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**Gerhard Meisenberg & Michael A. Woodley**

**Journal of Happiness Studies**

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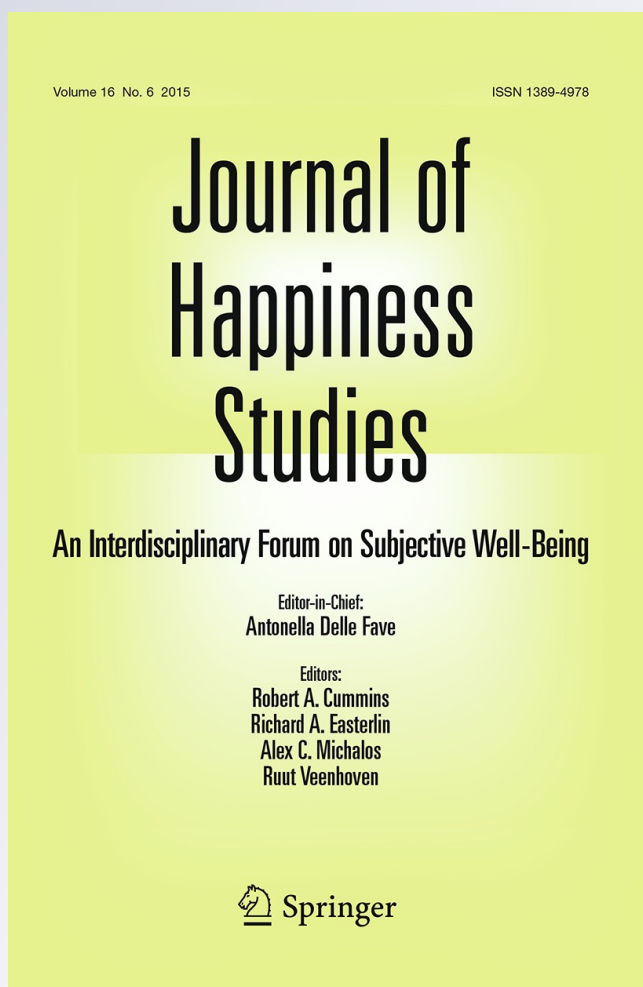
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# Gender Differences in Subjective Well-Being and Their Relationships with Gender Equality

Gerhard Meisenberg · Michael A. Woodley

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**Abstract** Although most surveys of happiness and general life satisfaction find only small differences between men and women, women report slightly higher subjective well-being than men in some countries, and slightly lower subjective well-being in others. The present study investigates the social and cultural conditions that favor higher female relative to male happiness and life satisfaction. Results from more than 90 countries represented in the World Values Survey show that conditions associated with a high level of female relative to male happiness and life satisfaction include a high proportion of Muslims in the country, a low proportion of Catholics, and absence of communist history. Among indicators of gender equality, a low rate of female non-agricultural employment is associated with higher female-versus-male happiness and satisfaction. Differences in the rate of female non-agricultural employment explain part of the effects of communist history and prevailing religion. They may also explain the recent observation of declining female life satisfaction in the United States.

**Keywords** Happiness · Life satisfaction · Women · Gender equality · World Values Survey

## 1 Introduction

*...women have made substantial progress toward gender equality over the past 25 years across a number of dimensions. Gender differences in labor force*

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*participation have narrowed sharply....Differences between men and women in occupations, types of education, and rates of self-employment have been greatly diminished; and women have narrowed the gender wage gap substantially.* (Blau 1998, p. 160).

The above quotation celebrates progress toward gender equality as a success for women. Although not saying so explicitly, it implies that women are now better off than before as a result of greater gender equality. If women are indeed the main beneficiaries of these developments, we can predict that women's subjective well-being has improved not only in absolute terms, but also in relation to men's. However, there is no empirical support for this prediction. In the United States, female happiness and life satisfaction may have declined marginally since the 1970s, despite a secular trend towards greater gender equality. Women, who had higher subjective well-being than men until the early to mid-1980s, have reported lower life satisfaction than men since at least the late 1990s (Blanchflower and Oswald 2002; Ross 2011; Stevenson and Wolfers 2009; but see also Herbst 2011). In Britain, the gender difference in life satisfaction has remained essentially unchanged between 1972 and 1998 (Blanchflower and Oswald 2002). If gender equality does promote the subjective well-being of women, either it raises male well-being to at least the same extent, or the positive effects on female well-being are cancelled by other trends that are unfavorable for women.

Possible reasons for the lack of progress in female well-being are being debated. Stevenson and Wolfers (2009, p. 27) speculate about the possibility that certain general social trends, such as rising neuroticism, decreased social cohesion and greater household risk had greater impact on women than men. Gender-specific effects of the contraceptive pill have been proposed as a more specific reason (Pakaluk and Burke 2010, cf. Pezzini 2005). The introduction of mutual consent divorce laws has been proposed as a possible countervailing trend that may have cancelled beneficial effects of gender equality on female subjective well-being (Pezzini 2005).

Most of the studies cited above are analyses of subjective well-being trends in advanced industrial societies. Alternatively, gender gaps can be studied in cross-sectional studies at the country level. At least three studies of this kind have been performed to date. The first, by Sabrina Vieira-Lima, studied a sample of 80 countries from the World Values Survey (WVS), concluding that "women are happier than men in most African and many developing countries, and less happy in around 15 European and other industrialized countries" (Vieira Lima 2011, p. 1), and "objective matters of female rights and achievements display a negative impact on women's happiness, whereas national beliefs that would favour men at the expense of women in economic and political terms would grant them happiness" (ibid., page 15). The second study, by Arrosa and Gandelman (2013), found women happier than men in most countries. Relating this difference to objective conditions, they concluded that "the happiness gap cannot be explained by observables, quite the contrary, the differences in the objective individual determinants of happiness suggest women should be less happy than men" (Arrosa and Gandelman 2013, p. 19). In a third study (Tesch-Römer et al. 2008), the authors reported a correlation of  $-0.10$  between relative female life satisfaction and relative female economic activity rate for a sample of 57 countries. These authors propose that cultural attitudes to economic gender equality determine the direction in which objective gender equality is related to subjective life satisfaction.

Cross-temporal and cross-country approaches are complementary. Both are confounded by unmeasured variables that correlate with trends or cross-country differences,

respectively, in measures of subjective well-being and gender equality. These unmeasured confounding variables can be different in cross-temporal and cross-country studies.

In this study we use a cross-sectional approach to test the hypothesis that greater gender equality raises female relative to male well-being. We predict that in “patriarchal” societies with traditional gender roles, men will report higher subjective well-being than women; and in societies with greater gender equality, women’s subjective well-being will be at least as high as that of men. More generally, the question is: what social, economic and cultural conditions favor female over male subjective well-being and vice versa? In theory, knowledge about the conditions that favor either male or female well-being can be used to predict differential effects of social changes on male versus female subjective well-being.

## 2 Methods

### 2.1 Subjective Well-Being Measures

Measures of *Happiness* and *Satisfaction* are from the WVS Official Aggregate v.20090901, 2009, available at [www.worldvaluessurvey.org](http://www.worldvaluessurvey.org). Interviews were conducted between 1981 and 2008 with 355,298 respondents in 96 countries and territories. Answers to two questions were used: (1) *Taking all things together, would you say you are very happy—quite happy—not very happy—not at all happy*; and (2) *All things considered, how satisfied are you with your life as a whole these days? 10-step scale*. The country-level correlation between these two subjective well-being measures is .744. For ease of presentation, raw scores were converted to a scale with zero as the lowest and ten as the highest possible score. The measure of gender differences was the unstandardized B coefficient in country-level regressions predicting happiness or satisfaction with gender, age and survey year. Positive values indicate higher scores for females. Sample sizes ranged from 986 (Zimbabwe) to 11,203 (Spain).

### 2.2 Development Indicators

*Intelligence* is the average of IQ (Lynn and Vanhanen 2012) and school achievement in international testing programs for those countries that have both measures, with weighting for data quality as described in Meisenberg and Lynn (2011). IQ or school achievement alone was used for countries having only one of these measures. The correlation between school achievement and IQ is .885 ( $N = 100$  countries).

*Education* measures length of schooling for adults 15+ years old (1995–2010 average), based on the Barro-Lee data set (<http://www.barrolee.com/data/dataexp.htm>). Missing data points were extrapolated from World Bank and United Nations sources.

*lgGDP* is log-transformed per capita GDP (1985–2005 average) adjusted for purchasing power from the Penn World Tables (Heston et al. 2011), with missing data extrapolated from the World Development Indicators of the World Bank.

*No corruption* is a composite of Transparency International’s Corruption Perception Index for the years 1998–2003 (<http://www.transparency.org>) and the *no corruption* measure of the World Bank’s Governance Indicators, 1996–2005. Scores from these two sources correlate with a Pearson’s  $r$  of .971 for the 135 countries having both measures. High values indicate low corruption.

*Political freedom* is averaged from two source variables: (1) averaged scores of political rights and civil liberties from Freedom House at <http://www.freedomhouse.org/research/freeworld>, average 1985–2008; and (2) the Voice and Accountability measure of the World Bank's Governance Indicators, 1996–2008 average, from [www.govindicators.org](http://www.govindicators.org). The correlation between these two measures is  $r = .963$ ,  $N = 177$  countries.

## 2.3 Measures for the Status of Women

*Income ratio* is the female/male income ratio. The measure is averaged from data reported in the 2004 and 2005 Human Development Reports covering the time between 1991 and 2002, published at <http://hdr.undp.org/en/reports/global/>.

*m–f years in school* is the male–female difference in length of schooling for the population aged 15+, 1985–2005 average according to the Barro-Lee data set, high values indicating more female schooling.

*f/m enrolment* is the average of the gender parity indices (ratio of girls/boys enrolled) for secondary education and tertiary education published by the United Nations. (<http://mdgs.un.org/unsd/mdg/Data.aspx>), average of the years 2000, 2005 and 2010.

*f in parliament* is the proportion of seats in parliament occupied by women, 1990–2011 average, from the Millennium Development Goals indicators of the United Nations at <http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=557>.

*f managers* is the proportion of females among legislators, officials and managers, 1995–2005 average, published by the World Bank at [data.worldbank.org](http://data.worldbank.org).

*f/m labor force* is the female/male ratio in the labor force participation rate, 1990–2010 average from the United Nations at <http://data.un.org/Data.aspx?q=labour&d=GenderStat&f=inID%3a106>.

*f non-agricultural employment* is female non-agricultural employment as percent of the total, 1990–2010 average from the United Nations at <http://data.un.org/Data.aspx?d=MDG&f=seriesRowID%3A722>.

## 2.4 Other Indicators

World regions are defined based on the system developed in Inglehart et al. (2004). They include Protestant Europe, Catholic Europe and Mediterranean (including Greece, Cyprus, Israel), the English-speaking countries (Britain, Ireland, USA, Canada, Australia, New Zealand), the ex-communist countries of Eastern Europe and the former Soviet Union, Latin America, the Muslim Middle East (defined here as the predominantly Muslim countries from Morocco to Pakistan), South and Southeast Asia (from India to Indonesia and the Philippines excluding Singapore, which has an ethnic Chinese majority), East Asia (China, Taiwan, South Korea, Japan, Hong Kong, Singapore), and Sub-Saharan Africa.

## 2.5 Weighting of Country Samples

In correlations and regressions (reported in Tables 1, 2, 3, 4, 5, 6), the country average was the unit of analysis independent of the country's size or number of respondents in the WVS. When averages were formed for different world regions (reported in Fig. 1), each country was weighted by the number of respondents interviewed in that country. In the WVS, larger countries (e.g., Spain) usually have larger sample sizes than smaller countries in the same world region (e.g., Andorra).

**Table 1** Correlations of country averages in subjective well-being measures (Happy, Satisfied) and their gender differences (f–m Happy, f–m Satisfied, positive values indicating higher female happiness or satisfaction) with development indicators and with measures of gender equality or female status

	Happy	Satisfied	f–m Hap	f–m Sat	Intellig.	Educ.	lgGDP	No Corr.	Freedom	N
Satisfied	.739***	1								93
f–m Happy	.197	.108	1							93
f–m Satisfied	.136	–.095	.768***	1						93
Intelligence	–.022	.351**	.076	–.065	1					93
Education	–.093	.266*	.052	–.120	.752***	1				93
lgGDP	.264*	.642***	.116	–.104	.797***	.750***	1			93
No corruption	.455***	.679***	.204	.015	.631***	.554***	.821***	1		93
Political freedom	.368***	.650***	.011	–.148	.548***	.584***	.750***	.813***	1	93
f/m Income ratio	–.123	–.127	–.079	–.031	.213*	.201	–.025	.201	.172	89
f–m years in school	.131	.340**	–.200	–.374***	.345**	.474***	.374***	.359**	.512***	84
f/m enrolment	.022	.394***	–.085	–.233*	.553***	.704***	.625***	.385***	.473***	87
f in parliament	.175	.255*	–.049	–.030	.313**	.248*	.299**	.491***	.397***	90
f managers	–.010	.075	–.213	–.281*	.102	.330**	.113	.151	.335***	80
f/m labor force	–.207*	–.171	–.334**	–.305**	.206*	.288**	–.019	.145	.197	92
f non-agric. empl.	–.073	.220*	–.318**	–.420***	.586***	.606***	.502***	.427***	.514***	90

N = number of countries

Statistical significance (2-tailed): \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$



**Table 2** Correlations among indicators of female status (Pearson's  $r$ )

	f/m inc. ratio	f–m Y in Sch	f/m enrolment	f in parliament	f managers	f/m labor f.
f–m years in school	.325**	1				
f/m enrolment	.032	.653***	1			
f in parliament	.480***	.269**	.150	1		
f managers	.295**	.732***	.676***	.233*	1	
f/m labor force	.821***	.479***	.218*	.492***	.483***	1
f non-agric. employ.	.604***	.707***	.562***	.439***	.701***	.798***

N = 92 countries

Statistical significance (2-tailed): \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Table 3** Regression models predicting average happiness in countries (males and females combined)

	1	2	3	4	5	6	7	8
Intelligence	–.126	–.082	–.070	–.151	–.065	–.091	–.131	–.097
Education	–.159	–.183	–.282	–.133	–.152	–.151	–.167	–.177
lgGDP	.083	.211	.086	–.141	.050	.277	.118	.117
No corruption	.323	.202	.401*	.416	.336	.302	.301	.232
Political freedom	.089	–.004	–.064	.005	.049	–.235	.078	–.071
Communism	–.456***	–.560***	–.497***	–.562***	–.486**	–.585***	–.471**	–.633***
f/m income ratio		.089						
f–m years in School			.235*					
f/m school enrolment				.246*				
f in parliament					.010			
f managers						.184		
f/m labor force							.033	
f non-agric. employ								.216
N	93	89	84	87	90	80	92	90
Adj. R <sup>2</sup>	.494	.504	.534	.543	.493	.541	.488	.529

Standardized  $\beta$  coefficients are shown

Statistical significance (2-tailed): \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## 2.6 Strategy of the Study

The relationship of gender differences in subjective well-being with culturally defined world regions was investigated initially (Fig. 1), based on the expectation that major cultural differences in gender roles might plausibly be related to gender differences in subjective well-being. The remainder of the study consists of an effort to define which aspects of cultural variation and specifically, which aspects of gender equality are related to these gender differences.

**Table 4** Regression models predicting average life satisfaction (males and females combined)

	1	2	3	4	5	6	7	8
Intelligence	-.121	-.045	-.102	-.067	-.047	-.081	-.100	-.086
Education	-.289*	-.285*	-.389**	-.373**	-.280*	-.247	-.265	-.298*
lgGDP	.626**	.584*	.662**	.417*	.579**	.709***	.525*	.649**
No corruption	.117	.118	.178	.252	.129	.132	.177	.049
Political freedom	.277*	.242	.135	.141	.247	.039	.309*	.183
Communism	-.171	-.201	-.165	-.272*	-.207	-.260*	-.126	-.276*
f/m income ratio		-.042						
f-m years in school			.212*					
f/m school enrolment				.328**				
f in parliament					-.004			
f managers						.111		
f/m labor force							-.092	
f non-agric. employm.								.117
N	93	89	84	87	90	80	92	90
Adj. R <sup>2</sup>	.599	.588	.601	.642	.596	.615	.599	.601

Standardized  $\beta$  coefficients are shown

Statistical significance (2-tailed): \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Measures of general social and economic development were included although these are, in most cases, expected to affect male and female well-being in similar ways. To the extent that these development indicators are associated with gender differences in subjective well-being measures, we hypothesize that these relationships are mediated by one or another aspect of gender equality that impacts men and women in different ways. For example, gender roles may be related systematically to prosperity, democracy, or communist history.

Table 1 reports the zero-order correlations of subjective well-being measures and their gender differences with plausible correlates. Because correlations between measures that operationalize different aspects of gender equality are not always high (Table 2), and there is no theoretical reason to expect that all aspect of gender equality have the same well-being effects, composite measures of gender equality were avoided. Because gender equality can be related to overall subjective well-being for men and women combined, as well as to gender differences, regression models were used in which the outcome variable was either the average level of happiness or life satisfaction (Tables 3, 4), or their gender difference (Tables 5, 6). All statistical analyses were done using SPSS 16.0.

### 3 Results

#### 3.1 Magnitude and Geography of Gender Differences

Among the 95 countries in the sample, happiness was greater for women in 50 countries, and greater for men in 45 countries. Life satisfaction was higher for women in 49 countries and higher for men in 46 countries. Most gender differences were small, with average absolute size of .178 for happiness and .159 for satisfaction, both on the zero-to-10 scale. Gender

**Table 5** Regression models predicting gender differences in average happiness

	1	2	3	4	5	6	7	8
Intelligence	.291	.171	.143	.176	.181	.212	.294	.271
Education	.496**	.515**	.510**	.517*	.473*	.549**	.572**	.527**
lgGDP	-.453	-.450	-.249	-.277	-.409	-.549*	-.819**	-.424
No corruption	.317	.389	.357	.249	.430	.470*	.605**	.433*
Political freedom	-.512**	-.455*	-.586**	-.448*	-.487**	-.506*	-.391*	-.238
Communism	-.710***	-.604**	-.608**	-.620**	-.629***	-.602**	-.473**	-.259*
Happiness avg.	-.067	.023	-.070	-.002	-.027	.000	-.056	.109
f/m income ratio		-.019						
f-m years in School			-.095					
f/m school enrolment				-.124				
f in parliament					-.143			
f managers						-.118		
f/m labor force							-.375**	
f non-agric. employm.								-.537***
N	93	89	84	87	90	80	92	90
Adj. R <sup>2</sup>	.249	.221	.257	.200	.223	.252	.300	.339

Standardized  $\beta$  coefficients are shown

Positive values indicate an effect favoring female over male happiness

Statistical significance (2-tailed): \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

differences reached a statistical significance level of  $p < .05$  (two-tailed  $t$  test) in 43 countries for happiness and in 33 countries for life satisfaction: Women were significantly happier than men in 27 countries and more satisfied in 21 countries; and men were significantly happier than women in 16 countries and more satisfied in 12 countries. This confirms the finding of Arrosa and Gandelman (2013) that women are happier than men in most countries. Gender differences for happiness correlated with those for life satisfaction at  $r = .772$ . The correlations of *absolute* sex differences with sample size are  $-.142$  for happiness and  $-.164$  for life satisfaction (both non-significant with  $N = 95$  countries). Because true effect sizes of gender differences scatter closely around zero, and because smaller sample sizes cause larger deviations from the true values, the small magnitude of these negative correlations indicates that insufficient sample size plays a minor role in the measured sex differences.

The geographic distribution of gender differences is shown in Fig. 1. We see that women tend to be happier and more satisfied than men in the Muslim countries ("Middle East"), followed by East Asia. The three world regions in which men report higher happiness and life satisfaction than women are the ex-communist countries, Catholic Europe, and Latin America. Some of these differences are statistically significant. For example, comparison of the 9 countries of the Muslim Middle East with the remaining 86 countries produces significant differences for happiness ( $p = .018$ ) and life satisfaction ( $p = .003$ ). Comparing the 23 ex-communist countries with the rest of the world produces significance

**Table 6** Regression models predicting gender differences in average life satisfaction

	1	2	3	4	5	6	7	8
Intelligence	.374	.312	.272	.363	.299	.227	.341	.332
Education	.337	.350	.443*	.327	.339	.310	.396*	.336
lgGDP	−.543*	−.569	−.492	−.529	−.544	−.669*	−.890**	−.481
No corruption	.274	.322	.318	.316	.312	.481*	.604**	.419*
Political freedom	−.388*	−.379*	−.395*	−.423*	−.384*	−.319	−.255	−.178
Communism	−.674***	−.643***	−.535**	−.605***	−.633***	−.529**	−.420*	−.303
Satisfaction avg.	−.228	−.194	−.184	−.144	−.204	−.226	−.268	−.150
f/m income ratio		.016						
f–m years in School			−.236					
f/m school enrolment				−.069				
f in parliament					−.024			
f managers						−.159		
f/m labor force							−.393**	
f non-agric. employm.								−.514**
N	93	89	84	87	90	80	92	90
Adj. R <sup>2</sup>	.220	.176	.258	.168	.174	.220	.273	.277

Positive values indicate an effect favoring female over male satisfaction

Standardized  $\beta$  coefficients are shown

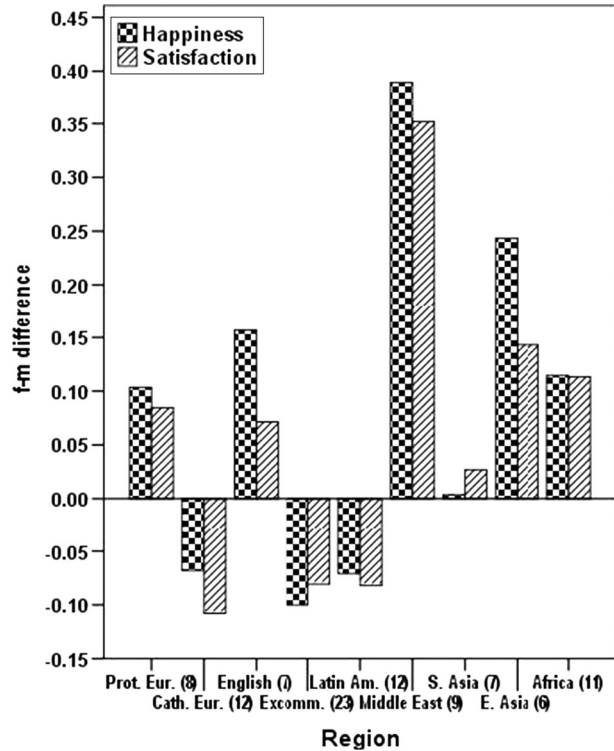
Statistical significance (2-tailed): \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

levels of  $p < .001$  for both happiness and satisfaction. These observations show that the global patterning of gender differences in happiness and life satisfaction is not entirely random.

### 3.2 Gender Differences and Development Indicators

Earlier studies have shown that in factor analysis of the WVS (at both the individual and country levels), the subjective well-being measures load on the dimension that Inglehart and Baker (2000) described as “survival versus self-expression” and that Meisenberg (2004) called “postmodern.” This dimension is related most strongly to freedom from corruption and to material wealth (Meisenberg 2004). Therefore the relationships between the well-being measures, their gender differences, and five different development indicators were investigated. Their correlations are included in Table 1. As expected, correlations among the development indicators are high. Higher absolute levels of happiness and life satisfaction (men and women combined) are robustly related to the absence of corruption, greater political freedom, and higher per-capita GDP. Intelligence and education appear to be less important. The correlations are higher for life satisfaction than for happiness.

**Fig. 1** Gender differences for average self-reported happiness and life satisfaction in different world regions. Positive values indicate greater female happiness or satisfaction. Numbers in parentheses behind world regions are the numbers of countries. Country averages are weighted for sample size.



However, gender differences in happiness and life satisfaction are virtually unrelated to the development indicators.

### 3.3 “Status” of Women and Gender Differences in Subjective Well-Being

The seven indicators of female status defined in the Methods section include one measure of earnings equality, and two each of female education (years in school and school enrolment ratios), representation of women in high-status positions (parliamentarians, officials and managers), and gainful employment (labor force participation, non-agricultural employment). Table 2 shows that correlations between these measures are generally positive, but not always large.

Table 1 shows that in general, the female status indicators are positively correlated with the development indicators, showing greater gender equality or higher female status in the more prosperous and complex societies. We further see in Table 1 that although some indicators of female status are related to higher life satisfaction, the relationships are modest in size. More surprising is that the correlations between the gender equality indicators and relative female (vs. male) subjective well-being have negative signs: If anything, higher female status and/or greater gender equality are associated with *lower* female relative to male happiness and life satisfaction. Specifically, female well-being appears to be compromised (or male well-being enhanced) by high female involvement in gainful employment, and perhaps to some extent by prolonged female schooling.

### 3.4 Gender Equality as a Correlate of General Happiness or Satisfaction

Before examining the determinants of differences between male and female subjective well-being, we need to examine whether gender equality has any specific relationship with the *general* level of subjective well-being (males and females combined), independent of other social and economic conditions with which gender equality is correlated. A standard linear model was specified as follows:

$$SWB = \beta_0 + \beta_1 \times \text{Intelligence} + \beta_2 \times \text{Education} + \beta_3 \times \text{lgGDP} + \beta_4 \times \text{noCorr} + \beta_5 \times \text{Freedom} + \beta_6 \times \text{Communism} + \beta_7 \times \text{Equality}.$$

*SWB* is a measure of subjective well-being, either happiness or life satisfaction; *noCorr* is freedom from corruption, *Freedom* is political freedom, *Communism* a history of communist rule, and *Equality* is one of the 7 indicators of gender equality described under Methods. The gender equality measures were used one at a time to avoid unnecessary collinearity and to reduce the risk of false positives by limiting the number of analyses performed for each dependent variable. Tables 3 and 4 show the results.

Low happiness is, above all, predicted by a history of communist rule. Intelligence, education and, more surprisingly, political freedom do not raise average happiness in countries when the other variables are controlled. Of the indicators of female status, those describing high female versus male schooling are related to higher happiness. Significant relationships are not observed with other gender-related indicators, although all have positive signs in the regressions.

The major predictor of high life satisfaction is high per-capita GDP (lgGDP). Education and communist history tend to reduce life satisfaction, while freedom from corruption and political freedom have positive signs. As in the happiness regressions of Table 3, more female than male schooling is related to higher life satisfaction.

### 3.5 Regression Models for Gender Differences in Happiness and Life Satisfaction

The correlations in Table 1 suggest that gender equality or high female status do not necessarily lead to higher female than male happiness and life satisfaction. This impression is further explored in the regression models of Tables 5 and 6. One observation is that communist history, political freedom and possibly high per-capita GDP seem to define conditions under which happiness and life satisfaction are greater for men than for women. Female subjective well-being appears to be favored by prolonged schooling and possibly freedom from corruption. Most of the “feminist” indicators, with the unsurprising exception of high female/male earnings, have negative signs. Of the seven indicators, high female non-agricultural employment and high female-versus-male labor force participation are associated significantly with gender differences in both happiness and life satisfaction.

Because each outcome measure was explored with seven alternative measures of gender equality, false positive findings can arise through multiple testing, which capitalizes on chance. Testing of multiple relationships is considered a main reason for irreproducible results in the scientific literature (Ioannidis 2005). Therefore a Bonferroni correction was applied, which is considered the most stringent control for multiple testing (Perneger 1998). This reduced the statistical significance of female/male labor force participation and female non-agricultural employment to  $p < .05$  and  $p < .01$ , respectively, with the gender difference in either happiness (Table 5) or life satisfaction (Table 6) as the dependent variable.

The interpretation of  $\beta$  coefficients in Tables 5 and 6 is not straightforward, especially for the development indicators. These predictors are highly collinear while having only small zero-order correlations with the outcome variables, as shown in Table 1. Therefore their  $\beta$  coefficients in Tables 5 and 6 are predictably inflated and should not be used as indicators of the true effect sizes. However, the indicators of gender equality do not show this high collinearity. For example, the highest variance inflation factors (VIFs) in model 8 of Table 6 are 8.3 for  $\lg\text{GDP}$  and 5.2 for freedom from corruption, and the lowest are 2.7 for life satisfaction and 2.6 for female non-agricultural employment. Their  $\beta$  coefficients are not much higher than the zero-order correlations shown in Table 1, and can be considered realistic indicators for the strength of the relationship.

### 3.6 Spatial Analysis of the Female Employment Effect

Variations in any country characteristic can manifest at different scales of aggregation. For example, they may be primarily present between larger world regions, such as Europe, East Asia and Latin America, or between neighboring countries within any of the world regions. In general, neighboring countries tend to be similar on many dimensions, and therefore data points are not strictly independent. In consequence, this spatial autocorrelation can inflate correlations among country-level indicators and produce false positives in statistical significance testing (Eff 2004). For this reason, the statistical significance levels in the two-tailed  $t$  tests reported in Tables 1, 2, 3, 4, 5, 6 need to be interpreted conservatively.

Some of the relationship between female employment and gender differences in subjective well-being appears to exist at the level of differences among the major world regions, as is the case with the patterning of gender differences in subjective well-being shown in Fig. 1. When we correlate female non-agricultural employment with gender differences in happiness and life satisfaction at the level of the world regions, we obtain Pearson's correlations of  $-.352$  for happiness and  $-.645$  for satisfaction. These correlations are in the expected direction, but fail to reach conventional statistical significance. However, statistical significance cannot be expected because of the small sample size of only nine world regions.

As a conventional control for spatial autocorrelation we determined, for each of the countries, female non-agricultural employment and gender differences in happiness and life satisfaction of immediately neighboring countries. For example, for Switzerland the average of France, Germany, Austria and Italy was used. Countries separated by expanses of water were used when few or no countries with available data had land boundaries with the focal country. For example, Algeria and Spain were used as neighboring countries of Morocco although Spain and Morocco are separated by the Strait of Gibraltar. Next, the difference between the value of the focal country and the average of the neighboring countries was derived. This procedure was used to test whether there is a tendency for countries that have higher female employment than neighboring countries to also have systematically higher or lower female-versus-male happiness and life satisfaction when compared with these same countries. The correlations of the difference score in female employment with the difference score of female-versus-male happiness (Pearson's  $r$ ) was  $-.170$  ( $p = .102$ ), and for satisfaction it was  $-.278$  ( $p = .007$ ). Using non-parametric correlation, we obtained a Spearman's  $\rho$  of  $-.198$  ( $p = .055$ ) for happiness and  $-.268$  ( $p = .009$ ) for satisfaction. These correlations and significance levels are smaller than those reported in Table 1. However, this is expected because there is severe range restriction when neighboring countries are compared, and the calculation of difference scores between each country and the average of its neighboring countries amplifies

measurement error. The results support the robustness of the female employment effect, and suggest that it exists both on the global scale and between neighboring countries.

#### 4 Discussion

The cross-sectional approach used in the present study permits us to investigate those country-level conditions that have differential effects on male and female well-being. First, we can see that some aspects of the socio-cultural environment appear to affect males and females to different degrees. Communist history not only predicts lower happiness for everyone (Table 3), but this effect is stronger for women than men (Table 5). In Model 1 of Table 5, the differential effect of communist history amounts to .396 points on the zero-to-10 scale of happiness (95 % confidence interval .252–.539), which is 16.4 % (10.5–22.3 %) of the standard deviation for happiness in Russia (males and females combined,  $N = 8148$ ). Similar results are obtained for education and political freedom. Prolonged schooling for everyone appears to be more detrimental for men than for women, and political freedom appears to raise subjective well-being more for men than for women.

More interesting are the effects of gender equality. First, Table 2 shows that although alternative measures of female equality or status are positively correlated, the correlations are not always high and the measures are not interchangeable. Therefore we advise against the use of composite indices of women's rights, gender equality and related constructs (e.g., Cingranelli et al. 2013; OECD 2009) in basic research. Tables 3 and 4 reveal that greater gender equality has few significant effects on overall subjective well-being (males and females combined), except for a slight association of more female (relative to male) education with higher well-being.

Most of the gender equality measures do not predict differences between male and female subjective well-being, neither when considering zero-order correlations (Table 1) nor in regression models that control for plausible covariates (Tables 5, 6). Therefore we can confirm the conclusion of Vieira Lima (2011) that greater gender equality or higher female status does not usually benefit women more than men. For example, a higher proportion of women in high-status occupations does not raise the average subjective well-being of all women, although it is likely to do so for the minority of highly ambitious women competing for these positions. High female labor force participation and non-agricultural employment emerge as conditions that appear to *reduce* female relative to male (or raise male relative to female) well-being (Tables 5, 6). This result confirms and extends the observation of Tesch-Römer et al. (2008) of a predominantly negative relationship between relative female life satisfaction and relative female economic activity rate. One possible explanation is that in many (though not necessarily all) countries, the disutility of work is greater for women than men. In other words, women dislike gainful work in a modern economy more than men do.

Another possibility is that high female non-agricultural employment does not cause lower female happiness and life satisfaction, but that it is a proxy measure for cultural conditions that are detrimental for women. One of these cultural factors, history of communist rule, is included in Tables 5 and 6. In the absence of any gender equality measure, communist history is a robust predictor of lower female than male well-being. Comparison of the  $\beta$  coefficients for models 1 and 8 in Tables 5 and 6 shows that the effect of communism is reduced by 63.5 and 55 %, respectively, when female non-agricultural employment is included in the model. Therefore at least half of the negative effect of communism on female relative to male subjective well-being is statistically “explained” by higher rates of female employment in the



communist and ex-communist countries. Tables 5 and 6 further show that the negative effect of democracy on relative female well-being is attenuated when female non-agricultural employment is included in the model. Like communism, modern democracy is associated with a normative expectation of gender equality, which has resulted in efforts at socializing women into traditionally male economic roles. Like communism, political freedom is associated with high female non-agricultural employment (Table 1). Revealingly, neither communism nor liberal democracy have attempted in earnest to educate men into traditionally female economic and social roles.

Results are similar when cultural factors are indexed by the prevailing religion. A high percentage of Catholics in the country favors male over female subjective well-being, while % Muslims has the opposite effect (see Fig. 1). When the percentage of Muslims in the country is added to model 1 in Tables 5 and 6, % Muslims predicts higher female than male happiness and life satisfaction ( $p = .002$  in both cases). When % Muslims is included together with female non-agricultural employment, employment remains a negative predictor for relative female happiness ( $p = .015$ ) and satisfaction ( $p = .038$ ), and % Muslim still has marginal positive effects with  $p = .211$  for happiness and  $p = .039$  for satisfaction. The negative effect of % Catholics is significant for happiness ( $p = .007$ ) but not satisfaction ( $p = .295$ ). In regression models containing both female non-agricultural employment and % Catholics, employment remains a significant predictor for both happiness ( $p < .001$ ) and satisfaction ( $p = .001$ ), and Catholicism remains a significant negative predictor of happiness ( $p = .007$ ).

The results suggest that much or even most of the apparent detrimental effect of female non-agricultural employment on relative female well-being is related to specific effects of female employment, rather than to associated “cultural” factors. Conversely, some of the cultural effects of Islam (as well as communism and democracy) on female-versus-male well-being appear to be related to female non-agricultural employment. Only the effect of Catholicism appears unrelated to female employment. One possibility is that it is not only female employment but the normative *expectation* of female employment that is detrimental for women (or favorable for men). In the communist and ex-communist countries, low female well-being coincides with an ideology of gender equality that expected, demanded, and largely achieved, full participation of women in the labor force. The Muslim countries represent the other extreme. Here gender roles are still differentiated, with men earning the money and women responsible for domestic chores, and low scores on the index of female non-agricultural employment. The comparison of male versus female happiness and life satisfaction suggests that this cultural framework, and this division of labor, is more favorable for women than for men—or less detrimental for women than for men.

One possibility is that higher female life satisfaction in countries with traditional gender roles is caused by lower female expectations. However, in this case we would expect that traditional gender roles favor higher self-reported female life satisfaction but not necessarily happiness. Inspection of Fig. 1 shows this not to be the case. Also the inclusion of a measure of acquiescent response style (Meisenberg and Williams 2008) in the regression models did not affect gender differences in happiness and life satisfaction (data not shown).

Some Western scholars may find these conclusions counterintuitive. However, there is evidence from Western societies indicating that unlike men, women do better with part-time than full-time employment (Booth and van Ours 2010; Gash et al. 2010; Willson and Dickerson 2010). In Europe, women who are housewives or are employed part-time are slightly happier than those in full-time employment (Treas et al. 2011), and low male participation in housework further reduces female happiness (Mencarini and Sironi 2012). The latter observation is a possible explanation for low relative female well-being in

Southern Europe (see Fig. 1), where male participation in housework is generally low. We can add that the trend for declining subjective well-being for women relative to men in the United States (Ross 2011; Stevenson and Wolfers 2009), if real, not only coincided with rising female employment, but can possibly be explained by it.

Studies have shown repeatedly that Western women average lower than men in ambition, competitiveness, risk taking and materialism (Croson and Gneezy 2009; Lynn 1992). Vocational interests differ between men and women in ways that generally conform to gender stereotypes, and within genders they are related to sexual orientation and to androgen-influenced physical traits such as voice pitch and amount of body hair (Ellis and Ratnasingam 2012). While some social scientists attribute both the gender differences and individual differences to biology (Ellis and Ratnasingam 2012; Sapienza et al. 2009; Van Vugt 2009), and in consequence are inclined to tolerate them, others are experimenting with methods for making women more competitive, enabling them to succeed in traditionally male-dominated careers (Balafoutas and Sutter 2012; Beaman et al. 2012; Villeval 2012). The under-representation of women in traditionally male-dominated careers such as mathematics, engineering and computer science seems to be a major concern (Ceci and Williams 2011).

Although surprising for some social scientists, our observations concur with experiences made in Israeli kibbutzim, which were founded based on an ideology of strict gender equality. Women were expected to work like the men, and to participate in political governance of the kibbutz. However, despite this strong ideological commitment, women were soon found to avoid traditionally male occupations, and to drift from agricultural work groups and machine repair shops to the communal kitchen, laundry and the children's house; and many were disinterested in politics and decision making in the kibbutz. Within one generation, gender roles became more strongly differentiated in the kibbutz than in Israeli society at large. Unlike the initial ideology of strict gender equality, which had been originated mainly by men, the subsequent development of gender role differentiation was driven by female preferences (Spiro 1979; Tiger and Shepher 1975). These experiences show that even in a modern society, female preferences can diverge substantially from male preferences.

The present study is strictly cross-sectional. However, it shows that greater gender equality is not associated with higher subjective well-being of women relative to men. It even suggests that high rates of female employment, or possibly a value system that insists on female employment, have the potential to *reduce* female well-being. Therefore we need to be aware of the possibility that continued efforts at educating women out of traditional female roles and into traditional male roles can reduce female subjective well-being, as has happened in the communist and ex-communist countries. But is this really surprising? Men would not be happy and satisfied either if they were forced out of traditional male roles and into traditional female roles. Perhaps the implicit belief among many social scientists that male-typical preferences, values and social roles are in some way superior to traditional female ones needs to be re-evaluated.

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