Are Feminists Unhappier?

An Exploration Of Gender Equality and What it Means for Women's Happiness

Connie Xu

INTRODUCTION

In 2009, a working paper published by Stevenson and Wolfers found that American women experienced a decline in life satisfaction in the period between the 1970s and the 1990s, despite having made a number of gains in their level of equality to men. This paper noted that in the 1960s, American women were happier on average than American men; today, as women have gained increasing gender rights (to work, to income equality, to increased protections against discrimination, etc.), they have correspondingly become less happy than men. As such, concluded the paper, "in postfeminist America, men are happier than women" (Stevenson and Wolfers, 2009).

This paper gained fair amounts of press, as commentators from The Guardian, The Atlantic, Vox, and the New York Times, as well as writers from smaller publications and blogs, discussed the simplified findings and their implications. Some took the simple route, noting that this may be an argument that feminism is actually bad for women's happiness; others came with more nuanced arguments, noting that as feminism did continue to make gains and adapt, women were now experiencing an "expanding perceptions of our limitations" (Hirsch, 2019). Still others noted that the in-roads to equality for women still meant "absorbing the views of an older male world" (Hochschild, 2001), which would add to the pressures to women in modern culture.

While this article (and in particular the related commentary published on this article) made a number of assumptions of causation based on a potentially spurious relationship, it did give rise to a related question – are *feminists* (here defined as individuals who believe in the social, political, and economical equality of the sexes) less happy than other people overall? That is, does the rise of *feminist thought* and the rise of *valuation of gender equality* correspond with decreased overall happiness?

In answering this question, the following paper sets out to identify patterns around the relationship between women's belief in equality and happiness levels using data collected from the sixth wave of the World Values Survey (WVS). The intention is to delve deeper into the drivers in the relationship between feminist attitudes (between men and women) and happiness by looking at a variety of control variables and looking at data from countries all around the world.

My hypothesis, following some of the findings of commentators and researchers such as Hochschild, is that individuals (specifically women) who believe more in gender equality would be less happy or satisfied overall, because individuals who believe in more equality would pay more attention and be "close enough to see what we are missing." (Hirsch, 2019)

DATASET USED, VARIABLES, AND DATASET STATISTICS

Dataset and Variables:

The primary dataset used for the purpose of this project was the World Values Survey (WVS) Wave 6. The WVS is a comprehensive global survey compiled every few years to study human beliefs, values, and practices for 100 countries around the world. Per the worldvaluessurvey.org (2020) this survey is the "largest non-commercial, cross-national, time-series investigation" conducted, and is commonly used by social scientists across disciplines to explore topics such as gender equality and subjective well-being. Wave 6 was conducted during the years 2010-2014. (Refer to the description and use of the Gender Inequality Index dataset in the Control Variables Section under '**eqindex**').

I filtered by '**sex**' for all of the measures below as I am looking **only at women** for the purposes of this study. I wanted to eliminate this as a control variable as I feel that men and women may have different relationships between the independent and dependent variables detailed below (i.e., if I wanted to add gender, I feel that it would be better to run separate models entirely for the two genders).

Within this dataset, the main **independent variables** are meant to measure the belief in women's choice and freedoms. I tried to recode all of these variables such that increases correspond with the respondent's degree of support for gender equality. The following are the independent variables:

- **'wmnsrts'** – an index measuring the view of the centrality of women's rights to democracy. This variable is measured by question "E233 - Democracy: Women have the same rights as men," which is a question measured on a 10-point Likert scale. Higher values (i.e., closer to 10) correspond with individuals who feel that women's equality is essential to democracy.
- '**econeq1**' and '**econeq2**' – two indices I compiled, which in total comprise 5 questions that measure the various ways that we prioritize men in the workplace.
    - o '**econeq1**' included two questions such as "C001 – When Jobs are Scarce, Men should have more right to a job than women," which are measured on a 3-point Likert scale and recoded so that higher values would correspond with disagreement (i.e., 3="agree"). This is recoded in this way because individuals who disagree to this statement are assumed to believe that men do **not** have more rights to a job than women.

o   '**econeq2**' included four questions such as "– When a mother works for pay, the children suffer." These questions are measured on 4-point Likert scales, recoded such that higher values would correspond with stronger feelings of disagreement that men are more important/more competent in the workplace (i.e., 4= "strongly disagree").

A more detailed breakdown of these indices can be seen in **Appendix A**; note that I chose not to standardize the two indices above to a [0,1] scale and combine them into one index; however as shown in **Table 1** below, the two measures for '**econeq**' are closely correlated[1]; I will thus use one measure at a time for my initial models to avoid collinearity).

-   '**nowmnhome**' – these are two ways of understanding this variable is based on a 4-point Likert scale question "D057 – Being a housewife is just as fulfilling as working for pay." I felt that the valuation of women's work in all spheres is an example of more controversial thought around gender equality (i.e., some may feel that this is not gender equality because it discourages women in the workplace, while others may interpret it as the valuation of all work by women, paid and unpaid). In alignment with its title '**nowmnhome**' is coded such that higher values (i.e., 4) correspond with *strongly disagree* that being a housewife is just as fulfilling as working for pay.

As all of these variables were meant to measure different dimensions, I wanted to present a high-level Pearson Correlation to look at whether the independent variable measures and indices should be further combined.

TABLE 1: Pearson Correlations between
Independent Variables

term	econeq1	econeq2	nowmnhome	wmnsrts
<chr>	<dbl>	<dbl>	<dbl>	<dbl>
econeq1	*NA*	0.52766	-0.14696	0.20698
econeq2	0.52766	*NA*	-0.25989	0.23345
nowmnhome	-0.14696	-0.25989	*NA*	0.00590
wmnsrts	0.20698	0.23345	0.005890	*NA*

As shown in **Table 1,** the Pearson correlations (absolute values) are lower than 0.25 (outside of the two **econeq** values), which is a commonly used threshold for *low level of correlation*[2]. This is corroborated by a Cronbach's Alpha value of 0.18, which indicates a low level of scale reliability, as it is generally

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[1] I assumed (per popular conventions) that correlation coefficients below 0.3 were *weak,* correlations from 0.31-0.49 was *moderate*, and 0.5+ was *strong*. See cited sources for example (i.e., BMJ).

[2] Ibid.

accepted that alpha values of **0.6-0.8** correspond with fairly high intergroup correlation and indicate acceptable to high levels of scale reliability.

Meanwhile, the main **dependent variables** that I will be using are focused on measuring *happiness*. Refer to the variables below:

- **'satisfied'**, which is derived from WVS Question "A170 - Satisfaction with your life," measured on a 10-point Likert Scale (values closer to 10 correspond with higher levels of "satisfaction" with one's life). I felt that this would be a stronger variable for measuring one's happiness holistically, as this question asked about "overall satisfaction," which implies less sensitivity to the moment of the interview.

- **'happy'** – this uses WVS question A008 to look at the "feeling of happiness" in the respondent. This would potentially be a weaker measure of general happiness, as "feeling of happiness" seems to imply more fleeting feelings of joy and happiness. This variable was re-coded such that greater amounts of happiness corresponded with higher values on the 4-point Likert Scale.

- For potential logit and categorical models, I also applied min-max scaler to the two variables, and combined them to make one index, '**happinesssc**' (i.e., **happyscaled+satisfiedscaled/2**). As the correlation between these two variables is 0.48, the two variables can be considered to be *moderately correlated* (thus, combining into an index could potentially create a reliable measure of the concept).

The primary things that I want to **control** for are:

- **'age'** of the respondent (WVS Question X003)

- **'giipts'** of the respondents' country - for each country value in the WVS dataset, I appended the **Gender Inequality Index** value (GII).[3] I multiplied this factor by 100 for personal ease of interpretation (i.e., it is relatively simpler to discuss the result in terms of a 1-point increase in GII Points rather than to interpret it on a 0-1 scale for OLS regressions).

- **'incomescl'** of the respondent – measures the income level of the respondent on a 10-group scale (Question X047). Higher values correspond to higher levels of income.

- **'married'** or whether the individual is or has been married (Question X007)

- **'children'** – the number of children that the recipient has. (Question X011)

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[3] The GII dataset is an index ranging between 0 and 1, with values closer to 1 corresponding to higher levels of inequality (as measured by dimensions such as women's rights to equal healthcare, personal choice, education, political representation, and employment).

Descriptive Statistics

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┌─────────────────────────────────────────────────────────┐
│              TABLE 2A: Independent Variables              │
│  =======================================================  │
│  Statistic    N     Mean St. Dev. Min Pctl(25) Pctl(75) Max │
│  -------------------------------------------------------  │
│  econeq1   36,689 2.0    0.6    1.0   1.5      2.5    3.0  │
│  econeq2   35,235 2.5    0.6    1.0   2.0      3.0    4.0  │
│  wmnsrts   36,965 7.9    2.6    1.0   6.0      10.0   10.0 │
│  nowmnhome 37,070 2.2    1.0    1.0   1.0      3.0    4.0  │
│  -------------------------------------------------------  │
└─────────────────────────────────────────────────────────┘
```

The mean is quite high around variable '**wmnsrts**' at 7.5 / 10, indicating the general respondent population seem to find that women's equality in general is very important for functioning democracies. Following the mean for **'wmnsrts'**, the distribution shows 25% of respondents felt wholeheartedly that women's rights were central to democracy (as the 75[th] percentile of the responses was "10").

The '**econeq**' indices and '**nowmnhome**' variable are more centered in their distributions. Responses for the 'econeq' indices show that responses the 75[th] population percentile were also at the 75% point on the Likert scale (for '**econeq2**' this was ¾). This also indicated that individuals who are the top 75[th] percentile on the population's scale (going from least to most belief in women's economic equality), merely 'agreed' or were 'neutral' on these types of questions (rather than 'strongly agreeing'). The mean response for '**nowmnhome**' was 2.2/4.0, which meant that the average respondent was fairly neutral in terms of whether they believed that 'housewives are not as important as women in paying jobs'. The divide in this variable fits my expectations, as women who believe that '**wmnsrts**' are central to democracy do not universally agree about women who prefer to occupy traditionally feminine roles (i.e., there are a number of individuals who claim to believe in women's equality who conceptualize this equality in a job-market context).

In this vein, the spread standard deviation appears to be largest for '**wmnsrts**' and **'nowmnhome'** (relative to the min-max scale of these questions respectively) For '**wmnsrts**', this means that while the majority of individuals tend to skew fairly high ("8" to "10" on the Likert Scale) in believing in women's rights as central to democracy, there were also individuals who tended to '**strongly disagree**,' identifying as "1" or "2" on the Likert Scale about women's equality being central to democracy.

These differences in distributions seem to indicate to me that while people tend to agree more about whether women's equality is important in an abstract sense (i.e., central to democracy), there is more variance in regards to how people view gender equality in the context of whether one gender should be prioritized over others *in practice* or *in specific situations*(when women's rights and democracy are not stated as concepts).

TABLE 2B: Dependent Variables							
Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
happy1	37,965	0.7	0.3	0.0	0.7	1.0	1.0
satisfied1	38,012	0.6	0.3	0.0	0.4	0.8	1.0

I wanted to present the **scaled** version of my dependent variables for ease of interpretation (as **'happy'** and '**satisfied**' were on different scales. As shown above, the respondent exhibited slightly above-average levels of '**happy**' on a 0-1 scale; the 25th percentile of the standardized '**happy**' measure was higher than the 25th percentile of the standardized '**satisfied**' measure, indicating that individuals were more likely to respond that they were 'very happy' than that they were 'very satisfied overall [with life].' For both measures, the population is above average on the happiness scale (i.e., the means are 0.6 and 0.7, while the center of the scaled variables would be 0.5).

TABLE 2C: Control Variables							
Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
married	16,965	0.5	0.5	0.0	0.0	1.0	1.0
children	37,512	2.0	1.8	0.0	0.0	3.0	8.0
age	38,205	41.3	16.2	16.0	28.0	53.0	102.0
incomescl	37,184	4.7	2.1	1.0	3.0	6.0	10.0
GII	34,763	0.4	0.1	0.1	0.3	0.5	0.7

Of the control variables, it can be shown that women worldwide have 2 children on average; for **married**, the mean is 0.5 (indicating that there is an approximately equal split between female respondents who have been married vs not). I also noted that women tended to on average were slightly below the scale's in terms of income group, which made sense as '**incomescl**' is a measure of the income category or income class (proportionally to other households in the individual's country), and women on average are paid less in many countries.

MODELS

Initial Models – Simple OLS

For my first model, I ran four simple OLS models – two each with '**satisfied'** and **'happy'** respectively, in order to look at the linear relationships between the independent and dependent variables. I chose to look at one dependent variable at a time because I didn't want to start with my scaled [0,1] data index '**happinessc'** without looking at both components of this index first. Furthermore, due to collinearity between the **econeq1** and **econeq2** indices, I chose to run simple OLS regressions with one of each at a time, because I wanted to see whether one index exhibited more statistically significant results than the other. (These initial models will also be used to inform which measures of happiness and economic equality index I will use in following models). The first linear models were as follows:

$$\textbf{LM1: } satisfied = a + b_1 econeq1 + b_3 nowmnhome + b_4 wmnsrts$$
$$\textbf{LM2: } satisfied = a + b_2 econeq2 + b_3 nowmnhome + b_4 wmnsrts$$
$$\textbf{LM3: } happy \quad\;\; = a + b_1 econeq1 + b_3 nowmnhome + b_4 wmnsrts$$
$$\textbf{LM4: } happy \quad\;\; = a + b_2 econeq2 + b_3 nowmnhome + b_4 wmnsrts$$

As stated in the introduction, I hypothesized that all the relationships between the independent variables and the dependent to be **negative**.

TABLE 3: Simple OLS Models

```
===========================================================================
                                    Dependent variable:
                           ---------------------------------------
                                satisfied            happy
                             (1)       (2)       (3)       (4)
---------------------------------------------------------------------------
econeq1                    0.137***            0.034***
                           (0.021)             (0.007)

econeq2                              0.240***            0.074***
                                     (0.022)             (0.007)

nowmnhome                 -0.040*** -0.058***  0.009**    0.003
                           (0.014)   (0.014)   (0.004)   (0.005)

wmnsrts                    0.061***  0.059***  -0.001    -0.002
                           (0.005)   (0.005)   (0.002)   (0.002)

Constant                   6.068***  5.801***  3.052***  2.956***
                           (0.064)   (0.069)   (0.021)   (0.023)


---------------------------------------------------------------------
```

```
Observations                           32,139    32,139    32,139    32,139
R2                                      0.007     0.009     0.001     0.004
Adjusted R2                             0.007     0.009     0.001     0.003
Residual Std. Error (df = 32135)        2.314     2.311     0.762     0.761
F Statistic (df = 3; 32135)          71.092*** 98.612*** 10.054*** 38.140***
====================================================================
Note:                                        *p<0.1; **p<0.05; ***p<0.01
```

<u>LM 1 and LM 2:</u>

The first two models, both of which included '**satisfied**' as the dependent variable, included statistically significant relationships at the 99% confidence interval (i.e., p-value >0.01) for all of the independent variables' coefficients measuring women's equality. The R-Squared is slightly higher for LM2, as the linear model with the '**econeq2**' index explains 0.9% of variances in '**satisfied**' (overall satisfaction levels), while LM1, or the linear model with the **econ1** index, explains 0.7% of variances in overall '**satisfied**'. (Note that these r-squared values are still quite low; variances in **satisfied** are not particularly comprehensively explained).

In LM1, the coefficient (b_1) for **econeq1** is 0.13. This means that assuming ceteris paribus, as an individual moves from **agree** to **neutral** to **disagree** on questions about the prioritization of men in the job market, they increase by 0.13 points (out of 10) in overall life satisfaction (on average).

The coefficient (b_4) for **wmnsrts** is 0.06. This means that, on average, as the respondent moves from 1 to 2 or from 9 to 10 on the Likert scale (in terms of **strongly agreeing** that women's equality is essential to democracy), the respondent will correspondingly also have a 0.06 point (out of 10) increase in general satisfaction (ceteris paribus)

Finally, the coefficient (b_3) for **nowmnhome** is -0.04, meaning that on average, as the respondent moves from "strongly agree" to "agree" from "agree" to "disagree" to the statement that being a housewife is just as fulfilling as working for pay, the individual decreases in overall satisfaction by approximately 0.04 points out of 10, all else equal.

The remaining LM2 results are largely consistent with the LM1 results (the coefficient magnitude for **nowmnhome** is slightly larger for LM2, but the coefficient magnitude for **wmnsrts** is slightly smaller).

Finally, the coefficient (b_2) for **econeq2** is 0.24, which means that assuming all else is equal, as the respondent moves from "strongly agree" to "agree" (for example) to the 4-point Likert scale questions

about the prioritization of men in the economic world, they increase an average of0.24 points (out of 10) in the overall satisfaction level.

Outside of **nowmnhome**, all of the coefficients had positive relationships with *happiness*, which seems to indicate that as one identifies more with believing in gender equality, they would also tend to be above average in terms of overall satisfaction. As such, my general hypothesis that women who value women's equality more are generally less happy was **rejected**.

<u>LM 3 and LM 4:</u>

The next two models, which included **'happy'** as the dependent variable, each had fewer statistically significant relationships (compared to LM1 and LM2). Additionally, it must be noted that the R-Squared value for LM3 and LM4 are 0.001 and 0.004 respectively, which means that the models are explaining .1% and .4% of the variance respectively.

In LM3, the coefficient (b_1) for **'econeq1'** is +0.034. This means that assuming ceteris paribus, as an individual moves from *agree* to *neutral* to *disagree* on questions about the *prioritization* of men in the job market, she increases by 0.03 points out of 4 on average in in terms of how 'happy' she is feeling at the time of interview. This coefficient **was** statistically significant on the 99% confidence interval (p value < 0.01).

In LM4, the coefficient (b_2) for **'econeq2'** is 0.074. This means that assuming all else is constant, as an individual moves from *strongly agree* to *agree* or from *agree* to *disagree* on questions about the prioritization of men in the job market, they increase by an average 0.07 points out of 4. This coefficient was once more statistically significant on the 99% confidence interval (p-value < 0.01). Both of these coefficients were positive in direction and relatively small in magnitude (even when considering that the dependent variable **'happy'** is on a smaller scale compared to '**satisfied.'**

Of the remaining coefficients **'nowmnhome'** and **'wmnsrts'**, both were below 0.01 in magnitude for LM3 and LM4; furthermore, only **'nowmnhome'** for LM3 was statistically significant (p<0.05) – i.e., there is less than 5% chance that we encountered the related coefficient of 0.009 by pure chance. The directions of these coefficients were the opposite from those from LM1 and LM2; however, given the low p-values and low coefficient magnitudes, I do not find these relationships to be statistically meaningful and will not be looking further into them for the purpose of this analysis.

Summary

Looking at the statistically significant coefficients for LM1-LM4, I noted that the **dependent variable** with more variance explained by the selected independent variables was '**satisfied**,' which confirmed my prior as I thought that this was the variable that better measures happiness (as noted in the **Dataset and Variables** section). Between the independent variables for valuation of economic equality, I noted that '**econeq2**' (with 4-point Likert Scale questions) tended to involve relatively higher coefficients in relation to the dependent variables; this also made some sense because the **econeq2** index encompassed more questions within the index (**econeq1** had two survey questions coded as part of the index; **econeq2** had four).

All of this said, I noted that my R-Squared is quite low for all of these models. The best model thus far only explains 0.7% of the variance in the output. I think that this can be improved upon by subsequent models.

Finally, I noted that my initial hypothesis was rejected out of hand, as there was an overall **positive relationship** between the respondents' valuation of '**gender equality**' and the respondents' overall satisfaction ('**satisfied**')**.** I also noted that for my first model, **nowmnhome** varied negatively with the dependent variable (which made sense as the **Table 1** of correlations seemed to show the **econeq** measures varying negatively with the measure of **nowmnhome**).

As I was thus far unsure about whether '**nowmnhome**' was a good measure of the valuation of women's equality, the results from LM1 and LM2 as well as **Table 1** seem to indicate that '**housewifeeq**' (i.e., '**nowmnhome**' reverse-coded so that increases in this variable would indicate that the respondents agree more strongly that housewives are equally important as paid workers) would potentially a better and more intuitive way to measure of the valuation of gender equality; I do remain suspicious however because the descriptive statistics indicate to me that individuals may simply interpret this measure very differently from one another (and it may not be measuring the valuation of gender equality at all).

Strengths, Weaknesses, Next Step

The linear models above were able to use indexes to measure economic equality, and incorporated multiple measures of the valuation of women's equality with men.

These initial models run were limited in that they don't include controls or interaction terms for any other variables. Factors such as '**age**' and '**income**,' as well as terms such as lifestyle (e.g., if the individual has been married) and the level of inequality in the respondent's country, may also have an impact on the individual's happiness. For example, I would imagine that individuals from countries that are more inequal who themselves value equality would be less happy (vs. individuals who value equality but who live in countries that are less inequal). This concept will be explored in later models.

I would also consider running a model with '**happinessccaled**' (refer to discussion of this variable in the **Variables** section) to look at an indexed dependent variable.

Multivariate Regression with Control Variables

For my second model, I chose to include all of the control variables to see if I could gain more understanding around the relationship between the valuation of women's equality when controlling for variables '**age**,' income ('**incomescl**'), number of children ('**children**'), and whether the individual has been '**married,**' and '**giipts**'. My assumptions about the control variables are as follows:

1. As '**age**' increases, general satisfaction decreases (as optimism may decrease over one's life)
2. As income level increases, general satisfaction increases because income can often determine the access to a comfortable life.
3. As number of children increases, general satisfaction decreases (as women become busier with the duties of motherhood)
4. Women who have been married would be more satisfied with life in general controlling for other factors, because they have had a romantic partner.
5. Increased GII would lead to decreased overall satisfaction for women because inequality in reality makes people less happy.

TABLE 4: OLS models with controls

```
==============================================
                          Dependent variable:
                          --------------------------
                               satisfied
----------------------------------------------
econeq2                         0.227***
                                 (0.035)

housewifeeq                     -0.017
                                 (0.022)

wmnsrts                         0.061***
                                 (0.008)

age                            -0.013***
                                 (0.001)

married                        -0.128**
                                 (0.053)

children                        0.104***
                                 (0.015)

incomescl                       0.266***
                                 (0.010)

giipts                         -0.008***
                                 (0.002)

Constant                        5.055***
                                 (0.171)

------------------------------------------------
Observations                     12,503
R2                               0.084
Adjusted R2                      0.084
Residual Std. Error      2.265 (df = 12494)
F Statistic            143.444*** (df = 8; 12494)
==============================================
Note:                     *p<0.1; **p<0.05; ***p<0.01
```

LM5: $satisfied = a + b_1 econeq2 + b_2 housewifeeq + b_3 wmnsrts + b_4 age + b_5 married + b_6 chilren + b_7 incomescl + b_8 giipts$

As shown in **Table 4** (above), this model explains much more variance in the output ('**satisfied**') than the initial models - R-Squared is now 0.08, meaning that 8% of the variance is explained rather than less than 1%. While this is still not a particularly large amount of variance, it is certainly an improvement on the initial models.

Controlling for all variables, it appears that '**housewifeeq**' (originally '**nowmnhome**') has lost some statistical significance; that is the p-value is greater 0.05 which means that we can no longer reject the null hypothesis that this variable was as large as it was by pure chance. Outside of this variable, all other variables are *statistically significant* at the 1% level ($p<0.01$).

Of the remaining independent variables, '**econeq2**'s coefficient has increased in magnitude indicating that the control variables actually increased the meaningfulness of this variable to an individual's happiness. Now, holding all things equal, a 1 unit increase in the belief in economic equality corresponds with a 0.23-point increase on average in the individuals' overall satisfaction level.

Meanwhile, '**wmnsrts**' coefficient remained relatively the same as it was in LM1 (in magnitude, direction, and statistical significance).

Of the remaining (control variables), '**incomescl**' is fairly impactful. In alignment with my hypothesis, a 1-point (out of 10-point) increase in income level (category) corresponds with a 0.266-point increase (out of 10 points) in '**satisfaction**' Also as hypothesized, increases in inequality ('**gii**') correspond with decreases in '**satisfaction**' as a one-point *increase* in '**gii**' value corresponds with a **0.008-point** *decrease* in '**satisfaction**' on average**.** Finally, in terms of '**age**', a one-year increase in corresponds with a 0.01-point decrease in satisfaction on average; '**married**' and '**children**' have defied my expectations as each additional child seems to lead to higher levels of happiness (0.10-point increase in satisfaction per child on average), while having been married seems to correspond with lower levels of happiness (0.13-point decrease in satisfaction on average for married respondents on average). All of these coefficients are assuming ceteris paribus.

<u>Strengths, Weaknesses, Next Steps</u>

I thought that potentially, the confound with **married** would be that I coded 0 for having "never been married," whilst 1 was coded for having "been married" (which includes individuals who have been divorced, separated, and widowed). The "1" category encompasses a vast array of marital statuses; this would have potentially been better to look at for each category (using "as.factor")

TABLE 5: Correlation Table

```
=================================================
            age   children married incomescl giipts
-------------------------------------------------
age          1     0.497     0.571   -0.200    -0.181
children   0.497    1        0.548   -0.180    0.050
married    0.571   0.548      1      -0.169    -0.096
incomescl -0.200  -0.180    -0.169    1        -0.085
giipts    -0.181   0.050    -0.096   -0.085     1
-------------------------------------------------
```

At this point, I also considered the possibility of correlations between the control variables (as I realized that older women are more likely to have been married and to have children; also, individuals with children more often have been married). As shown in **Table 5** (above), the correlations between **marriage**, 'age', and **children**, are fairly high. To avoid issues of multicollinearity, I will no longer include **marriage, 'age',** and **children** simultaneously within one model.

Happiness, Equality, and Marriage

This time, I made the following adjustments:

1. I used the '**happiness**' index, which combines the 0-1 scaled measures for '**happy**' and '**satisfied**' into one index.

2. Per my findings in the previous model, I decided to only use '**marriage**' and look at it on an **as.factor** basis (as a control variable), primarily looking at how individuals who are currently "single" compare to the individuals who are "married." Because the baseline factor was "married," **as.factor 6** would tell me more about this difference; refer to **Appendix B** for the related question.

3. I removed '**housewifeeq**' as a variable partially due to its inconsistency in meaningfulness and partially because once more I am uncertain about how respondents actually interpret this (i.e., I'm not sure if it is measuring the concept of support for gender equality, which is my intended independent variable).

LM6: satisfied = $a + b_1$econeq2 + $b_2$wmnsrts + b_3(asmarried-married) + b_4(divorced-married) + b_5(separated-married) + b_6(widowed-married) + b_7(single married) + $b_8$incomescl+$b_9$giipts

TABLE 6: Happiness as Dependent Variable

```
================================================
                        Dependent variable:
                   -----------------------------
                             happiness
------------------------------------------------
econeq2                      0.017***
                              (0.002)

wmnsrts                      0.003***
                             (0.0005)

as.factor(X007)2             0.022***
asmarried vs married          (0.005)

as.factor(X007)3            -0.081***
divorced vs married           (0.006)

as.factor(X007)4            -0.029***
separated vs married          (0.009)

as.factor(X007)5            -0.096***
widowed vs married            (0.005)

as.factor(X007)6            -0.009***
single vs married             (0.003)

incomescl                    0.024***
                              (0.001)

giipts                      -0.001***
                             (0.0001)

Constant                     0.551***
                              (0.008)

------------------------------------------------
Observations                  28,371
R2                             0.098
Adjusted R2                    0.097
Residual Std. Error    0.207 (df = 28361)
F Statistic          340.987*** (df = 9; 28361)
================================================
Note:                  *p<0.1; **p<0.05; ***p<0.01
```

This model exhibited a yet higher R-Squared – the adjusted r-squared was 0.092, explaining 9.7% of the variance. Once more, all of the variables were statistically significant at the 1% level (p-value < 0.01). Finally, the scale of the dependent variable here ranges from 0-1 due to scaling, so I will be expressing the coefficients in terms of percentage change.

This time, a 1-point increase in '**econeq2**' corresponds with a 1.7% increase in the overall happiness (happy + satisfied) on average, keeping all else equal. (Note that **Table 4** demonstrated a 2.2% increase in overall '**satisfaction**' when we consider that '**satisfaction**' is on a 10-point scale and that the coefficient for '**econeq2**' was 0.22). For '**wmnsrts**'**,** a 1-point increase in the 10-point scale of believing that women's rights are central to democracy corresponds with an average of 0.3% increase in the overall happiness (happy + satisfied), assuming ceteris paribus.

Of the control variables, individuals who are divorced, widowed, and separated exhibited lower levels of '**happiness**' vs married individuals (negative coefficients indicating relative **decreases** of 3-10% in happiness vs for married individuals). For individuals who are single, I also noted that there was a 0.9% decrease in happiness relative to married individuals. (on average and assuming all things equal).

The remaining control variables exhibited similar relationships with the control variables in the previous model (e.g., 1 level increase of '**incomescl**' corresponded with increased 2% '**happiness'** –; one unit increase of '**giipts**' related to 0.1% decrease in overall happiness). Once more, these relationships were on average and assume that all else is held constant.

<u>Strengths, Weaknesses, Next Step</u>

Overall, while the R-Squared value was higher, this model detracts from focusing on the interaction between the independent and dependent variables. The variable '**married**' is categorical in nature and thus is more difficult to interpret in a regression model in this manner; it may make sense in future models to simply use '**age**' or '**children**' as control variable. Additionally, I remain unsure whether the use of '**happy**' within an index with '**satisfied**' is necessarily better than the use of only '**satisfied**' as the dependent variable. Even though '**happiness'** includes a higher overall R-Squared for the model, I will be using '**satisfied**' for my next model's dependent variable, because I think that '**satisfied**' more purely measures the construct I want to look at (i.e., overall satisfaction with one's life).

Interaction Term Model

As previously mentioned, I thought that there could be an interaction term between the respondent's home country inequality and the respondent's belief in women's rights – I wanted to see whether women who believed more in gender equality would correspondingly be increasingly less satisfied overall if the country they reside in experienced above-average Global Inequality Indices. In other words, I believe that the gap in overall satisfaction for women living in higher inequality countries vs.

for people living in lower inequality countries will widen more – due to the smaller slope of happiness for individuals in higher inequality countries as these individuals increasingly value equality.

I wanted to split GII into relatively Higher and Lower levels of Gender Inequality, splitting at 38.7 points (the median value – refer to **Figure A** and **Table 7**). The resulting term is '**giihilo**'.

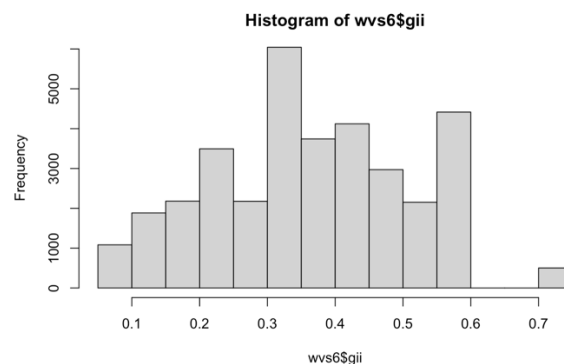**FIGURE A –** Distribution Characteristics

Histogram of wvs6$gii

TABLE 7: Detailed Descriptive – '**giipts**'

```
 Min. 1st Qu.  Median    Mean 3rd Qu.    Max.     NA's
 9.00   28.80   38.70   38.33   48.80   73.30   11235
```

I also chose only '**econeq2**' as my variable for belief in women's rights to construct the interaction variable, because I believed that this variable was more important in measuring the valuation of gender equality (as there was more variance in the responses).

LM7: satisfied = a + $b_1$econeq2 + $b_2$wmnsrts + $b_3$age + $b_4$incomescl + $b_5$giihilo + $b_6$giihilo:econeq2

TABLE 8: Interaction Term Model

```
=============================================
                         Dependent variable:
                        ---------------------------
                                satisfied
---------------------------------------------
econeq2                          0.206***
                                 (0.030)

wmnsrts                          0.056***
                                 (0.005)

age                             -0.006***
                                 (0.001)

incomescl                        0.265***
                                 (0.006)
```

```
giihilo                          -0.098
                                (0.114)

econeq2:giihilo                 -0.118***
                                (0.044)

Constant                        4.928***
                                (0.101)

-----------------------------------------------
Observations                     28,374
R2                               0.078
Adjusted R2                      0.078
Residual Std. Error    2.223 (df = 28367)
F Statistic          398.310*** (df = 6; 28367)
===============================================
Note:                 *p<0.1; **p<0.05; ***p<0.01
```

I noted firstly that the adjusted r-squared is smaller than some of the previous models (i.e., **LM5** and **LM6**). This being said, it must be noted that this model no longer includes the three components with moderate to high levels of correlation ('**age**,' '**children**,' and '**married**'). Additionally, R-Squared seems to be higher for models with **happiness** index (of short-term happiness and longer-term satisfaction) – refer to **Appendix D** for an output summary of the above model, which includes an r-squared of 0.083.

When looking at the interaction term '**econeq2:giihilo**,' I noted that the interaction term agreed with my hypothesis (refer to **Appendix C** of a rough visualization of this interaction term). I did note that '**giihilo**' as a standalone variable did lose some statistical significance for its related coefficient; the p-value was above 0.05, which meant that I could **not** reject the null hypothesis that this coefficient was as large as it is by chance. When the interaction term is in the model '**giihilo**' refers instead to the happiness level as the gii goes from high to low where the '**econeq2**' is 0 (i.e., it is an intercepts of sorts). Thus, the most important term here is '**econeq2:giihilo**,' indicating that while individuals from countries with lower than average *specific* or *economic* gender inequality increased their overall satisfaction by 0.2 points for each point increase in belief in gender equality, individuals from countries with higher-than-average global inequality tended to lose 0.12 points on average for each point increase in belief in gender inequality. **Econeq2** and **econeq2:giihilo** are both statistically significant at the 1% level (i.e., $p<0.01$).

'**wmnsrts**' continued to vary positively with overall satisfaction, as individuals who believe in women's rights as central to democracy experienced a 0.05-point increase in overall satisfaction for each point

increase in belief in *abstract* gender equality, assuming ceteris paribus. The remaining control variables '**age**' and '**incomescl**' were statistically significant at the 1% level and were in a similar general magnitude and direction with previous models (e.g., LM5).

Ordinal Logit Equation

Even though variables that are on a Likert scale (such as '**satisfied**') can be analyzed with OLS, there are some weaknesses with the use of this type of model in this context. In using OLS, we are assuming that the relationship is linear (i.e., between the independent and dependent variables). I further noted that while OLS models assume the "distance" between two points of the dependent variable would be equivalent (for '**satisfied**', that would mean the "distance" between 1 and 2 on the scale is presumed same as the distance between 7 and 8, etc.), ordinal logit does not make such assumptions, accounting for proportionality from one category-break to the next (Eirich, 2020).

For this final model run, I used the same variables as in the previous model (without the interaction in the equation); these variables were all ordinal or continuous in nature, making interpretability more possible.

TABLE 9: Ordinal Logit Equation

```
Call:
vglm(formula = satisfied ~ econeq2 + wmnsrts + age + incomescl +
    giipts, family = propodds, data = wvs6)

Coefficients:
               Estimate Std. Error z value Pr(>|z|)
(Intercept):1  2.1100104  0.0825539  25.559  < 2e-16 ***
(Intercept):2  1.6167636  0.0805544  20.070  < 2e-16 ***
(Intercept):3  1.0133596  0.0791705  12.800  < 2e-16 ***
(Intercept):4  0.5058252  0.0785810   6.437 1.22e-10 ***
(Intercept):5 -0.3583598  0.0783054  -4.576 4.73e-06 ***
(Intercept):6 -0.9407478  0.0784378 -11.994  < 2e-16 ***
(Intercept):7 -1.6360715  0.0788144 -20.759  < 2e-16 ***
(Intercept):8 -2.5445498  0.0795970 -31.968  < 2e-16 ***
(Intercept):9 -3.2287973  0.0804870 -40.116  < 2e-16 ***
econeq2        0.0940384  0.0173398   5.423 5.85e-08 ***
wmnsrts        0.0537038  0.0040356  13.307  < 2e-16 ***
age           -0.0038753  0.0006634  -5.842 5.16e-09 ***
incomescl      0.2138306  0.0050317  42.497  < 2e-16 ***
giipts        -0.0074714  0.0007193 -10.387  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of linear predictors:  9
Residual deviance: 123422.9 on 264865 degrees of freedom
Log-likelihood: -61711.45 on 264865 degrees of freedom
```

As shown above, each 1-point increase in **econeq2** (on the 4-point scale of valuing gender equality) increases the individual's log odds by 9% on average that they will be one category (on the scale of 10) more satisfied overall in life, net of other factors; each 1-point increase in **wmnsrts** (on the 10-point scale of valuing women's equality as essential to democracy) increases the respondent's log odds by 5% of jumping one category of satisfaction in life, net of other factors.

The remaining control variables were once more consistent in terms of the relationship between variables '**age**', '**incomescl**', and '**giipts**;' as the control variables with negative coefficients in previous models LM1-2 and LM 5-7 were '**age**' and '**giipts**,' and the same variables in this ordinal logit model were negative. For example, this meant that as the General Inequality Index of the respondents' country increases by one point, there is also a decrease on the individual's log odds by 0.7% on average that they will jump a category (on the 10-point Likert-scale) of being more satisfied overall in life.

Finally, it must be noted that all of these results were statistically significant at the 0.1% level (i.e., $p<0.001$)

CONCLUSION

Results

Overall, I think that while my latter two models did not have the highest R-Squared values[4], they were the best at measuring the relationships I am seeking to look at. For example, LM7 gave me information about **satisfied** in relation to **econeq2** and **wmnsrts**, with the interaction variable between **econeq2** and relative **GII** (i.e., high vs low Indices of Inequality); while the final (Ordinal Logit) included methodological strengths, in that it accounts for non-linearity in ordinal dependent variables such as the Likert-scale measure of **satisfied.**[5]

I did note that the direction and relative magnitudes of my variables were quite consistent even when using different indices and coding variables in different ways. Most importantly, it was shown that **econeq2** and **wmnsrts** varied positively with an individual's overall satisfaction (ceteris paribus), leading me to **reject** my primary hypothesis that (on a global level) as individuals increasingly value

---

[4] Note that I had issues generating the pseudo-R-Squared for my final model and instead relied on interpreting the coefficients to simply understand more about the relationship

[5] Note that I had also had problems running Brant test for my regressions – as such I chose to look at the strength of my models through r-squared, statistical significance of the most important variables, correlations between variables within my models, and my understanding of what each variable is purporting to measure

gender equality, they are also increasingly satisfied with life overall. Through this finding, it could be that these explorations of "unhappy feminists" tells only one side of the story. An alternative theory that could explain this phenomenon is that individuals with **any** strong view (and having a correspondingly supportive community), such as a strong belief in women's equality, could also lead to more life certainty and happiness (O'Rourke, 2006).

As proposed by some, it is also possibly not the valuation of gender equality that makes individuals unhappy, but spurious factors that should be **controlled for.** In this vein, I also wanted to highlight a few consistencies between my models in terms of the impact of **'age', 'incomescl'**, and **'GII'**. It was consistently shown that, as an individual grew older, they were on average less satisfied overall. I think that this finding was fairly difficult to interpret (as many things happen over the course of one's lifetime) – one insight could be that these women have simply had more negative experiences (note also that this finding was contrary to other research as findings have typically shown that individuals are happier over time). I also noted that higher inequality often corresponded overall with lower levels of satisfaction of respondents, holding other factors constant, which makes sense intuitively as women would be the targets of most issues of gender inequality. Finally, income scale increases tended to correspond with decreases in satisfaction. This meant that individuals in higher income brackets (or higher income categories) would be more satisfied overall with life, which once more makes sense as individuals with more money tend to live more comfortably and have access to things that can support individuals' overall satisfaction levels.

Reflections

Based on the work done, I would have potentially done well to begin with a *simpler* model (i.e., with *one measure* of the independent variable) and built from it. Additionally, when changing elements of models, it would have served better for the purpose of comparability to make one change at a time (e.g., changing only the independent variable or changing only the dependent variable, changing the model type and making fewer changes to the independent and dependent variables, etc.)

I also made a number of assumptions around (1) what a generally assumed strong correlation is, and (2) what the questions in the survey seem to be measuring (conceptually). Given more time, I would like to look at other studies using the same data and see if other researchers have the same interpretations of the concepts captured in the WVS questions as I had.

If I had more opportunity to look into different types of models, I would have focused more on models such as the ordinal logit, rather than focusing so strongly on OLS. Finally, I initially uploaded the Time Series dataset from the WVS (Waves 1 to 7) with the intention of running First Differences models to look at the relationship between the individual's valuation of gender equality and the individual's happiness. However, after completing a substantial portion of the models, I noted that this data set was (while longitudinal) not run on the same individuals, meaning that it would not be possible to run panel models on individuals; as such, the models above are still subject to issues of individual heterogeneity, or the concept that there are variances between any two individuals (which is difficult to control for without the existence of panel-based data run on the same individuals over time).

Finally, it would be good to delve deeper into the impact of the uneven distributions (e.g., variable **wmnsrts** tended to concentrate more around the upper values as most respondents tended to "strongly agree" that women's equality is central to democracy), and look into how the models above would be different for men vs. for women (i.e., in this paper, I only looked at female respondents' values of gender equality and overall satisfaction, because I felt that men's models of the sort tested above would be somewhat different).

APPENDIX A – Pearson Correlations between measures within **'econeq'**

- term	C001	D066_B	D061	D059	D060	D078
- <chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
C001	*NA*	0.2999471	0.2781859	**0.4492246**	0.3154560	**0.4436948**
D066_B	0.2999471	*NA*	0.2569328	0.2785007	0.2251569	0.2761854
D061	0.2781859	0.2569328	*NA*	0.3342564	0.2693412	0.3128284
D059	**0.4492246**	0.2785007	0.3342564	*NA*	0.4067973	**0.6537162**
D060	0.3154560	0.2251569	0.2693412	0.4067973	*NA*	0.4911468
D078	**0.4436948**	0.2761854	0.3128284	**0.6537162**	0.4911468	*NA*

```
The following is the correlation matrix for the raw question variables below (not yet
recoded to directionally vary with strength of belief in women's' equality) — the
purpose is to understand intercorrelation between measures of economic equality /
inequality assumptions.


C001. When jobs are scarce, men should have more right to a job than women

D066_B. If a woman earns more money than her husband, it's almost certain to cause
problems

D061. When a mother works for pay, the children suffer

D059. On the whole, men make better political leaders than women do

D060. A university education is more important for a boy than for a girl

D078. On the whole, men make better business executives than women do
```

Note: as shown above, many of these variables are **moderately** or **highly correlated**; additionally, the chrohnbach's alpha was 0.78, which corresponds to fairly high levels of inter item correlation and falls within the generally accepted range of indices with a high level of reliability.

When I later separated these variables based on scale (0-4 vs 0-3) to create two separate indices, I obtained alphas of 0.76 (for the questions D061, D059, D060, and D078); the correlation between C001 and D066_B can further be seen to have correlation of 0.3, which can be said to be a **moderate correlation**.

APPENDIX B – Marital Status (Question X007)

1 Married

2 Living together as married

3 Divorced

4 Separated

5 Widowed

6 Single/Never married

APPENDIX C – Valuation of Gender Equality vs Overall Satisfaction (For higher vs lower gii countries)
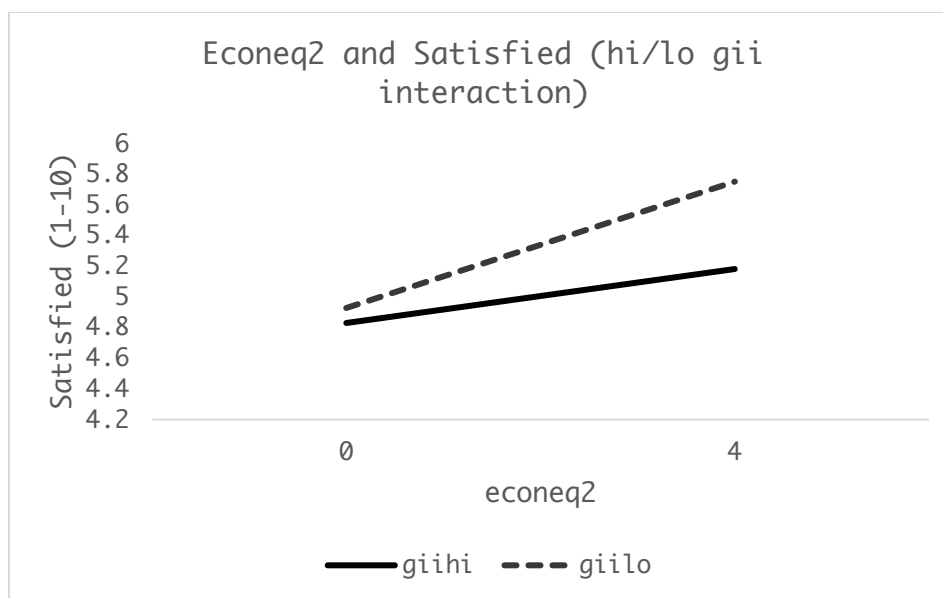
APPENDIX D – LM7 with **happinesssc** as the dependent variable

```
================================================
                  Dependent variable:
                 ---------------------------
                        happinesssc
------------------------------------------------
econeq2                    0.016***
                           (0.003)

wmnsrts                    0.003***
                           (0.0005)

age                       -0.001***
                           (0.0001)

incomescl                  0.025***
                           (0.001)

giihilo                   -0.052***
                           (0.011)

econeq2:giihilo            0.005
                           (0.004)

Constant                   0.556***
                           (0.009)

------------------------------------------------
Observations               28,374
R2                         0.083
Adjusted R2                0.083
Residual Std. Error    0.208 (df = 28367)
F Statistic        426.526*** (df = 6; 28367)
================================================
Note:              *p<0.1; **p<0.05; ***p<0.01
```

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