

# Increased Education Level of Women Associates with Higher Occupational Prestige and Happiness\*

An Analysis of Potential Factors From 2000 to 2021

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## Abstract

This paper utilizes data from the US General Social Survey to discuss women's level of education from 2000 to 2021. We find that the mean levels of education among surveyed women increased, as did their occupational prestige score and level of happiness. These findings matter as they enable us to understand the importance of women's access to higher education. The rise in occupational prestige scores can enhance economic development, and associates with increased levels of happiness. This suggests that advanced education leads to well-respected careers that generate happiness

## 1 Introduction

“The education of girls is the most powerful investment we can make in our collective future.”

-Carrie Chapman Catt, Women's Suffrage Leader

Improving the education level of women is a critical factor in driving social and economic development. Over the past two decades, women have gained an increase in access to higher education. In this paper, we will examine the trend of women's level of education in the United States from 2000 to 2021, as well as women's occupational prestige and happiness. Our findings show that while there were slight fluctuations in some years, overall, women's education level, occupational prestige scores, and happiness all increased through this time period.

We will draw data from the US General Social Survey (henceforth GSS), which is available through the GSS website. Our respondents of interest are participants over 18 years of age who self-identify as women.

This exploration is critical as the data can help government officials and policy makers play an informed role in influencing the use of public policies to improve education and career opportunities for women. Showing the importance of women's education is also important for economic development, as women with higher education are more likely to find formal employment, earn higher wages, and contribute to their country's economy and workforce.

In section 1, we discuss the source of data used in this paper, the strengths and weaknesses of GSS, methodologies that follow it, and data terminology. Section 2 discusses the results from our graphs, including the trend over the 20 year period. In section 3, we explore the factors that contribute to women's education levels and career prestige. In section 4, we provide an optional survey that we conducted to gather more information about women's educational attainment and career aspirations. The final section provides an analysis of the bias and ethical concerns, and weakness and steps.

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\*Code and data are available at: [https://github.com/jennyshen-playground/women\\_highest\\_level\\_education\\_20\\_years.git](https://github.com/jennyshen-playground/women_highest_level_education_20_years.git).

## 2 Data

### 2.1 Data Source and Methodology

The data used in this paper is obtained from the US General Social Survey (henceforth GSS), and is available through the GSS website. Funded by the National Science Foundation and operated by the National Opinion Research Centre (NORC), the GSS has collected data regarding social change and growth complexity of American society since 1972. It keeps records of the practices, concerns, experiences, and attitudes of US residents. The survey randomly selects participants across the United States to take part in the survey. From those participants, only those that volunteer to participate are surveyed. Participants come from a mix of rural, urban and suburban areas. The survey is conducted face-to-face through an in-person interview conducted by staff at NORC. The survey itself takes around 90 minutes to complete. However, due to the pandemic, NORC had to change their collection methodology: the latest GSS was conducted through website and telephone interviews.

The survey received responses from 2817 respondents in 2000, 2348 respondents in 2018, and 4032 respondents in 2021, with the increase in the latter year being attributed to the changing survey methods due to the COVID-19 pandemic. Over the period spanning from 2000 to 2021, the survey averaged 2793.6 respondents across 11 surveys. The number of variables recorded in the survey was 1161 in 2000, 1065 in 2018, and 735 in 2021. On average, there were 883.67 variables recorded in the survey over the recorded three years (2000, 2018, and 2021).

In this paper, the analysis will be carried out using the statistical programming language R (R Core Team 2020), using the `haven` (Wickham, Miller, and Smith 2022) and `tidyverse` (Wickham et al. 2019) packages. All figures in the report are generated using `ggplot2`.

### 2.2 Attributes

In this case, the survey focuses on US citizens who are adults and living in households. The data frame includes adults that are 18 and over that are living in households. The sample is voluntary and randomly selected from households. The survey relies on probability sampling, specifically simple random sampling, which ensures the validity of the survey. However, this type of sampling can be expensive, and some households may opt-out, which reduces the expected sample size. Non-response does not result in any penalty. The main goal of the survey is to gather information about American society to discern trends in attitudes and behaviors. One of the strengths of this survey is that it is highly respected and serves as a gold standard in social science research, with a 50-year history of successful data collection. However, one of the weaknesses is that one person represents 90,000 people, and if one person chooses not to participate, a large number of voices are lost.

This report provides an analysis of the questionnaire used in the General Social Survey (GSS). The GSS questionnaire covers a wide range of topics, which offers social science researchers a great deal of flexibility in their analyses. In this survey, a vast variety of topics means there are tons of angles that social science researchers could take with the GSS. Additionally, the bi-annual aspect of the survey means that the survey can be catered to trends and world events that have occurred, or are occurring.

Another strength is that public trust of the survey is backed by its history, which means that very little worry about privacy concerns due to a good history of keeping privacy protected. Furthermore, the bi-annual nature of the survey enables it to be updated in response to current trends and world events. The GSS has a long history of privacy protection, which enhances public trust in the survey.

On the negative side, the questionnaire is too general, requiring supplementary research to provide a specific focus on certain aspects of the GSS. While this is not necessarily a bad thing, it can limit the quality of data collected. Moreover, the breadth of the survey lets researchers ask the questions they want to ask before they delve deep to find answers. As stated before, there are too little respondents, there should be more for better quality of data. Additionally, there are relatively few respondents, which can undermine the validity of the data.

## 2.3 Terminology

Respondents of the GSS were asked to provide the highest level of education using the following categories: ranging from 0-20, where grades 1-12 correspond to primary and secondary education, and grades beyond 12 indicate years of post-high school level education. The occupation prestige level refers to the degree of social status or esteem associated with a particular occupation, on a scale of 10-89%. Level of happiness refers to the degree of subjective well-being reported by an individual, with values ranging from 1 (not happy) to 3 (very happy). The metrics are measured per respondents, with each participant representing 90,000 people in the country.

## 2.4 Analysis

### 2.4.1 Mean Education Level from 2000 - 2021

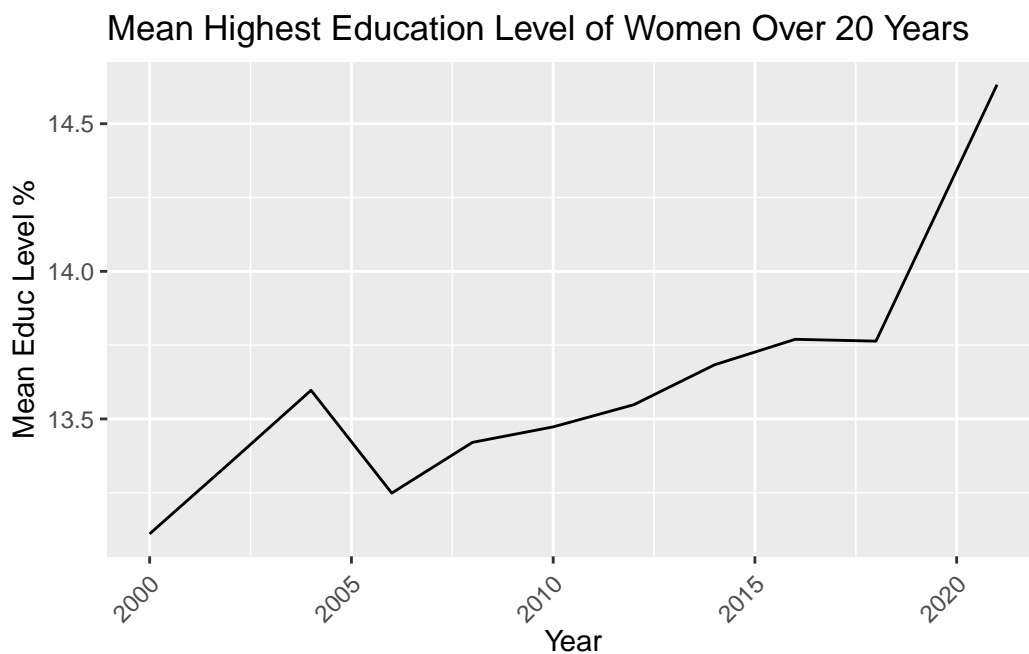


Figure 1: A graph detailing that the overall increase in the mean highest education level percentage of women over a 20 year period from 2000 to 2021 is from 13.0 to 13.7.

The overall trend of the plot shows a positive upward trajectory in women's education levels over the years, with fluctuations. As shown in Figure 1, the vertical axis shows the percentage of mean education level, while the horizontal axis displays the years. The data reveals significant fluctuations in the mean education level of women over the years, with the education levels gradually increasing over time. The overall increase from 2000 to 2021 is from 13.0 to 13.7. In particular, the mean education level percentage rose from 13.0 to 13.6 between 2000 and 2004, declined in 2006, and has been rising ever since. Overall, this trend highlights the potential benefits of providing access to education for women and demonstrates the need to continue investing in education to ensure that women can reach their full potential and the need to address the barriers that still exist to achieve gender equality in education.

### 2.4.2 Mean Occupational Prestige from 2000 - 2021



Figure 2: A display showing the rise of the mean occupational prestige in women ranging from years 2000 - 2021.

Figure 2 displays the trends of American women's occupational prestige scores from 2000 to 2021. We see that throughout the years, the level of prestige of women's occupations had a generally upward trend. The Y axis shows the mean occupational prestige score while the X axis shows the years. Overall, the mean prestige score rose from 42.5 in 2000 to 45.9 in 2021. However, fluctuations are evident in the years in between—the mean score rose to 43.8 in 2004, but dropped to 43.2 in 2010. It increased to 44.1 in 2012, but decreased once again in 2014 before increasing consistently in the years after that. This trend suggests a positive sign that women have had more opportunities in the workforce throughout the past decades, obtaining more prestigious positions that previously may have predominantly hired men.

### 2.4.3 Women's Happiness from 2000 - 2021

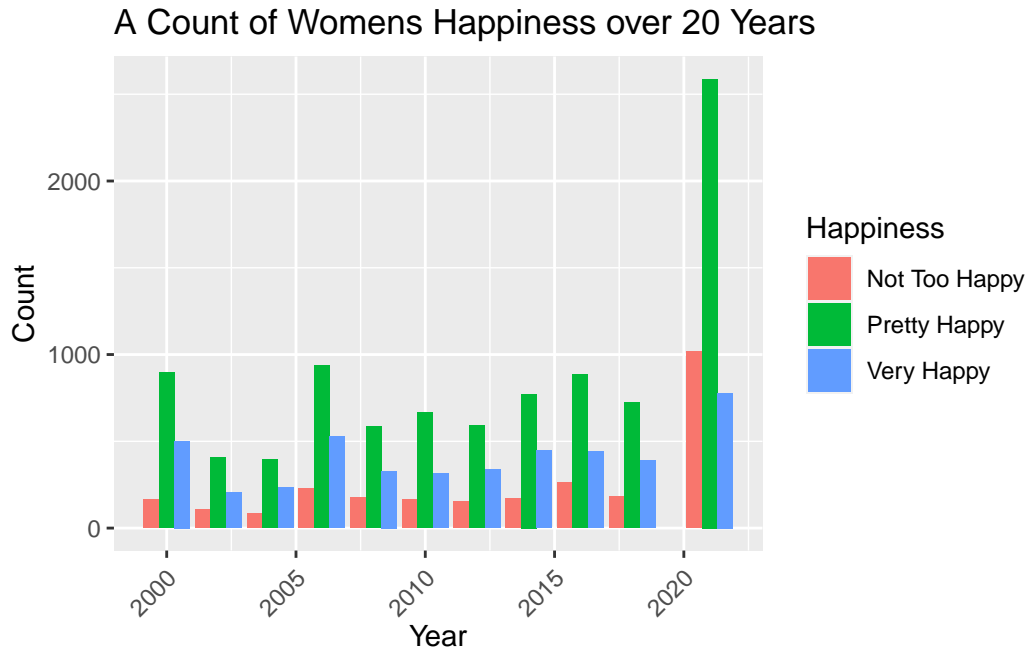


Figure 3: A graph of answers to the Happiness question by women ranging from the years 2000 - 2021

In Figure 3, the counts of "Very Happy" respondents peaked in 2000, 2006 and 2021. In 2008, "Very Happy" respondents dropped but steadily increased in the years afterwards. A similar trend can be observed with "Pretty Happy" respondents, with peaks in 2000 and 2006, and a steady increase since 2008. There is a spike in "Not Too Happy" responses in 2006, where both mean education level and mean occupational prestige also dropped. However, where there is another spike in "Not Too Happy" responses in 2018, there is no correlating drop in mean occupational prestige and education level. Figure 1 and Figure 2 show steady growth in their respective values, whereas in Figure 3 "Pretty Happy" and "Very Happy" counts experience similar growth but "Not Too Happy" counts fluctuate per year.

## 3 Results

Figure 1 shows an increase in mean highest education level, Figure 2 shows an increase in mean occupational prestige percentage and Figure 3 shows an increase in overall happiness. This means that at a slow and steady rate, women are acquiring better education, getting better jobs and becoming happier. The findings show that there is a positive relationship between job prestige, education and happiness. Just do these three factors tie into one another?

## 4 Discussion

### 4.1 Womens Education Discussion

According to the UNICEF (citation), the education of girls enhances economies and mitigates inequality, promoting more stable and resilient societies that offer all individuals, including boys and men, the chance to reach their full potential. Over the past two decades, there has been a steady increase in women's education levels, as evidenced by Figure 1, which displays a positive upward trajectory in women's education levels over time. This trend can be attributed to several factors.

This comprehensive approach to girls' education tackles discriminatory gender norms and harmful practices that have traditionally denied girls access to quality learning. It supports governments in ensuring that education budgets and national policies are gender-responsive and prioritize gender equality.

One factor is the state of the economy (International Information Programs 2012), as the increase in female education can be partly attributed to the rise in female employment rates. As the demand for skilled labor increases with economic growth, women's education becomes a more valuable asset in the labor market, leading to higher employment rates for women. Families also recognize the long-term benefits of investing in girls' education, prioritizing it over time. However, there can be volatility in education levels due to the state of the economy, as seen in the decline from 2004 to 2006 in figure 1. This could be seen as the volatility of the state of economy, and its relationship with the labor market and opportunities. In periods when the employment rate increases, Families are more likely to invest in girls' education because education offers benefits in the labor market. Educated women are more likely to have higher-paying jobs, leading to better financial stability for themselves and their families. This is one of the economic forces that contribute to the rise in female education over the past two decades.

Gender-focused policies also contribute to improving female education by building more female-friendly schools and land inheritance rights to women. The construction of school infrastructure, such as building schools and toilets have proven to be effective in increasing enrollment and retention rates for girls. In addition, developing countries have adopted the policies of eliminating school fees for primary schools, which supported those families that have financial barriers to education and improved access to education for women.

Educated women tend to have smaller, healthier, and better educated families, leading to an overall improvement in the quality of life. In addition, educating girls also has a positive impact on health and nutrition outcomes. Cites suggest that educated women have more knowledge about health, which can lead to improvements in health outcomes. For example, a study in Zimbabwe (Jayachandran, n.d.) found that access to secondary school education increased women's knowledge about how HIV is transmitted. The study found that girls who receive education are more likely to delay marriage and childbirth, leading to better maternal and child health outcomes.

Government and community partners are working together to support the growth of women's education level. The GSS data provides an assessment and framework for government policymakers to help schools to eliminate gender gaps in learning and promotes social protection measures such as gender-responsive pedagogies and teacher training, removing gender stereotypes from learning materials, and addressing other

obstacles including distance-related barriers to education, re-entry policies for young mothers, and menstrual hygiene management in schools. These measurements can contribute to the growth of women's education.

## 4.2 Womens Occupational Prestige Discussion

The results from Figure 2 shows a positive trend in the level of prestige of women's occupations had a generally upward trend, meaning that women's occupation prestige is increasing over time. There are several factors that contribute to occupational prestige scores for women. Higher levels of education, such as obtaining a bachelor's or graduate degree, are generally associated with higher career prestige scores. Women with higher income levels may also have higher prestige scores. Certain job titles, such as CEO or doctor, may be associated with higher levels of prestige for women. Women who work in certain professions, such as lawyers or professors, may be considered more prestigious due to their perceived social status. Additionally, certain industries, such as finance or law, may be considered more prestigious than others. Historical and cultural factors may also influence the perception of occupational prestige for women, with certain occupations, such as being a doctor or lawyer, considered more prestigious than others.

According to a study, exclusion by gender limits women's advancement into the highest levels in male-dominated organizations (Cech and Blair-Loy 2010). Haveman and Beresford (Haveman and Beresford 2012), argued that gender inequality relates to human capital. Their theory suggests that women are less likely than men to be promoted to top management due to less educational attainment. Although this theory is not fully supported by the increasing trend of women's education credentials, women are less likely to have degrees in some of the best-paid careers. For example, as demand increases in technology fields, employers are seeking more knowledge workers from the most prestigious business schools.

Our results from Figure 2 indicate that the mean occupational prestige score increased by over 3% suggesting that there are more women working and more work looks like work that would have been associated with women in the past. According to citation, the researchers at the University of Chicago and the Chicago Federal Reserve found that over time, women have become happier and more satisfied with their work, while men have become less happy and less satisfied. The researchers offer several reasons for this gender difference. First, changing social norms have allowed more women to enter the workplace in recent decades. Second, the work options available for women have expanded dramatically since the 1950s, with more professional and managerial jobs becoming available. Third, more women than men now graduate in the United States with college and graduate school degrees, which increases their options. Finally, lower-educated women have experienced the greatest increase in workplace satisfaction, possibly because they were the most constrained under old gendered rules.

## 4.3 Womens Happiness Discussion

Figure 1, Figure 2 and Figure 3 show growth in their values, with Figure 3 specifically showing growth with the values correlated to being happy. We can reasonably deduce that there is some positive relationship between happiness, the prestige of a woman's occupation and a woman's peak education level. From (Litwin 2023), the work options for women have expanded due to an increase in education and societal factors. An increase in work options means that women are shifting into more professional jobs rather than clerical ones. These factors lead to an increase in women's happiness overall.

From (Houlis, n.d.), a factor for happiness in working women is the demolition of male-favored gendered rules in the workplace. In the workforce, the old-fashioned gendered rules dictate that men are expected to succeed and women are not. However, when women succeed, those gendered rules begin to crumble and their success is seen as a victory. Over a 20 year period, working women's happiness may not just be correlated to their job pedigree, but also due to the collapse of the negative stigma towards women in work.

## 4.4 Biases and Ethical Concerns

There is selection bias with the women that willingly participate in the survey. We are using the responses of randomly selected women that voluntarily fill out the survey to make blanket statements about all women in America. Women that fill out the GSS could differ from the majority of women in America, but because they are the ones that filled out the GSS, we are using their data to generalize the whole populace. Naturally, using data from a subset of our estimand to analyze the whole estimand will produce biased results.

Measurement bias is also a factor here. The GSS survey is conducted face-to-face with an in-person interview. This means that some of the results found in the GSS could've been influenced by having a face-to-face interview.. Some of the questions asked in the GSS may have different answers if they were asked virtually, or through the web, instead.

The 2021 GSS changed their methodology, due to the pandemic, towards a "push to web" methodology with some telephone interviews. This accounts for the increase in participation. However, once again, measurement bias comes into play as responses collected through the web may differ if the same question was asked in-person.

Other common ethical concerns with surveys relate to privacy, confidentiality and anonymity. These concerns are amplified with the GSS. Due to the highly personal nature of many of the questions in the GSS, confidentiality and anonymity are essential to preserving the integrity of both the survey and the participants. If a participant was able to be identified through their answers, the general populace's trust and confidence in the GSS would shatter, and the repercussions could cause societal harm as well.

## 4.5 Weaknesses and next steps

Our paper analyzes the highest education level of women in relation to their occupational prestige and happiness. However, our data only examines the education level of women in the US and is insufficient to support the analysis of women's general level of higher education in the world. To further strengthen our findings, we can take the GSS of other Western countries, such as Canada, and compare the data for a more multifaceted outlook. Moreover, according to Appendix G of the GSS: Prestige Score and Socioeconomic Index Distributions, the rating systems for the prestige scores were first developed through a study in 1906-1965, then updated in 1989. As society's view on the social standing of occupations has changed significantly since 1989, the old metrics used for our analysis may not accurately reflect the standards of prestige in the modern day.



## Appendix

A link to our survey further exploring the relationship between happiness, occupational prestige level and education level can be found here: <https://forms.gle/iwFwnvGxsiewoKm46>

# Work Prestige, Education Level and Happiness Survey

Occupations with higher prestige can often be only accessed by those with higher education. Happiness can have many different meanings and can come from different sources. The purpose of this survey is to get a better understanding of the relationship between work prestige level, education level and happiness.

By filling this form you acknowledge and consent to the use of your answers to better understand the relationships between occupational prestige, education level and happiness. Identifiable information will not be asked nor will your data be shared by the creators of this survey.

If you have any further questions, feedback or a follow-up to the survey, please email us at [jason\\_ngo@live.com](mailto:jason_ngo@live.com)

\* Required

1. What is your age? \*

*Mark only one oval.*

- ☐ 18-27
- ☐ 28-37
- ☐ 38 - 47
- ☐ 48 - 57
- ☐ 58 - 67
- ☐ 68 - 77
- ☐ 77+
- ☐ Prefer Not to Answer

2. What's your highest education level? \*

*Mark only one oval.*

- ☐ High School
- ☐ Bachelors
- ☐ Masters
- ☐ PhD
- ☐ Did not finish High School
- ☐ Did not finish post-secondary

3. If you did post-secondary, what did you study?

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4. How long have you been employed for? \*

*Mark only one oval.*

- ☐ 1 - 3 years
- ☐ 4 - 6 years
- ☐ 7 - 10 years
- ☐ 11+ years

5. Did you leverage your education to get your current job? \*

*Mark only one oval.*

- ☐ Yes
- ☐ No

6. Is what you do for work related to what you learned in school? \*

Mark only one oval.

☐ Yes

☐ No

7. Are you in a position of leadership at work? \*

Mark only one oval.

☐ Yes

☐ No

8. Do you feel respected at work? \*

Mark only one oval.

I do not feel respected at work

0 ☐

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

I feel extremely respected at work

9. Are you content with your position at work? \*

Mark only one oval.

I am not content with my position at work

0 ☐

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

I am extremely content with my position at work

10. Do you feel like your position is prestigious \*

*Mark only one oval.*

Not at all

0 ☐

1 ☐

2 ☐

3 ☐

4 ☐

Absolutely

11. Does the work you do make you happy? \*

*Mark only one oval.*

Not at all

0

☐

1

☐

2

☐

3

☐

4

☐

5

☐

Absolutely

## 12. Outside of work, are you happy? \*

*Mark only one oval.*

Not at all

0 ☐

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

Absolutely



13. Do you feel like the effort you put into school reflects where you are at now in your <sup>\*</sup> career?

*Mark only one oval.*

Not at all

0 ☐

1 ☐

2 ☐

3 ☐

Absolutely

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## References

- Cech, Erin A, and Mary Blair-Loy. 2010. "Perceiving Glass Ceilings? Meritocratic Versus Structural Explanations of Gender Inequality Among Women in Science and Technology." *Social Problems* 57 (3): 371–97. <https://doi.org/10.1525/sp.2010.57.3.371>.
- Haveman, H. A., and L. S. Beresford. 2012. *If You're so Smart, Why Aren't You the Boss? Explaining the Persistent Vertical Gender Gap in Management*. Edited by M. L. Huffman. *The Annals of the American Academy of Political and Social Science*. Vol. 639. <https://journals.sagepub.com/doi/10.1177/0002716211418443>.
- Houlis, Anna-Marie. n.d. *Eight Surprising Reasons Women Are Actually Happier at Work Than Men*. <https://www.ellevatenetwork.com/articles/9201-eight-surprising-reasons-women-are-actually-happier-at-work-than-men>.
- International Information Programs, Bureau of. 2012. *Chapter 2, Women and Education*. <https://opentextbc.ca/womenintheworld/chapter/chapter-2-women-and-education/>.
- Jayachandran, Seema. n.d. *The Causes and Consequences of Increased Female Education and Labor Force Participation in Developing Countries*. [https://seemajayachandran.com/female\\_education\\_employment.pdf](https://seemajayachandran.com/female_education_employment.pdf).
- Litwin, Anne. 2023. *Working Women Are Happier*. <https://www.linkedin.com/pulse/working-women-happier-anne-litwin-phd/>.
- R Core Team. 2020. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>.
- Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Golemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. <https://doi.org/10.21105/joss.01686>.
- Wickham, Hadley, Evan Miller, and Danny Smith. 2022. *Haven: Import and Export 'SPSS', 'Stata' and 'SAS' Files*. <https://CRAN.R-project.org/package=haven>.