83440    (02) No        :27942
##  (08) Residue   :   88   (08) Residue   :   88    (08) Residue   :   92
##  (98) Refused   :  250   (98) Refused   :  193    (98) Refused   :  196
##  (99) Don't know:  261   (99) Don't know:  260    (99) Don't know:  128
##
##
##         VERIFY_CHARGES         PROTECT_COMPUTER      PURCHASE_IDTHFT_PROT
##  (01) Yes       :75419   (01) Yes       :16447   (01) Yes       : 4881
##  (02) No        :20344   (02) No        :79001   (02) No        :90756
##  (08) Residue   :   94   (08) Residue   :  100   (08) Residue   :  100
##  (98) Refused   :  180   (98) Refused   :  209   (98) Refused   :  217
##  (99) Don't know:   93   (99) Don't know:  373   (99) Don't know:  176
##
##
##         notify_breach
##  (01) Yes       :11037
##  (02) No        :84652
```

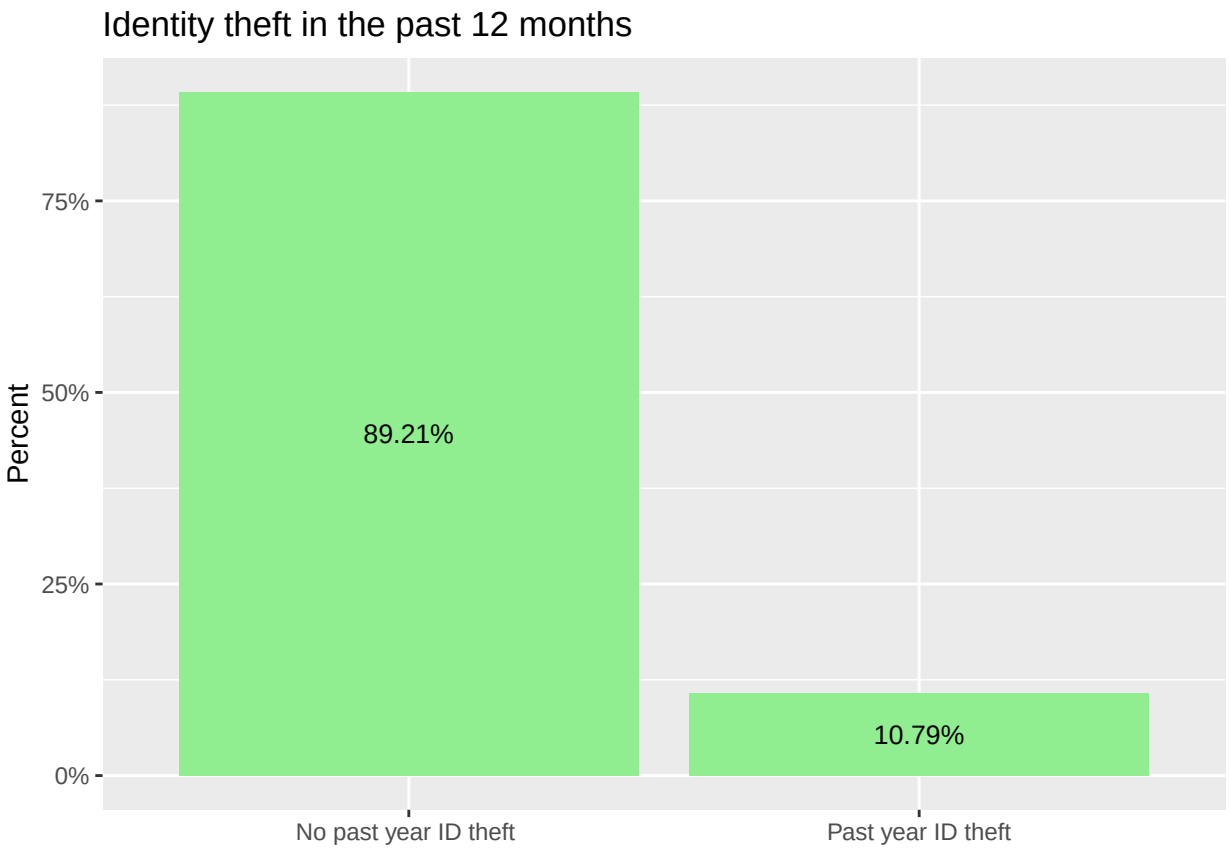
```
##  (08) Residue   :  102
##  (98) Refused   :  179
##  (99) Don't know:  160
##
##
```

Recoded variables, collasping categories and computing necessary variables for analysis.

Exploratory analysis

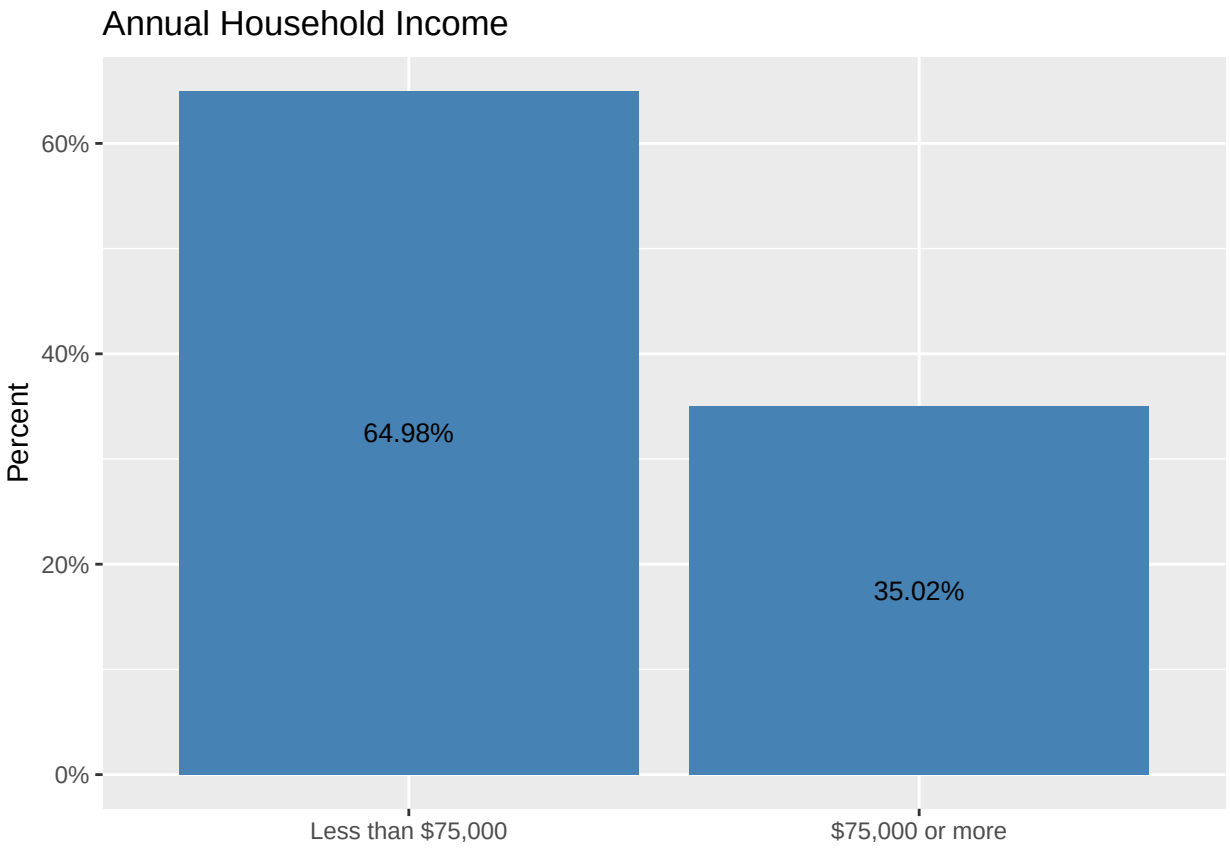
Past year identity theft

About 11% of the sample reported at least one type of identity theft (misuse of an existing account, misuse of personal information to open new account or misuse of personal information for other fraudulent purposes) in the past year while 89% of the sample reported no identity theft.



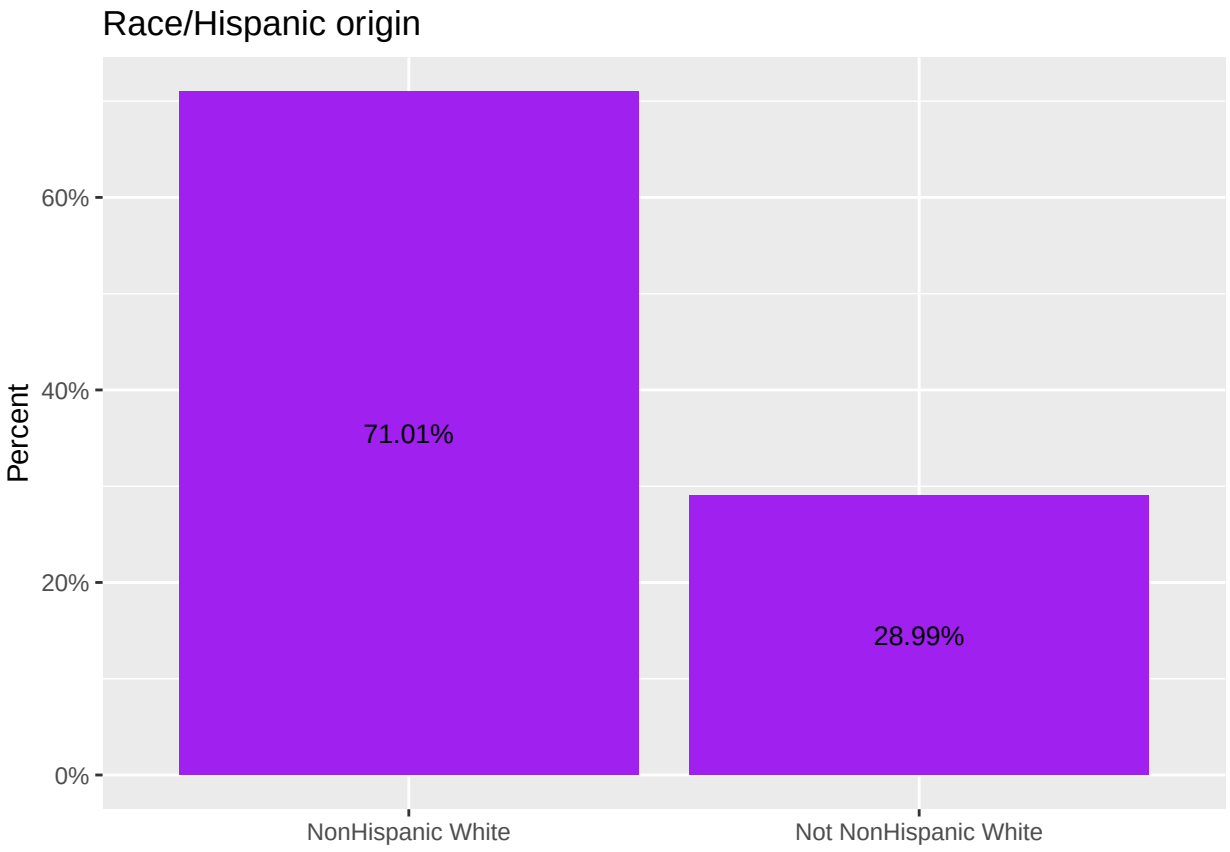
Annual household income

About two third of the sample were in householdswith annual incomes of less than $75,000 (65%) while the remainder (35%) were in households with annual incomes of at least $75,000 .



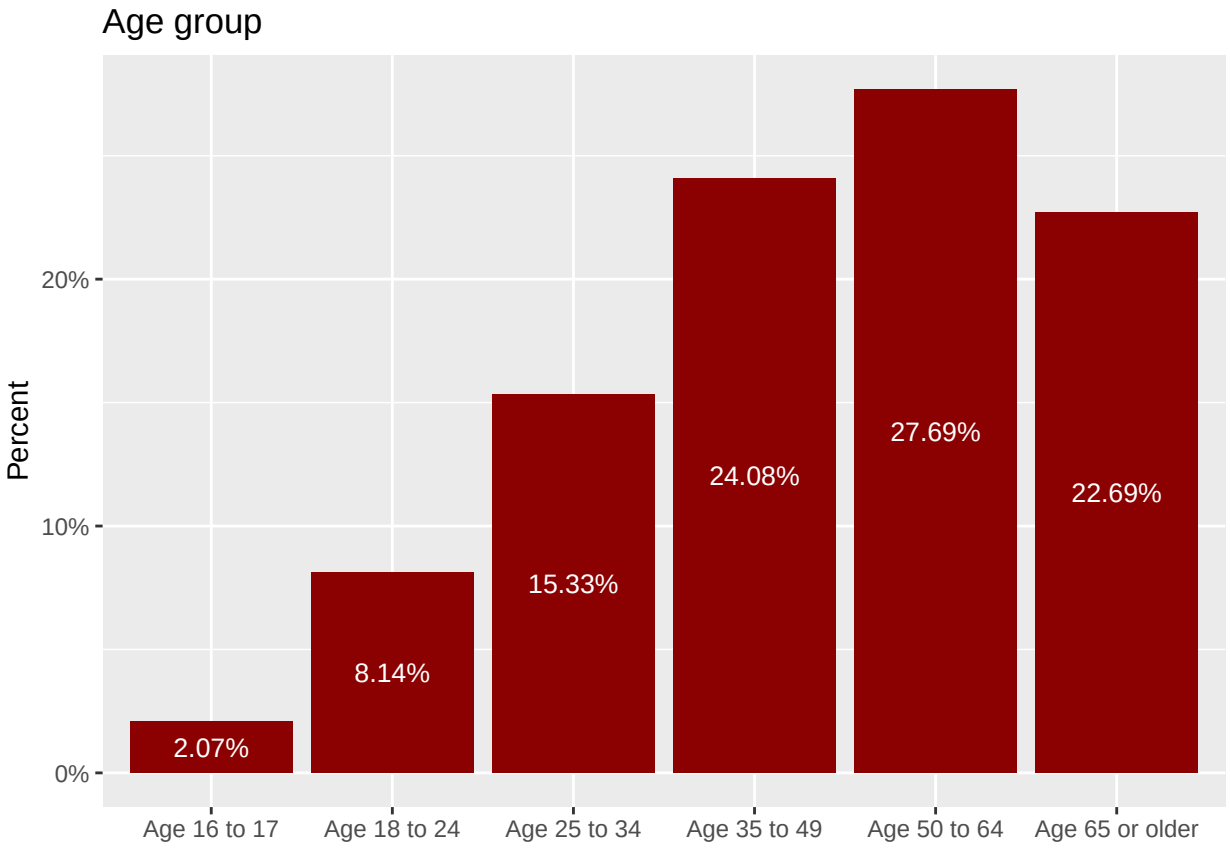
Race/Hispanic origin

71% of cases were NonHispanic White while 29% were not NonHispanic White.



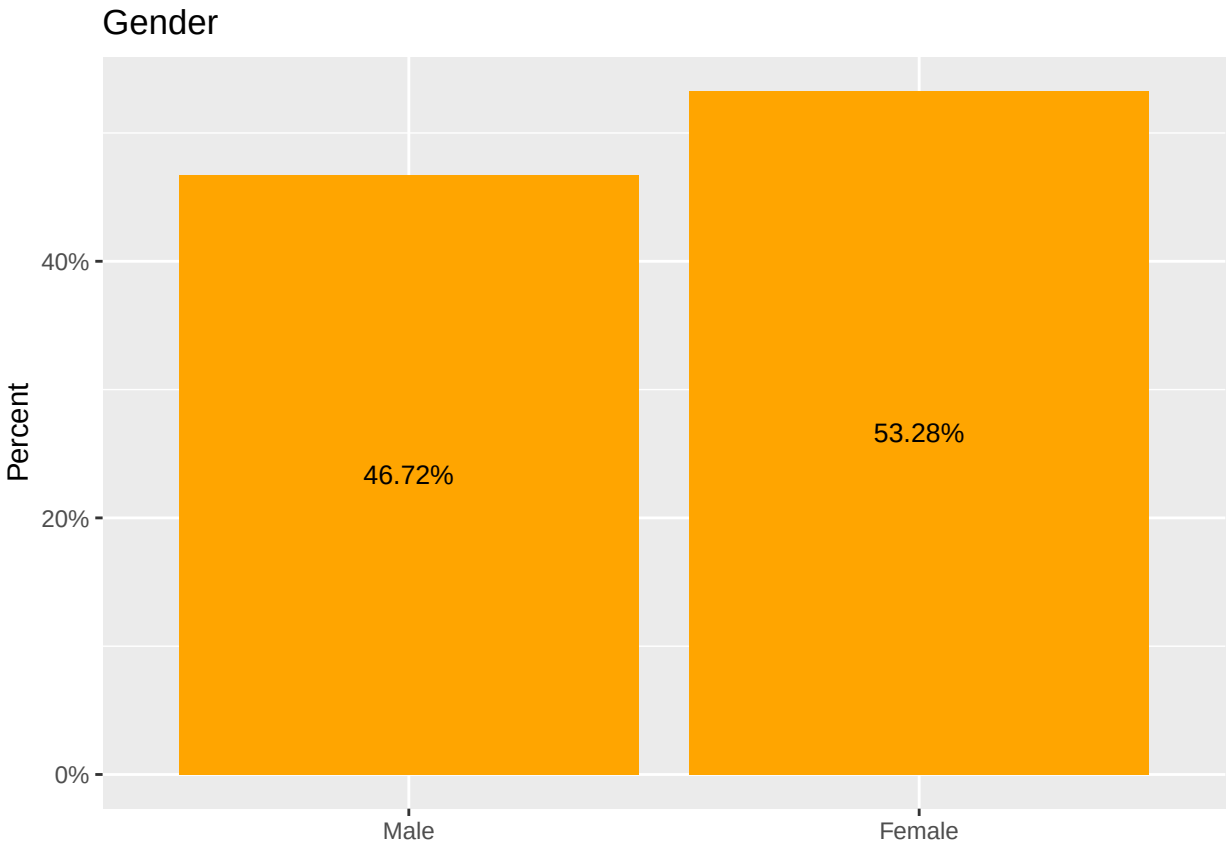
Age

28% of the sample was age 50 to 64 while nearly one in four (24%) were age 35 to 49. 23% of the sample was age 65 or older. The remainder of the sample was under the age of 35.



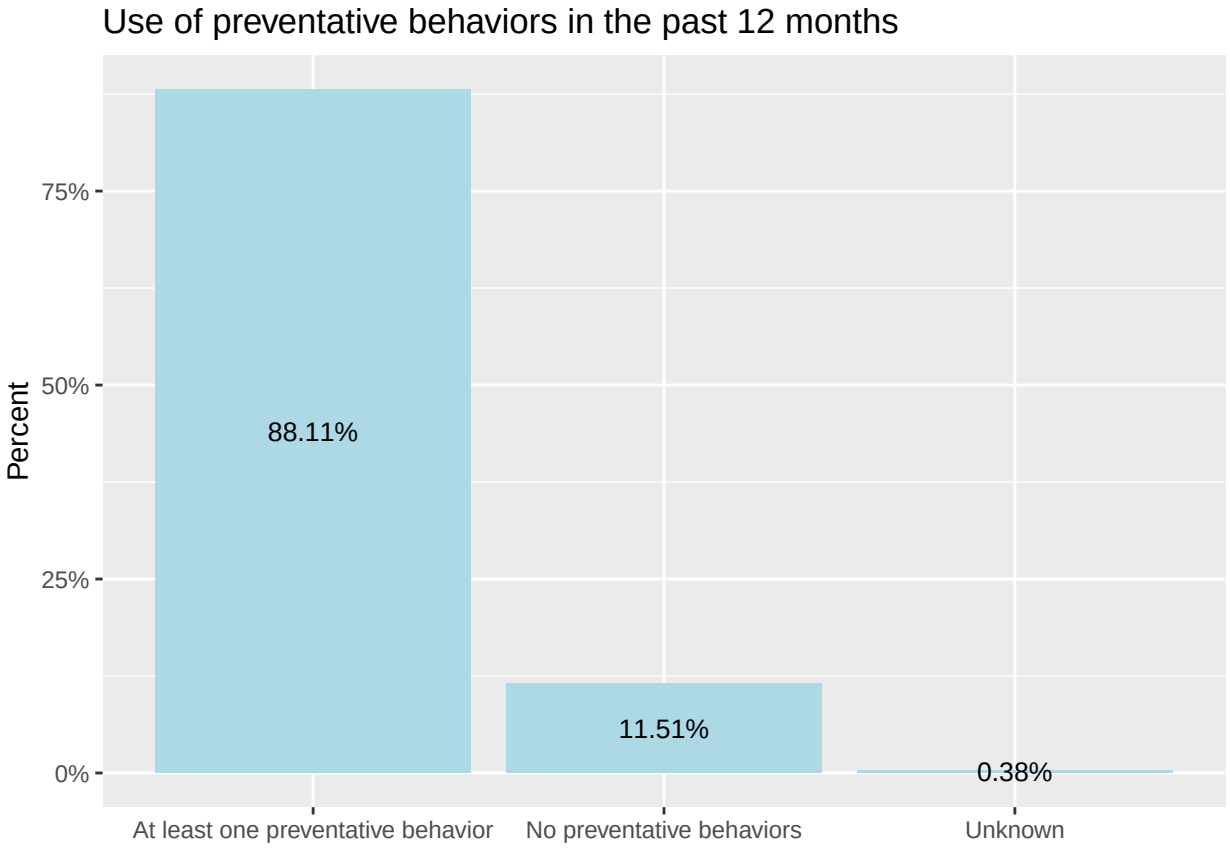
Gender

More than half of the sample (53%) was female while the remainder (47%) was male.



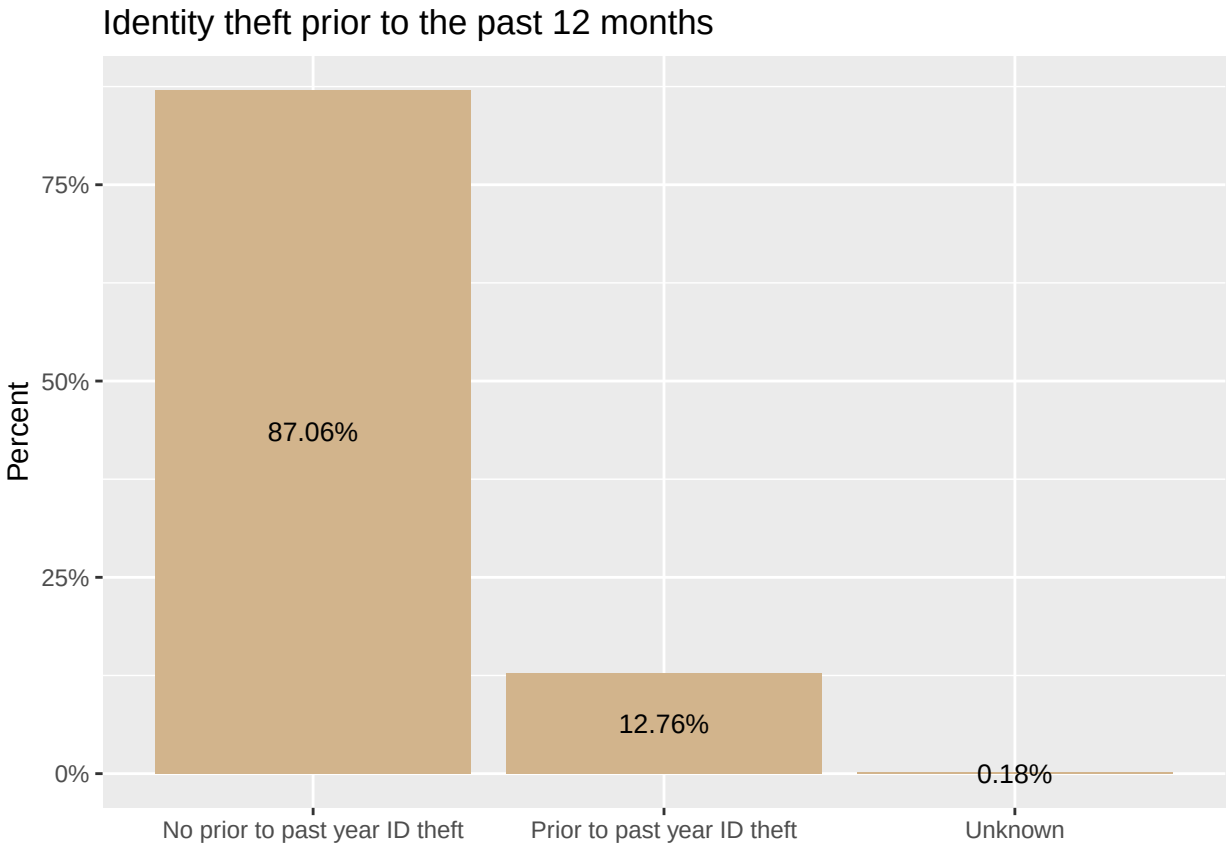
Preventative behaviors

Nearly nine out of ten persons in the sample (88%) used at least one of the preventative behaviors measured (checked bank or credit card statements, shredded or destroyed documents with financial information, checked credit report, changed passwords on financial accounts, used identity-theft security program on computer, Purchased identity-theft insurance or credit monitoring service, purchased identity-theft protection) in the past 12 months.



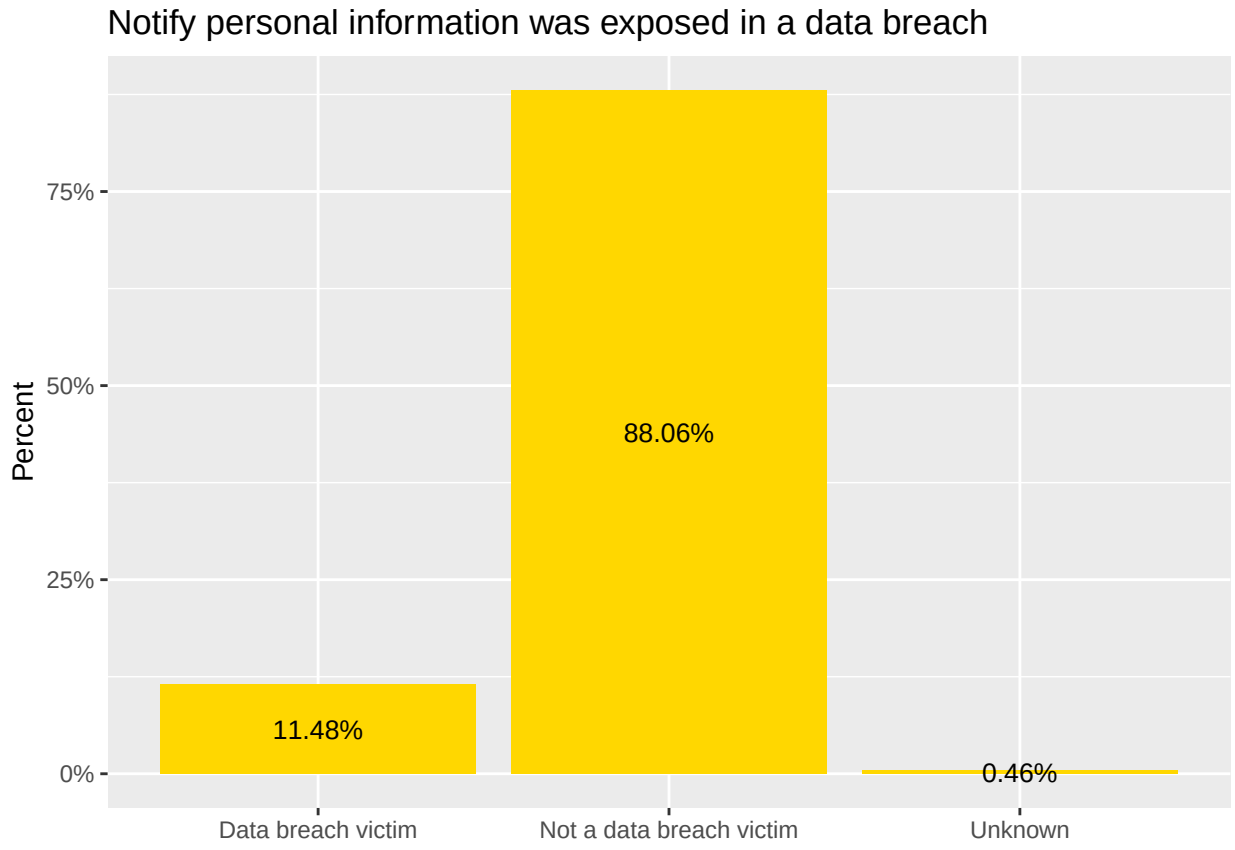
Identity theft prior to the past year

13% of the sample experienced identity theft (misuse of an existing account, misuse of personal information to create new account or misuse of personal information for other fraudulent purposes) prior to 12 months prior to their ITS interview. The majority of the sample did not experience it.



Notified of exposure due to data breach

12% of the sample reported that they were notified that their personal information was exposed during a data breach. The majority of the sample (88%) reported that they were not notified that their personal information was exposed during a data breach.



Contingency tables

Comparing each predictor with the outcome variable.

```
##
##                          Less than $75,000 $75,000 or more
##   No past year ID theft              57162           28600
##   Past year ID theft                  5306            5062

##
##                          NonHispanic White Not NonHispanic White
##   No past year ID theft              60078                  25684
##   Past year ID theft                  8187                   2181

##
##                          Age 16 to 17 Age 18 to 24 Age 25 to 34 Age 35 to 49
##   No past year ID theft          1963         7252        13041        20143
##   Past year ID theft               23          574         1699         3004
```

```
##
##                          Age 50 to 64 Age 65 or older
##   No past year ID theft         23441           19922
##   Past year ID theft             3180            1888

##
##                           Male Female Unknown
##   No past year ID theft  40027  45735       0
##   Past year ID theft      4881   5487       0

##
##                          At least one preventative behavior
##   No past year ID theft                                74557
##   Past year ID theft                                   10139
##
##                          No preventative behaviors Unknown
##   No past year ID theft                     10902     303
##   Past year ID theft                          164      65

##
##                          No prior to past year ID theft
##   No past year ID theft                           75678
##   Past year ID theft                               8014
##
##                          Prior to past year ID theft Unknown
##   No past year ID theft                          9981     103
##   Past year ID theft                             2286      68

##
##                          Data breach victim Not a data breach victim Unknown
##   No past year ID theft                8748                    76665     349
##   Past year ID theft                   2289                     7987      92
```

Data analysis

More data wrangling

Make copies of each variable used in analysis.Unknown level on each individual variable was changed to NA. Individual variables were combined into a single dataset and deleted individual variables. The individual variables were combined into a dataset (its1) and the individual variables were removed from the environment. Cases with NAs (614) were then removed from the dataset, leaving 95,516 cases in the dataset.

```
## [1] 95516
```

Data analysis

Multiple chi-square analyses were run on the dataset with only completed cases. They show an association between past year identity theft and all of the predictors ($p<0.05$) with the exception of sex ($p>0.05$).

```
##
```

```
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  its1$idtheft and its1$incomer
## X-squared = 962.27, df = 1, p-value < 2.2e-16

##
##  Pearson's Chi-squared test
##
## data:  its1$idtheft and its1$ager
## X-squared = 544.24, df = 5, p-value < 2.2e-16

##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  its1$idtheft and its1$sexr
## X-squared = 0.39041, df = 1, p-value = 0.5321

##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  its1$idtheft and its1$ethnicr
## X-squared = 359.61, df = 1, p-value < 2.2e-16

##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  its1$idtheft and its1$prevent_total
## X-squared = 1117.8, df = 1, p-value < 2.2e-16

##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  its1$idtheft and its1$OUTSIDE_PAST_YEARR
## X-squared = 899.98, df = 1, p-value < 2.2e-16

##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  its1$idtheft and its1$notify_breachr
## X-squared = 1291.3, df = 1, p-value < 2.2e-16
```