Satisfaction with life and income: A Secondary Data Analysis Using the BRFSS 2010 Interview Survey

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11/15/2016

**Objective**

The objective of this analysis was to investigate the association between satisfaction with life and income in a large, representative sample after controlling for gender, education level, and age.

**Introduction**

In 2012, the Marist Institute for Public Opinion performed a study on happiness (all facets of happiness) and income, concluding that the tipping point where Americans become happy related to annual income was $50,000 (Marist Institute of Public Opinion, 2012). Four years have passed in a second presidential term for Barack Obama, and as Americans are about to welcome a new president, the question arises: “Is $50,000 annual income still the point where happiness begins among American? If not, is it less, or is it more?” While the granularity for the Marist study was higher, focusing on several facets of happiness (e.g. family, neighborhood safety, and spiritual life), the Behavioral Risk Factor Surveillance System 2010 Survey (Centers for Disease Control and Prevention, 2010) centered around one question asked of responders: “*In general, how satisfied are you with your life*?”

The benefits of this study are a current analysis of the relationship between income and satisfaction with life, new results to compare with results from previous studies (that analysis is out of scope for this paper), and a snapshot of a large, representative sample categorized by age, college education, and gender by income that might provide insight into further, more in-depth studies about happiness and income. The objective of this study was to determine whether satisfaction with life was dependent on an individual’s annual income in a large, representative sample after adjusting for gender, education level, and age.

**Methods**

Data collected from the 2010 Behavioral Risk Factor Surveillance System indicated 261,026 respondents out of 451,075, which is 58% of total BRFSS responders, answered the question “*In general, how satisfied are you with your life?*” (Centers for Disease Control and Prevention, 2010). The model was built using five variables with the outcome variable *life satisfaction* (LSATISFY), the independent variable of interest *income* (\_INCOMG), and the rest of the independent variables *gender* (SEX), *age* (AGE),and *education level* (EDUCA). LSATISFY was categorized into two categories where the values 1 and 2 were considered satisfied and the values 3 and 4 considered *not* satisfied. The variable of interest \_INCOMG was categorized into two categories where values 1,2,3, and 4 were responders in the bracket < $50,000 annually and those who answered 5 were in the income bracket of > $50,000 annually. EDUCA was composed of two categories where the values 1,2,3, and 4 were those responders who had high school or less, and those who had attended some college or graduated college. SEX was categorized by males and females. Age was converted from a continuous variable to a categorical variable with three categories of responders between the ages of 18 and 35, responders between the ages of 36 and 50, and those between the ages of 51 and 65. Responders above the age of 65 were intentionally excluded to maintain a sample that reflected variable income levels as opposed to fixed incomes, whether the income is retirement-based or social security, normally found in older populations.

Using SAS University software version 9.04, univariate analyses (using PROC FREQ with CHISQ [chi-square method used to test associations between variables]), were used to examine unadjusted associations of the independent variable of interest \_INCOMG against education level, age, and gender. Multivariable logistic regression models were used (using PROC LOGISTIC with LACKFIT [LACKFIT provides the Hosmer-Lemeshow goodness of fit statistics]) to compare the adjusted odds of life satisfaction in relation to income while simultaneously adjusting for gender, age, and education level. Because education level may directly affect income level, one interaction term was examined: income with education level. Collinearity was assessed using a variation inflation factor (using PROC REG with VIF and TOL) of greater than three to indicate a potential problem. Adjusted odds ratios and 95% confidence intervals were calculated. All analyses were performed using SAS University software, version **9.04.01** (SAS Institute, Inc., Cary, North Carolina).

TABLE 1. Characteristics of 261,026 BRFSS 2010 Study Respondents between 18 and 65 years of age by Income.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Population  *n*(%) | | | Income < 50,000 Annually  *n*(%)  (n=129,603) | | Income > 50,000 Annually  *n*(%)  (n=131,423) | | *p* value\* |
|  |  |  |  | |  |  |  |  |
| Age in Years |  |  |  | |  |  |  | <.0001 |
| 18-35 | 39,164 | 15.0 | 22,679 | | 17.5 | 16,485 | 12.5 |  |
| 36-50 | 85,981 | 32.9 | 37,221 | | 28.7 | 48,760 | 37.1 |  |
| 51-65 | 135,881 | 52.1 | 69,703 | | 53.8 | 66,178 | 50.4 |  |
| Gender |  |  |  | |  |  |  | <.0001 |
| Male | 102,958 | 39.4 | 46,954 | | 36.2 | 56,004 | 42.6 |  |
| Female | 158,068 | 60.6 | 82,649 | | 63.8 | 75,419 | 57.4 |  |
| Education level |  |  |  | |  |  |  | <.0001 |
| Did not graduate college | 87,346 | 33.5 | 64,048 | | 49.4 | 23,298 | 17.7 |  |
| Graduated college | 173,680 | 66.5 | 65,555 | | 50.6 | 108,125 | 82.3 |  |

\* *p-*values based on Pearson chi-square test of association.

Table 2 describes the univariate statistics of age, gender, income, and college education by life satisfaction.

TABLE 2. Characteristics of 261,026 BRFSS 2010 Study Respondents between 18 and 65 years of age by satisfaction with life.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Population  *n*(%) | | | Satisfied with Life  *n*(%)  (n=244,738) | | Not Satisfied with Life  *n*(%)  (n=16,288) | | *p* value\* |
|  |  |  |  | |  |  |  |  |
| Age in Years |  |  |  | |  |  |  | <.0001 |
| 18-35 | 39,164 | 15.0 | 37,157 | | 15.2 | 2,007 | 12.3 |  |
| 36-50 | 85,981 | 32.9 | 80,805 | | 33.0 | 5,176 | 31.8 |  |
| 51-65 | 135,881 | 52.1 | 126,776 | | 51.8 | 9,105 | 55.9 |  |
| Gender |  |  |  | |  |  |  | <.0001 |
| Male | 102,958 | 40.3 | 96,679 | | 39.5 | 6,279 | 38.6 |  |
| Female | 158,068 | 59.8 | 148,059 | | 60.5 | 10,009 | 61.5 |  |
| Education level |  |  |  | |  |  |  | <.0001 |
| Did not graduate college | 87,346 | 33.5 | 79,965 | | 32.7 | 7,381 | 45.3 |  |
| Graduated college | 173,680 | 66.5 | 164,773 | | 67.3 | 8,907 | 54.7 |  |
| Income (annually) |  |  |  | |  |  |  | <.0001 |
| < $50,000 | 129,603 | 49.7 | 116,283 | | 47.5 | 13,320 | 81.8 |  |
| > $50,000 | 131,423 | 50.3 | 128,455 | | 52.5 | 2,968 | 18.2 |  |

\* *p-*values based on Pearson chi-square test of association.

Table 3 describes the logistic regression analysis comparing the odds of life satisfaction by income and other characteristics.

TABLE 3. Logistic Regression Analysis comparing the Adjusted Odds of Life Satisfaction Among 216,026 Behavioral Risk Factor Surveillance Study Participants by Income and Additional Characteristics, 2010.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Satisfied w/Life  *n*(%)  (*N*=244,738) | | Not Satisfied w/Life  *n*(%)  (*N* =16,288) | | AOR\* | 95% CI† | p-value‡ | |
|  |  |  |  |  |  |  | |  | |
| Age in Years |  |  |  |  |  |  | | <0.0001 | |
| 18-35 | 37,157 (15.2) 2,007 (12.3) | | | | 1.00 | -- | |  | |
| 36-50 | 80,805 (33.0) 5,176 (31.8) | | | | 1.46 | 1.387 – 1.544 | |  | |
| 50-65 | 126,776 (51.8) 9,105 (55.9) | | | | 1.47 | 1.399 – 1.547 | |  | |
| Gender |  |  |  |  |  |  | | <0.0001 | |
| Male | 96,679 (39.5) 6,279 (38.6) | | | | 1.00 | -- | |  | |
| Female | 148,059 (60.5) 10,009 (61.5) | | | | 0.95 | 0.920 – 0.984 | |  | |
| Education Level |  |  |  |  |  |  | | <0.0001 | |
| Did not graduate college | 79,965 (32.7) 7,381 (45.3) | | | | 1.00 | -- | |  | |
| Graduated college | 164,773 (67.3) 8,907 (54.7) | | | | 1.08 | 1.044 – 1.117 | |  | |
| Income (annually) |  |  |  |  |  | <0.0001 | | | |
| < $50,000 | 116,283 ( | (47.5) | 13,320 | (81.8) | 1.00 | -- | | | |
| > $50,000 | 128,455 | (52.5) | 2,968 | (18.2) | 0.20 | 0.194 – 0.211 | | | |

\* Odds ratios are adjusted for all other variables in the table.  
† 95% confidence intervals are for reported odds ratios.  
‡ p-value based on the Wald chi-square test statistic.

**Results**

Of the 451,075 BRFSS 2010 responders, 261,026 (58%) had complete data for the study. The demographic characteristics of this population are compared in Table 1. Of the entire population, 60.5% were female, 66.5% of males and females graduated or attended college, and 67.3% of males and females reported being attending or graduating from college. There were proportionately more females than males than expected who reported an income > $50,000 annually (p<0.0001) and proportionately more respondents who attended or graduated college that reported an income > $50,000 than who attended or graduated college and reported an income of < $50,000 (p<.0001).

Table 3 shows the odds ratios. Those respondents reporting obesity were at 3.24 times the odds of reporting diabetes when compared those who reported not obese after controlling for gender and exercise (OR = 3.24; 95% CI = 3.17 – 3.32). Those who reported exercising had roughly have the odds of reporting diabetes when compared to those not exercising after controlling for BMI and gender (OR = 0.52; 95% CI = 0.51 – 0.53). Females were at slightly lower odds of reporting diabetes when compared to males after controlling for age and exercise (OR = 0.96; 95% CI = 0.94 – 0.98).

There is a statistically significant multiplicative interaction between education level and income. Leave in the model.

**Strengths and Limitations**

**Conclusion**

Data collected from the 2010 Behavioral Risk Factor Surveillance System indicated 261,026 respondents who answered the question “*In general, how satisfied are you with your life?*” (Centers for Disease Control and Prevention, 2010). Females represented 60.6% of the total population while males were at 39.4%. The study population, which accounted for 58% of the total number of BRFSS responders (451,075), were divided into two categories with 49.7% of responders reporting making less than $50,000 annually and 50.3% making more than $50,000 annually.

# References

Centers for Disease Control and Prevention. (2010). *Behavioral Risk Factor Surveillance System.* Retrieved from Centers for Disease Control and Prevention: http://www.cdc.gov/brfss/

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