RUNNING HEAD: GENDER EQUALITY = ATHLETIC EXCELLENCE

Win-win: Female *and* male athletes from more gender equal nations perform better in international sports competitions

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Abstract

The present study provides the first evidence that increased gender equality in a society releases the human potential not only of women, but also of men. Our research setting is the Olympic Games, the world's foremost sports competition and one of the few contexts in which men's and women's performance is fully segregated by gender and objectively measured at the highest levels. We find that even after controlling for potential third variables (i.e., national gross domestic product, population size, geographic latitude, and income inequality), higher levels of gender equality in a country predict significantly greater success at winning Olympic medals for both its female and male athletes. These findings contradict the common belief that access to opportunities is a zero-sum game in which gains for women inevitably result in losses for men. Rather, gender equality is a "win-win" that allows members of both genders to realize their true potential.

KEYWORDS: gender inequality, achievement, sports, Olympic games, cross-national comparisons

Increased gender equality and opportunities for women have been shown to enhance the profitability of firms (McKinsey & Company, 2010), the collective intelligence of teams (Woolley et al., 2010), the scientific impact of intellectual collaborations (Joshi, in press), and the economic growth of entire nations (Inglehart & Norris, 2003). This is most often attributed to the gains realized by tapping women's previously underutilized human capital (Inglehart & Norris, 2003; McKinsey & Company, 2010) and the changes in team dynamics that accompany gender diversity (Joshi, in press; Woolley et al., 2010).

The present study provides the first evidence that increased gender equality in a society releases the human potential not only of women, *but also of men*. After all, gender inequality is accompanied by gender stereotypes that limit both women and men (e.g., Bem, 1975; Kimmel, 2006; Rivers & Barnett, 2011). Our research setting is the Olympic Games, the world's foremost sports competition and one of the few contexts in which men and women's performance is fully segregated by gender and objectively measured at the highest levels. We find that even after controlling for potential third variables (i.e., national gross domestic product, population size, geographic latitude, and income inequality), higher levels of gender equality in a society predict significantly greater success at winning Olympic medals for both female and male athletes from that nation.

Methods

Numeric counts of medals won by male and female athletes for each country in the Summer 2012 and Winter 2014 Olympics were gathered from The Official Website of the Olympic Movement (2014). Each country's gender gap score, a composite measure of economic, political, health, and educational equality between the sexes, was obtained from the most recent World Economic Forum's Global Gender Gap Report (2013). Higher gender gap scores reflect

less social inequality between men and women on these dimensions. Further assessed were control variables including gross domestic product (GDP), population size, and income inequality (GINI index), obtained from the most recent statistics produced by The World Bank (2012). Higher scores on the GINI index reflect greater economic inequality in a society. We also included geographic latitude, obtained from CSGNetwork.com. It is important to note that some of the controls (e.g., GDP and the GINI index) may be reversely determined by gender gap score, and controlling for them can suppress the real effect of gender inequality on sports performance. We hence consider this study to be a conservative test of our prediction.

There were a total of 121 countries for which data on all variables could be obtained. We initially gathered data on medals won only for the Winter 2014 Olympics but decided to also include the Summer 2012 Olympics since northern countries dominate winter sports, introducing a potential confound. The results reported below are unchanged when analyzed separately by the Summer 2012 and Winter 2014 Olympics.

Results and Discussion

Table 1 displays the correlations between all study variables. The average number of medals won by a country was 3.69 (SD = 10.34) for women and 4.02 (SD = 9.38) for men. Overall, medal counts were highly skewed towards zero with a variance (SD = 18.79) greater than the mean (M = 9.25), making Poisson regression models (Allison, 1999) appropriate. We included a scale parameter in Poisson regressions to account for the issue of over-dispersion, and standardized all predictors before analyses. As shown in Table 2, separate regressions showed that a country's gender gap score significantly predicted Olympic medals won by women (b = 0.44, p = .003) and men (b = 0.31, p = .019), even controlling for latitude, population, GDP, and income inequality. Gross domestic product and population size also predicted medals won, such

that wealthier countries and larger countries won more medals. Latitude was not a significant predictor.

Table 1. Correlations Between Study Variables

Variable	1	2	3	4	5	6
1. Women's medals						
2. Men's medals	.82**					
3. Gender Gap Score[a]	.22*	.24*				
4. Gini Index[b]	-.07	-.20*	-.10			
5. Population (in thousands)	.40**	.28**	-.06	.02		
6. GDP (in millions USD)	.87**	.64**	.12	.01	.50**	
7. Latitude (0 = 90º South, 180 = 90 º North)	.19*	.26**	.16	-.67**	.07	.17

[a] Higher scores indicate more gender equality.
[b] Higher scores indicate more economic inequality.
Note. *$p < .05$. **$p < .01$.

Table 2. Poisson Regressions on Olympic Medals Won

Variable	M (SD)[a]	Women's Medals	Men's Medals
		b (*SE*) *p*	*b* (*SE*) *p*
Intercept		1.01 (0.17) <0.0001	1.18 (0.16) <0.0001
Latitude[b]	110.40 (25.72)	-0.06 (0.17) 0.747	0.003 (0.17) 0.988
GDP[c]	567,505 (1,788,677)	0.39 (0.05) <0.0001	0.36 (0.05) <0.0001
Population[d]	53,664,616 (169,433,530)	0.20 (0.06) 0.001	0.14 (0.07) 0.041
Gini Index[e]	36.62 (8.94)	-0.46 (0.20) 0.025	-0.66 (0.21) 0.001
Gender Gap Score[f]	0.69 (0.06)	0.44 (0.15) 0.003	0.31 (0.13) 0.019

[a] Before standardization for regression analyses.
[b] 0 = 90º South, 180 = 90 º North
[c] In millions USD
[d] In thousands
[e] Higher scores indicate more economic inequality.
[f] Higher scores indicate more gender equality.

Interestingly, general income inequality in a country likewise predicted medals. The greater a country's economic equality, the more Olympic medals it won. However, a country's income inequality and gender equality were not significantly correlated, $r(120) = -.10$, $p = .28$. The two systems of social stratification appear to be largely unrelated within country, and independently predict medals won by athletes from that nation. Countries with greater equality of opportunity to excel, based on either socioeconomic status or gender, may have larger pools of talent from which their Olympic athletes emerge.

These regression results are robust to using standard OLS regressions on the number of medals, as well as using the square root of the number of medals and the number of medals divided by population as outcome measures (see Supplement). Splitting each country's gender

gap score by each of the four components (economic, political, health, and educational equality between the sexes) revealed that it was educational equality that best predicted Olympic medals for women and for men (see Table 3).

Table 3. Poisson Regressions on Olympic Medals Won by Gender Gap Score Subindexes

Variable	Women's Medals	Men's Medals
	b (*SE*) *p*	*b* (*SE*) *p*
Intercept	0.58 (0.25) 0.020	0.77 (0.24) 0.0013
Latitude[a]	-0.21 (0.14) 0.126	-0.17 (0.14) 0.222
GDP[b]	0.29 (0.06) <0.001	0.30 (0.06) <0.001
Population[c]	0.44 (0.13) <0.001	0.32 (0.11) 0.005
Gini Index[d]	-0.65 (0.19) <0.001)	-0.84 (0.19) <0.001
Economic Gender Gap Score[e]	0.31 (0.19) 0.100	0.01 (0.16) 0.975
Education Gender Gap Score[e]	1.27 (0.46) 0.006	1.35 (0.44) 0.002
Health Gender Gap Score[e]	0.38 (0.22) 0.092	0.24 (0.18) 0.190
Political Gender Gap Score[e]	-0.06 (0.13) 0.657	0.001 (0.11) 0.996

[a] 0 = 90º South, 180 = 90 º North
[b] In millions USD
[c] In thousands
[d] Higher scores indicate more economic inequality.
[e] Higher scores indicate more gender equality.

These findings contradict the common belief that access to opportunities is a zero-sum game in which gains for women inevitably result in losses for men (Morton, Postmes, Haslam, & Hornsey, 2009; see also Knowles, Lowery, Hogan, & Chow, 2009). Rather, gender inequality is likely to hurt both women and men by encouraging stereotypes that limit their ability to reach their full potential as individuals. Eroding false and antiquated norms regarding what men and

women can and cannot do is a "win-win" that allows members of both genders to realize their true potential.

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Online Supplement

OLS Regressions on Olympic Medals Won

	Medals Won		Square Root of Medals Won		Medals Won Divided by Population	
	Women	Men	Women	Men	Women	Men
Variables	*β* (*SE*) *p*	*β* (*SE*) *p*	*β* (*SE*) *p*	*β* (*SE*) *p*	*β* (*SE*) *p*	*β* (*SE*) *p*
Intercept	0.00 (0.04) 1.00	0.00 (0.07) 1.00	0.00 (0.07) 1.00	0.00 (0.07) 1.00	0.00 (0.08) 1.00	0.00 (0.08) 1.00
Latitude[a]	-0.04 (0.06) 0.548	-0.004 (0.09) 0.967	0.04 (0.08) 0.657	0.12 (0.10) 0.225	-0.32 (0.11) 0.005	-0.19 (0.12) 0.115
GDP[b]	0.87 (0.05) < 0.001	0.64 (0.08) <0.001	0.66 (0.07) <0.001	0.54 (0.08) <0.001	0.09 (0.09) 0.29	-0.02 (0.09) 0.858
Population[c]	-0.02 (0.05) 0.659	-0.03 (0.08) 0.738	0.02 (0.07) 0.764	0.001 (0.08) 0.990	--	--
Gini Index[d]	-0.l0 (0.06) 0.118	-0.20 (0.09) 0.033	-0.17 (0.08) 0.043	-0.19 (0.09) 0.044	-0.47 (0.11) <0.001	-0.35 (0.12) 0.003
Gender Gap Score[e]	0.11 (0.05) 0.013	0.15 (0.07) 0.035	0.20 (0.06) 0.001	0.19 (0.07) 0.008	0.34 (0.08) <0.001	0.31 (0.09) <0.001

[a] 0 = 90º South, 180 = 90 º North
[b] In millions USD
[c] In thousands
[d] Higher scores indicate more economic inequality
[e] Higher scores indicate more gender equality