Do Actions Speak Louder Than Words?

Rashika Kukreja [*] **Ashish Papanai** [*] **Karuna K Chandra** [*] **Siddharth Pandey** [*] **Snehil Seenu** [*]

Abstract

Discussions about gender equality have increased in the past decade leading one to believe that we have made substantial progress towards the achievement of gender equality. But have these changing attitudes truly translated into action or are they merely words? In this study, we assess attitudes and actions towards gender equality using exploratory factor analysis to score perceptions towards gender equality and further use these scores to quantify attitude-behavior (words-action) alignment in spheres of financial control, education, household responsibilities, and childcare. We observe that the translation of egalitarian principles into action is confined to household finances. Other domestic spheres, including labor, show no clear alignment between ideology and practice. Code available on GitHub[1].

1. Introduction

The global discourse regarding gender equality has intensified significantly over the last several decades, suggesting a transition toward more egalitarian societal norms. However, a fundamental concern persists regarding whether these stated attitudes reflect substantive changes in behavior or remain limited to superficial expressions. Examining how beliefs about gender equality align with actual actions at home is essential for society and the economy, because it helps us understand deep-rooted inequalities and analyse large-scale survey data. Scientifically, the challenge lies in distinguishing genuine attitudinal shifts from behavioural persistence across financial control, household responsibilities, and childcare.

Existing literature has recorded the impact of gender role beliefs on diverse economic outcomes, including labour market penalties linked to parenthood (Hong et al., 2025; Waszkiewicz & Bogusz, 2024) and the differentiation of paid versus unpaid work (Barnes, 2015). Research also shows how gender identity norms dictate income distribution within couples (Maier et al., 2024) and shape expectations in the labour market (Calanca et al., 2019; 2018). Despite these insights, significant perception gaps remain, particularly regarding the invisible burden of mental load (Barigozzi et al., 2025) and inherent differences in the measurement of egalitarianism between men and women (McDaniel, 2008). Previous studies are often limited by cross-sectional designs or a focus on specific sectors, which may fail to capture broader temporal shifts in domestic labor allocation. Furthermore, recent methodologies have attempted to model human behaviour in sociological surveys using computational frameworks or by comparing perceptions against official statistics (Wang et al., 2025; Bas, 2024). This study aims to address these gaps by using a harmonised, longitudinal analysis spanning multiple decades to test the convergence hypothesis and evaluate the persistence of the disconnect between ideological discourse and behavioral reality.

We study how egalitarian beliefs influence day-to-day dynamics within marriage. Using factor analysis, we calculate an 'equality score' for each respondent. We hypothesise that although people are becoming more egalitarian in their worldview, the relationship between beliefs and behaviour is not as linear as one might expect. The paper proceeds as follows: 1) We describe the survey dataset and the factor analysis method used to derive the equality score. 2) We analyze how gender and education relate to the equality score. 3) We examine the relationship between equality scores and different aspects of marriage—namely finance, household chores, woman employment, and family structure.

2. Data and Methods

The analysis uses the dataset[2] comprising five cross-national surveys conducted in 1988, 1994, 2002, 2012, and 2022. The set of participating countries varies across survey years. Each survey largely replicates the core questions with three broad types: 1) Attitudes of respondents through Likert-type agreement-disagreement scales, 2) Factual information such

[*]Equal contribution . Correspondence to: Rashika <rashika-vinod.kukreja@student.uni-tuebingen.de>.

Project report for the "Data Literacy" course at the University of Tübingen, Winter 2025/26 (Module ML4201). Style template based on the ICML style files 2025.

[1]https://github.com/ashishpapanai/2025-02-ActionWords

[2]Family and Changing Gender Roles, ISSP, Leibniz Institute for Social Sciences

as income, employment, hours spent on paid work, household work and childcare, and contribution to household expenses, 3) General demographic information, including sex, age, country, and marital status.

This study restricts the analysis to three survey years- 2002, 2012, and 2022-since they have a larger intersection of questions, which are later used for temporal analysis. The raw data were downloaded from the official website in Stata format(.dta). Respondents with 60% or more missing responses are excluded. To study the relationship between attitude and behaviour, the most relevant setting is between married couples, where actions and attitudes influenced by egalitarianism play a vital role in daily life. Therefore, married, adult (over 18) respondents are selected for the analysis. Since survey questions differ across years in both their phrasing and availability, we calculate the similarity of questions and select the common and relevant ones available across all three years to create focused datasets.

The respondents' answers to the survey questions are expected to reflect their attitudes toward gender equality. Identifying the underlying constructs that drive the observed distribution of responses is necessary for systematic measurement and analysis of the latent concept of gender equality. Exploratory factor analysis (EFA) is used to identify these latent variables (Fabrigar et al., 1999). Bartlett's test of sphericity (Bartlett, 1937) and the Kaiser-Meyer-Olkin (KMO) (Kaiser, 1970) measure are used to test the suitability of data for factor analysis. Scree plot analysis (Cattell, 1966) is used to identify the number of common factors used in EFA. Cronbach's alpha (Cronbach, 1951) measures the extent to which items consistently capture the same construct.

The following survey items are included in the Exploratory factor analysis, **WO-WARM:** Working mother can establish a warm relationship with children, **CH-SUFFER:** Pre-school child is likely to suffer if mother works, **FM-SUFFER:** Family life suffers when woman has a full-time job, **WO-HK:** What women really want is home and kids, **HW-FULFILL:** Being a housewife is as fulfilling as working for pay, and **ME-WH:** Men's job is to earn money, women's job is to look after the home.

Responses to these questions are measured on a 5-point agreement-disagreement scale. Items are coded (or reverse-coded where appropriate) such that higher scores indicate egalitarian attitudes, while lower scores reflect traditional or orthodox perspectives.

After conducting EFA, the weights of each question's response are computed using regression. The factor score for each respondent is then computed by taking a linear combination of the weight and response. This score determines the respondent's relative standing on the latent dimension. (Brown, 2015)

The factor score is then used to analyse the relationship between equality displayed in respondents' attitudes and their actions, such as contribution to household chores, control of finances, and the influence of family structure and education, on their equality. This analysis is then performed over the years to study the temporal trend.

3. Results

Item	Factor 1	Factor 2
WO-WARM	0.523	-0.558
CH-SUFFER	0.777	-0.271
FM-SUFFER	0.769	-0.284
WO-HK	0.719	0.333
HW-FULFILL	0.460	0.677
ME-WH	0.735	0.231

Table 1. Table 1. Loadings of survey items on two latent factors. Questions show high positive loadings on Factor 1, which represents the latent dimension of gender equality. First three variables (effect of women's employment on family) have negative loadings on Factor 2 and positive loadings for the last three variables (related to the role of women in society).

Scree plot analysis reveals two variables with eigenvalues $>$ 1 and hence a two-factor model is considered. We perform EFA to obtain the factor loadings for these two factors. KMO test values of > 0.75, and for Bartlett's test $p < 0.05$ supports the validity of the extracted loadings in Table 1 (Kaiser & Rice, 1974). A high Cronbach's alpha value of 0.75 indicates good internal consistency.

The first factor represents the underlying construct of attitudes towards gender equality for which the chosen survey items have high loadings, represented in Table 1. For the second factor, the set of attitude questions exploring the effect of working women on family has high negative loadings, whereas the questions related to the role of women in society have high positive loadings.

As the goal of the analysis is to capture traditional and non-traditional beliefs of people, we calculate factor scores for factor 1 for each respondent, representing their standing on the latent dimension of gender equality. For the remaining analysis and discussion, this factor 1 score is referred to as the equality score, which is used as an indicator of attitudes towards gender equality.

Before analysing the relationship between attitude and behaviour, we first analyse the influence of demographics on this equality score- specifically, gender and education.

Do the equality scores of men and women originate from the same distribution? In an ideal scenario, the equality scores for men and women should come from the same

distribution, signifying that there is minimal influence of gender on an individual's equality score. A permutation test is used to verify this. With $p < 0.001$, we reject the null hypothesis that the scores come from the same distribution. The difference in mean equality score between women and men is 0.0358, with women having the higher mean. The mean equality scores have an increasing temporal trend for both men and women, contributing to the overall increase in mean over the years. However, there is no significant convergence in the mean of men's and women's equality score over the years.

Does higher education make a person more egalitarian? Education information for each respondent is available (distribution and categories shown in Fig.1b). When studying the influence of education level on equality score, we find a positive correlation ($r = 0.3103$) between them. Each unit of increase in education level is associated with a 0.0705 increase in equality score. The R-squared value of 0.102 indicates that education level explains 10.2% of the variance in equality scores. There is also a temporal effect where, within each education level, equality scores increase over time. These results are shown in Fig. 2.

We now shift the perspective of analysis to egalitarian attitude-behaviour alignment within a marriage.

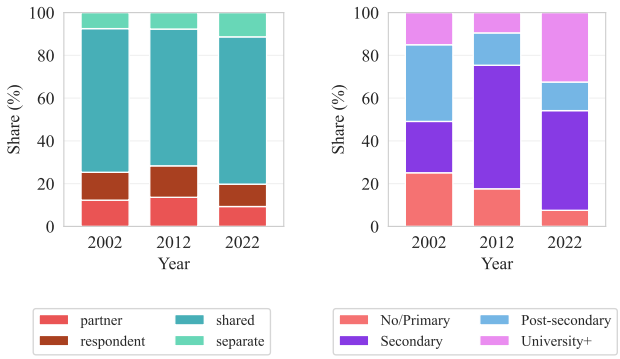
Does the employment of women in marriage affect the equality score? We hypothesise that women's employment status affects the equality scores of both partners in a marriage. For men, we analyse the difference in equality scores when their spouse is employed versus unemployed. For women, we examine the difference in equality scores based on their own employment status. We use permutation tests to determine whether these represent different distributions for both men and women.

We find that for both men and women, the scores do not originate from the same distributions ($p = 0.001$ for both gender's tests) and depends on employment, with the average equality score of men with an employed spouse increasing by $+0.0949$ compared to having an unemployed spouse. Similarly, it increases by $+0.103$ for women. These results indicate a positive association between the equality score and the employment of women, for both genders.

What are the effects of the equality score on the cognitive load with marriage? Finances play a vital role in marriage. When financial control rests with a single person, this is generally regarded as less egalitarian due to the unstable dynamics it creates. In contrast, shared or separate finances create no imbalance, as both parties enjoy financial independence in the relationship. Overall, shared income control is the most common arrangement, as seen in Fig. 1a. When examining the relationship between financial control and equality score, we observe that as equality score increases, the percentage of individual control decreases, and separate and shared control increases, as shown in Table 2.

Equality Level	Partner↓	Respondent↓	Separate↑	Shared↑
0 – 0.37	18.16	19.28	5.77	56.79
0.37 – 0.52	14.88	15.34	7.55	62.22
0.53 – 0.68	10.28	11.05	9.70	68.97
0.69 –1.00	4.77	6.92	11.56	76.76

Table 2. Percentage of distribution of income control types across equality score divided into 4 quartiles. Chi-square test shows an association between income control and equality score ($p < 0.01$). One-versus-rest logistic regression to predict income category using equality scores reveals negative association ($\beta = -2.37, -2.18$) for partner and respondent, and positive association ($\beta = 1.69, 1.29$) for shared and separate categories.



(a) Income Control distribution (b) Education distribution

Figure 1. (a) shows the distribution of income control in married couples. The most common type is shared. (b) shows the distribution of education level of respondents over the years. The percentage of primary or no education decreases while the higher education percentage increases.

Do egalitarian attitudes translate into a more equitable distribution of household labour? We analyze the coupling between egalitarian beliefs and domestic outcomes using the men's proportion of household work, where a value of 0.5 indicates equal sharing between partners. This metric provides consistent interpretation across both genders: for male respondents, it represents their own contribution; for female respondents, it represents their partner's contribution. Values above 0.5 indicate men performing more household work (egalitarian direction), while values below 0.5 indicate women performing more (traditional pattern). We test the hypothesis that stronger egalitarian attitudes are positively associated with more equitable domestic task distribution. The analysis identifies only a weak positive association, with Pearson correlation coefficients ranging from $r = 0.108$ to $r = 0.160$ across years (all $p < 0.001$). Egalitarian attitudes explain merely 1- 3% of household labour distribution behavioural variance.

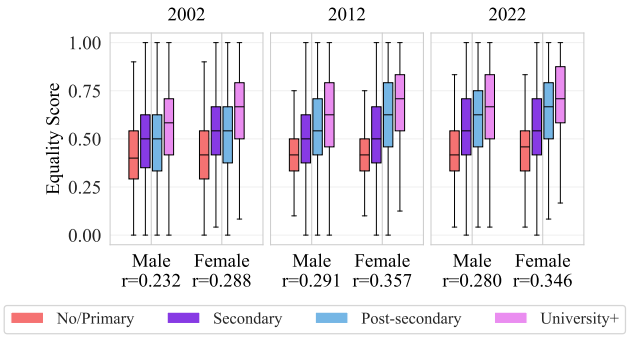


Figure 2. The change in equality score across the years and gender for each education level. Higher r value implies higher correlation between higher education level and higher equality score. Correlation for women is higher than men across years indicating that education has more influence on women than men. Within same education level, women have a higher average equality score.

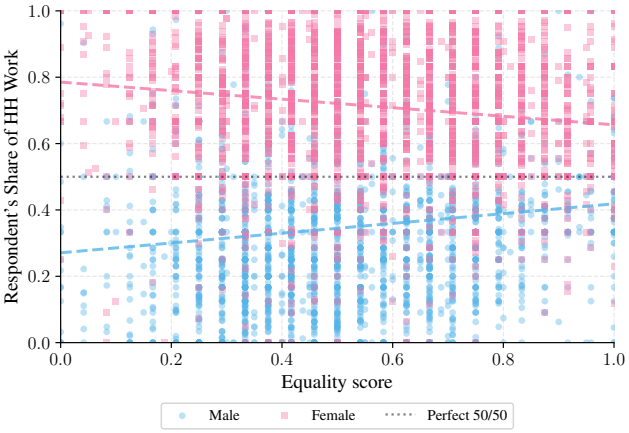


Figure 3. Linear regression of respondent's share of household work on normalized equality scores. The low explained variance ($R^2 \approx 0.003$ for all years; overall $R^2 = 0.0027$) indicates a persistent disconnect between reported attitudes and reported household behavior over twenty years, with no temporal strengthening.

Gender-stratified analyses of household hours as seen in Fig. 3 show similarly weak associations with the equality score for both genders (men: $r \approx 0.11$ to 0.14; women: $r \approx -0.11$ to -0.13; all $p \ll 0.001$). The explained variance is negligible ($R^2 \approx 0.01$ to 0.03). These results support the conclusion that domestic actions remain largely decoupled from increasing the equality score.

Are the equality scores coupled with the number of children within the marriage? We observed that there is no correlation between the number of children and the equality score for both genders across years (Spearman correlation < 0.1).

4. Discussion & Conclusion

Our study analyses the relationship between egalitarian attitudes and behaviour within marriage using the cross-national survey data from 2002, 2012, and 2022. We construct an equality score using exploratory factor analysis to measure how egalitarian respondents are in their attitudes and study this against different demographics and marital behaviour.

Our analysis reveals that equality scores increase over the years, indicating a positive shift in attitudes. As expected, the average equality score for women is higher than for men, to the extent that the scores for different genders do not seem to originate from the same distributions. We also find that higher education levels are often associated with higher equality scores. This highlights the importance of education in evolving mindsets for a more egalitarian society.

When examining how egalitarian attitudes translate into behaviour within marriage, we find a more complex picture. We first analyse that the working woman in the marriage results in a better equality score for both genders. We also analyse financial control to identify trends in which partner has more control. As equality scores increase, the percentage of shared or separate income control increases, showing consistency between attitudes and behaviour. However, when we examine the distribution of household work, one of the fundamental behavioural units in marriage, we find a very weak association between the equality score and division of household work. Although there is a weak positive correlation between men's household work hours and equality score, and a weak negative correlation between women's household work hours and equality score, neither is statistically significant.

We now examine the study's findings in light of certain limitations. Although the second factor is statistically sound, it does not lend a clear interpretation based on the available survey questions, which suggests the need for a more targeted analysis in future studies. The analysis relies on self-reported survey responses, which may be influenced by the differences in interpretation and social desirability (respondents may express egalitarian attitudes that are socially acceptable instead of adopted beliefs or practices). Gender equality is a complex construct that cannot be captured by a limited set of survey questions.

We find that while egalitarian attitudes are increasing and are associated with some egalitarian behaviours, particularly financial arrangements, there is no linear relationship between increasing equality scores and more egalitarian behaviour within marriage, especially for household labour. Achieving gender equality in marriage requires more than changing attitudes—it demands attention to the structural and practical factors that shape daily behaviours.

Contribution Statement

1. **Rashika Kukreja:** Manuscript preparation, exploratory data analysis, construction of equality score.
2. **Ashish Papanai:** Manuscript preparation, literature review, dataset extraction, statistical tests on hypothesis related to household variable and equality score.
3. **Karuna K Chandra:** Manuscript preparation, dataset cleaning and harmonization, statistical tests on hypothesis related to education, finance, female employment and equality score.
4. **Siddharth Pandey:** Manuscript preparation, literature review, factor analysis, dataset cleaning and harmonization
5. **Snehil Seenu:** Manuscript preparation, statistical analysis on child care and equality score.

References

Barigozzi, F., Biroli, P., Monfardini, C., Montinari, N., Pisanelli, E., and Vitellozzi, S. Beyond time: Unveiling the invisible burden of mental load, 2025. URL https://arxiv.org/abs/2505.11426.

Barnes, M. W. Gender differentiation in paid and unpaid work during the transition to parenthood. *Sociology Compass*, 9(5):348–364, 2015. doi: https://doi.org/10.1111/soc4.12263. URL https://compass.onlinelibrary.wiley.com/doi/abs/10.1111/soc4.12263.

Bartlett, M. S. Properties of sufficiency and statistical tests. *Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences*, 160(901):268–282, 1937. ISSN 00804630.

Bas, T. Assessing gender bias in llms: Comparing llm outputs with human perceptions and official statistics, 2024. URL https://arxiv.org/abs/2411.13738.

Brown, T. *Confirmatory Factor Analysis for Applied Research, Second Edition*. Methodology in the Social Sciences. Guilford Publications, 2015. ISBN 9781462515363.

Calanca, F., Sayfullina, L., Minkus, L., Wagner, C., and Malmi, E. Responsible team players wanted: an analysis of soft skill requirements in job advertisements. *arXiv preprint arXiv:1810.07781*, 2018.

Calanca, F., Sayfullina, L., Minkus, L., Wagner, C., and Malmi, E. Responsible team players wanted: an analysis of soft skill requirements in job advertisements, 2019. URL https://arxiv.org/abs/1810.07781.

Cattell, R. B. The scree test for the number of factors. *Multivariate Behavioral Research*, 1(2):245–276, 1966. doi: 10.1207/s15327906mbr0102_10. URL https://doi.org/10.1207/s15327906mbr0102_10. PMID: 26828106.

Cronbach, L. J. Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3):297–334, 1951. doi: 10.1007/BF02310555.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., and Strahan, E. J. Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3):272–299, Sep 1999. doi: 10.1037/1082-989x.4.3.272.

Hong, X., Zheng, X., Yuan, H., and Ni, C. Parenthood penalties in academia: Childcare responsibilities, gender role beliefs and institutional support, 2025. URL https://arxiv.org/abs/2504.13923.

Kaiser, H. F. A second generation little jiffy. *Psychometrika*, 35(4):401–415, 1970. doi: 10.1007/BF02291817.

Kaiser, H. F. and Rice, J. Little jiffy, mark iv. *Educational and Psychological Measurement*, 34:111 – 117, 1974.

Maier, E.-M., Stöcker, A., Fitzenberger, B., and Greven, S. Additive density-on-scalar regression in bayes hilbert spaces with an application to gender economics, 2024. URL https://arxiv.org/abs/2110.11771.

McDaniel, A. E. Measuring gender egalitarianism: The attitudinal difference between men and women. *International Journal of Sociology*, 38(1):58–80, 2008. doi: 10.2753/IJS0020-7659380103. URL https://doi.org/10.2753/IJS0020-7659380103.

Wang, J., Zhao, Z., Ni, T., and Wei, Z. Sociobench: Modeling human behavior in sociological surveys with large language models, 2025. URL https://arxiv.org/abs/2510.11131.

Waszkiewicz, R. and Bogusz, H. The impact of parenthood on labour market outcomes of women and men in poland, 2024. URL https://arxiv.org/abs/2306.12924.