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

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**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: “Will $50,000 annual income still be the point where happiness begins among American? If not, is it less, or is it more?” A competing article by Robert Frank of The Wall Street Journal (Frank, 2010) stated that $75,000 annually was the “Perfect Salary for Happiness.” 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 main benefit to this study is to have an analysis to use for the BRFSS 2016 survey which will be completed under a new president with a new economy. This is not an analysis to be used to determine current satisfaction with life as it pertains to annual income. Other benefits of this study are a previous analysis of the relationship between income and satisfaction with life, results to compare with new results from future studies (those analyses are 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 in 2010.

**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 (“very satisfied”) and 2 (“satisfied”) were considered *satisfied* and the values 3 (“dissatisfied”) and 4 (“very dissatisfied”) considered *not satisfied*. The variable of interest \_INCOMG was categorized into two categories where values 1 (< $15,000), 2 ($15,000 - $25,000), 3 ($25,000 - $35,000), and 4 ($35,000 - $49,999) were responders in the bracket < $50,000 annually and those who answered 5 ($50,000+) were in the income bracket of > $50,000 annually. EDUCA was composed of two categories where the values 1 (“Never attended school or only kindergarten”), 2 (“Grades 1 through 8 (Elementary)”), 3 (“Grades 9 through 11 (Some high school)”), and 4 (“Grade 12 or GED (High school graduate)”) were those responders who had high school or less were placed in the first category, and those who had attended some college (5) or graduated college (6) comprised the second category. SEX was categorized by males (1) and females (2). Age was converted from a continuous variable to a categorical variable with three categories of responders between the ages of 18 and 35 (agecat1), responders between the ages of 36 and 50 (agecat2), and those between the ages of 51 and 65 (agecat3). 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 populations of retirement age.

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 | 39.4 | 96,679 | | 39.5 | 6,279 | 38.6 |  |
| Female | 158,068 | 60.6 | 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) | | OR\* | 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, 60.6% were female, 66.5% of responders graduated or attended college, and 52.1% of responders reported being between the ages of 51 and 65. There were proportionately more females than males than expected who reported an income > $50,000 annually (p<0.0001) and proportionately more respondents between the ages of 51 and 65 who reported an income > $50,000 than expected in the two younger age groups (p<.0001).

Table 2 shows age, gender, education level, and income by life satisfaction. In this population, 244,738 (94%) responders reported being satisfied with life. There were proportionately more responders between the ages of 51 and 65 who reported dissatisfaction with life compared with those who were satisfied (p<0.0001). There were proportionately more responders who reported attending or graduating college who reported satisfaction with life than those who reported dissatisfaction (p<0.0001). There were proportionately more responders who reported an income less than $50,000 or higher who reported dissatisfaction with life.

Table 3 shows the odds ratios. Those respondents between the ages of 51 and 65 were at 1.5 times the odds of reporting satisfaction with life when compared with those who reported dissatisfaction after controlling for gender, education level, and income (OR = 1.47; 95% CI = 1.399 – 1.547). Those who reported an income of $50,000 or higher when compared to those below $50,000 after controlling for age, gender, and education level were at much lower odds of reporting dissatisfaction (OR = 0.20; 95% CI = 0.194 – 0.211). Females were at slightly lower odds of reporting dissatisfaction with life when compared to males after controlling for age, education, and income (OR = 0.95; 95% CI = 0.920 – 0.984). There were no confounders identified in the final model and the VIF did not exceed 1.13. There was, however, a statistically significant multiplicative interaction between education level and income so education level was left in the final model.

**Strengths and Limitations**

The limitations discovered during investigation of the population sample were that the one question, “*In general, how satisfied are you with your life*?”, was narrow and not did not provide the granularity in different facets of happiness/satisfaction as the previous study by Marist Institute of Public Opinion (Marist Institute of Public Opinion, 2012). Another limitation is that an assumption was made that the ‘tipping point’ salary discussed in the Marist study would, four years later, remain at $50,000 annually. In 2016, Doug Short of Advisor Perspectives, Inc. (Short, 2016) identified a different income ceiling than the Marist study: $75,000 annually, updating and validating the same study he performed in 2014.

The strengths of this analysis lay in a few factors. The population was a strong, representative sample at 58% of the 451,075 total responders to the BRFSS 2010 survey. Concerning the Marist study, this is a direct comparison using the same tipping point of $50,000 annually where happiness/satisfaction occurred. Another reason this study chose to use this salary was that as recently as 2014, the median household income in the United States was listed as $51,939 (Wikipedia, 2016) while the median household income in 2010 was $49,445 (United States Census Bureau, 2011). While not a complete match, it was close enough with the sample observed to create a viable two-category variable using the calculated variable \_INCOMG. Lastly, what could also be considered a limitation of the study (narrow-scope), was also its strength: the pointed nature of the singular question presented in the variable LSATISFY allowed for a single outcome that was broad in scope.

**Conclusion**

The objective of this study was to investigate the association between income and life satisfaction while controlling for age, gender, and education level. Recent studies suggest that the level of income where happiness starts to diminish is around $50,000 annually (Marist Institute of Public Opinion, 2012). Other studies suggest that that number is rising with inflation (Short, 2016).

Based on this secondary analysis, there was a statistically significant association between life satisfaction and income. Respondents between the ages of 51 – 65 who attended or graduated college were proportionately more likely to report *satisfaction* than the rest of the age groups. Females reported satisfaction at a proportionately higher rate than males. Responders reported a proportionately higher rate of dissatisfaction when reporting no college at all. Overall, females between the ages of 51 and 65 who reported attending or graduating college reported proportionately higher satisfaction rates than other responders. Adjusting for age, gender, and education level ensured that these independent variables did not affect the exposure variable or the outcome.

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