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Clotilde Napp

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Gender Stereotypes about career and family are stronger in more economically developed countries and can explain the Gender Equality Paradox

Author: Clotilde Napp^{a,b,*}

Affiliations:

^a CNRS, UMR7088, 75016 Paris, France

^b Université Paris-Dauphine, PSL Research University, Paris, France

*Corresponding author: Clotilde Napp, Université Paris-Dauphine, Place du Maréchal de Lattre de Tassigny, 75016 Paris, France.

Email: clotilde.napp@dauphine.psl.eu

Abstract

Using data from Project Implicit collected between 2005 and 2020, comprising 1,489,721 observations in 111 countries, we find that implicit and explicit gender stereotypes about career and family are more pronounced in more economically developed countries. Besides, these gender stereotypes are strongly correlated at the country level with gender differences in values (such as family values), self-reported personality traits (such as agreeableness or dependence), and occupational preferences (such as health-related occupations), and may account for the fact that these gender imbalances are 'paradoxically' stronger in more economically developed countries (the so-called 'gender equality paradox').

In line with Social Role Theory, our findings suggest that there are in developed countries strong gender stereotypes about career and family, which may at least partly explain the persistence or even the 'paradoxical worsening' of a number of gender differences in these countries, despite generally high levels of gender equality in other areas.

Keywords: Gender stereotypes about career and family. Cross-cultural analysis. Gender equality paradox. Implicit stereotypes. Gender differences.

Gender stereotypes, *i.e.*, shared beliefs about the roles or attributes of men and women in a given society, exist across cultures and are acquired from early childhood (Bian et al., 2017; Gelman et al., 2004; Master et al., 2021; Payne et al., 2017). They can have deep influences on how men and women are perceived and perceive themselves, on their attitudes and preferences and on their choices (Correll, 2004; Eagly & Wood, 2012; Ellemers, 2018; Grusky & Charles, 2004; Ridgeway, 2006).

A common and fundamental stereotype is the belief that men are better suited for a professional career and women for taking care of home and family (Nosek et al., 2002). This stereotype, associating men and women to different spheres, and aligning men with professional life or the breadwinner role and women with domestic life or the homemaker and caregiver role acts as an unseen force steering men and women to different values, traits and behaviors, and likely contributes to gender imbalances in the labor force and in the home, the two being intertwined (Ellemers, 2018; England, 2010; Goldin, 2021). Recently, the Covid19 pandemic has underscored the persistence of significant gender differences in work-family balance, as well as their deleterious impact on personal and professional outcomes for women (Deryugina et al., 2021; Myers et al., 2020; Saxler et al., 2024; Stefanova et al., 2021). More fundamentally, in the most developed countries, where gender equality has advanced in many domains such as female participation in the labor force and higher education and equal rights, substantial gender imbalances persist. These imbalances encompass gender differences in time allocation between household and market work (especially among people with children), the 'child penalty' (Kleven et al., 2019), or gender differences in occupational choices (OECD, 2017).

Exploring the variation of gender stereotypes about career and family across countries, particularly in relation to economic development, and examining their relationships with gender differences in various domains such as traits and occupational choices, can help us gain a better understanding and potentially reduce these stereotypes and gender imbalances.

First, exploring the variation of gender stereotypes about career and family with economic development is important to better understand the mechanism of stereotypes' formation, evolution and persistence as well as potential strategies for mitigation.

Second, the analysis at the country level of the link between gender stereotypes about career and family and gender differences is important in order to better understand how such differences can persist even in more developed countries, the role of gender stereotypes in their persistence and how to possibly mitigate them (Correll, 2004; Croft et al., 2015; Ellemers, 2018; Nosek et al., 2009; Ridgeway, 2006; Wood & Eagly, 2012). In particular, the analysis of gender stereotypes held separately by males and females and of their relation to traits and behaviors of males and females may provide insights about possible mechanisms.

Third, such an analysis would shed particularly enlightening insights into the Gender Equality Paradox (GEP), which refers to the paradoxical observation that gender differences in various domains such as

values (Schwartz & Rubel-Lifschitz, 2009), personality traits (Costa et al., 2001; Lee & Ashton, 2020; Mac Giolla & Kajonius, 2019; Schmitt et al., 2008), or preferences (Falk & Hermle, 2018; Markowsky & Beblo, 2022) are larger in more economically developed countries (see Herlitz et al. (2024) for a recent systematic review) and in particular on the possible role of gender stereotypes to explain the paradox.

Theoretical and empirical Evidence for Variations of Gender Stereotypes with Country Level of Economic Development

Gender stereotypes about career and family have cultural foundations, and their strength should vary across countries, but the way it should vary with country level of development is not clear.

Theoretical Evidence. Lay expectations suggest that gender career/family stereotypes should be less marked in more developed countries. Indeed, in such countries, women have fewer children, and stay less at home to take care of them. There is less inequality between men and women in educational attainment and in labor force participation, and more generally fewer differences in opportunities for men and women and fewer gender-based disparities. Moreover, in such countries, not only practices but also values are more gender egalitarian. Intuitively, these features should be associated with reduced gender career/family stereotypes. In support of these arguments, Inglehart and Norris suggested in their 'rising tide' theory (Inglehart & Norris, 2003) that development brings in any society systematic changes in gender roles towards gender equality.

However, sociological literature has shown that occupational gender segregation is increased in more developed countries. As discussed in Herlitz et al. (2024) and analyzed in Charles and Bradley (2009) and Grusky and Charles (2004), the modes of female incorporation in higher education and in the labor force in developed countries have been shaped by societal perceptions of appropriate feminine roles. As societies move toward greater economic development, women increasingly participate in higher education and the labor force but, for the most part, they do not displace men from their roles but enter female-labelled roles, often in the expanding service, education, and health care sectors of the economy (Croft et al., 2015). Occupational gender segregation also manifests as a greater share of women than men working part-time. These patterns result in more differentiated social roles of men and women. According to Social Role Theory (SRT) (Eagly et al., 2000; Eagly & Wood, 2012; Koenig & Eagly, 2014; Wood & Eagly, 2012), gender stereotypes stem from people's direct and indirect observations of the differential family and employment roles that men and women occupy in society. Although women participate more in the labor force and values are more gender equal in more developed countries, the economically driven growth of female-dominated sectors and forms of employment should strengthen and reinforce gender stereotypes associating women with the family/caregiver role and men with the career/breadwinner role.

Empirical Evidence. Empirical cross-country studies on gender stereotypes are quite scarce, because measuring stereotypes, especially in a cross-country context, is difficult. Previous works have argued that gender stereotypes may be more marked in more developed countries. Williams and Best in their seminal international study of gender stereotypes in personality traits already observe that men and women are seen as relatively more different in more developed countries ((Williams & Best, 1990b), p.27). Relying on data from the Programme for International Student Assessment (PISA) and 'nonstandard' measures of internalized stereotypes, Breda et al. (2020) and Napp and Breda (2022) show that the stereotype associating math with boys as well as that associating talent with boys, more than girls, are stronger in more developed countries. Recently, relying on word embeddings, a Natural Language Processing tool, Napp (2023) shows that gender stereotypes in online language are stronger in text corpora of more economically developed countries. Word embeddings are a powerful tool but the measure of stereotypes can be noisy, and as underlined in Napp (2023), results relying on such big data analysis and online language may involve various underlying mechanisms and need to be confirmed relying on other datasets and measures. Some previous works have analyzed how gender stereotypes vary not across countries but *over time*. Such analyses can provide insights into the relation between gender stereotypes and economic development, since societies usually progress in development over time, although there can be confounding factors, and the issues differ. Results are not univocal

(Charlesworth & Banaji, 2022) but an increase of gender stereotyping about women's gender roles, and in particular an increase in the stereotype of women's greater communality has been observed across time in several studies (Eagly et al., 2020; Haines et al., 2016; Lueptow et al., 2001).

Theoretical and Empirical Evidence for the Cross-Country Relation between Stereotypes and Gender Imbalances

Theoretical as well as empirical and experimental literature has emphasized how gender stereotypes and their internalization through socialization are associated to internal and external social and psychological barriers to men's and women's sharing the same values, the same personality traits, the same interests, or making the same choices (Correll, 2004; Croft et al., 2015; Eagly & Wood, 2012; Ellemers, 2018; Nosek et al., 2009; Ridgeway, 2006; Wood & Eagly, 2012). Variations across countries in gender stereotypes should then be mirrored in variations in gender differences in values, traits and choices, even if other factors can interfere in such cross-country context.

The few empirical studies on the cross-country relationship between stereotypes and gender imbalances confirm this pattern. Relying on data about perceived sex differences in five-factor personality in 26 countries, Löckenhoff et al. (2014) show that cross-country variations in these perceptions map onto variations in assessed gender differences. Gender stereotypes in math or science have been shown to be related to gender imbalances in these fields (see (Breda et al., 2020; Miller et al., 2015; Nosek et al., 2009). As underlined in Miller et al. (2015), the country-level relationship between gender stereotypes and gender imbalances may be bidirectional since gender imbalances present in a country also have an impact on gender stereotypes, leading to the vicious cycle between stereotypes and social roles underlined by Eagly and Koenig (2021).

Theoretical and Empirical Evidence about the Gender Equality Paradox

Literature has shown that a large number of gender differences such as differences in personality traits (Costa et al., 2001; Lee & Ashton, 2020; Mac Giolla & Kajonius, 2019; Schmitt et al., 2008), in values (Schwartz & Rubel-Lifschitz, 2009), preferences (Falk & Hermle, 2018; Markowsky & Beblo, 2022) and choices of occupations (Block, 2022; Breda et al., 2020; Charles & Bradley, 2009; Stoet & Geary, 2018) are 'paradoxically' stronger in countries with higher living conditions. This pattern has been referred to as 'the Gender Equality Paradox' (see Balducci (2023) and Herlitz et al. (2024) for recent systematic reviews).

A common explanation for the gender-equality paradox is that in more economically developed and equal countries, reduced economic and social constraints afford men and women greater freedom and ease to express their intrinsically distinct inner preferences and interests (Balducci, 2023; Falk & Hermle, 2018; Lippa et al., 2010; Mac Giolla & Kajonius, 2019; Schmitt et al., 2008, 2017; Stoet & Geary, 2022). This explanation gets its theoretical foundations from the tradition of evolutionary psychology, which posits the existence of innate gender differences in, e.g., personality or interests (Buss, 1995; Schmitt et al., 2017), due to different (sexual) selection pressures in the past. Reduced constraints include the relaxation of gender norms (Falk & Hermle, 2018; Mac Giolla & Kajonius, 2019) and the analysis of the variations of gender stereotypes with economic development should make this point clearer.

More generally, in the same way as Breda et al. (2020) rely on PISA data to show that gender stereotypes about math can explain the relation between economic development and gender differences in preferences for math studies, our analysis should permit to analyze the extent to which gender stereotypes about career and family can explain, at least partially, the Gender Equality Paradox.

Current Research

Our aim here is to consider gender stereotypes about career and family roles, to analyze their variations with economic development, their relationship with gender imbalances and their possible role in the GEP.

We rely on measures of implicit and explicit stereotypes from the Project Implicit (Nosek et al., 2002) between 2005 and 2020. These measures are standard, and data span more than 100 countries allowing us to assess how country-level implicit and explicit gender stereotypes associating women with family and men with career vary as a function of country economic development. Data from Project Implicit make it possible to consider separately stereotypes held by males and those held by females, which can be important to better understand variations of stereotypes across countries, and their relationship with traits and behaviors. Regarding explicit stereotypes, we can consider separately stereotypes about career and those about family.

We first explore the variations of implicit and explicit gender career-family stereotypes with country level of economic development. We focus on indicators of economic development because they are among the most commonly considered indicators of cultural differences and importantly, they have been shown to be the most sensitive indicators in detecting the paradoxical relations with gender differences (Herlitz et al., 2024). According to SRT, as well as the empirical investigations across countries and across time, even though more economically developed countries are more gender equal in a certain sense, we expect a positive relation between gender stereotypes and economic development.

We then analyze the relationship at the country level between gender career-family stereotypes and several gender imbalances. We focus on gender differences in values, in personality traits and in preferences that are specifically related to the career and family roles. Regarding values, we consider family and communal values, whose gender differences should be directly related to GCF stereotypes. Regarding traits, we consider personality dimensions in which women score higher (such as agreeableness), since they are those that show the most consistent GEP (Herlitz et al., 2024). Regarding occupational preferences, we consider preferences for 'caring' occupations which are subject to both large gender differences and robust GEP (Block, 2022; Charles & Bradley, 2009). In line with theoretical perspectives such as SRT, we expect gender stereotypes and these gender imbalances to be related at the country level, even when controlling for measures of economic development.

We finally explore the Gender Equality Paradox. Specifically, we investigate the role of gender stereotypes about career and family in explaining why certain gender differences are more pronounced in more economically developed countries. Additionally, we assess the consistency of the gender equality paradox with theoretical perspectives such as Social Role Theory (SRT) or evolutionary perspectives, these perspectives being not mutually exclusive.

Materials and Methods

Our measures of gender career-family (GCF) stereotypes rely on data from Project Implicit (Nosek et al., 2002) (<http://implicit.harvard.edu/implicit/>) collected during the years 2005-2020. In the SI, the Project is described in detail (Appendix A). All data and code necessary to reproduce the analysis are available at https://osf.io/n5zwf/?view_only=c7701cf398d34c9fa1a7f293c8b5dc1f. No studies in this manuscript were preregistered.

Measures of Implicit GCF stereotypes. Our measures of implicit GCF stereotypes rely on the implicit association test (IAT). For the gender career-family IAT, participants are asked to categorize typical men (Ben, Paul, Daniel, John, Jeffrey) or women names (Rebecca, Michelle, Emily, Julia, Anna), as well as words related to career (Career, Corporation, Salary, Office, Professional, Management, Business) and family (Wedding, Marriage, Parents, Relatives, Family, Home, Children). Words are presented one at a time, and participants are asked to categorize them as quickly as possible by pressing one of two keyboard keys. In one condition ("stereotypical condition"), participants categorize men and career words with the *e* key, and women and family words with the *i* key. In the other condition ("counter-stereotypical condition"), participants categorize women and career words with the *e* key, and men and family words with the *i* key. The underlying assumption of the IAT is that participants are likely to categorize the words faster in the stereotypical condition than in the counter-stereotypical condition, due to the stereotypical association in memory of men with career and of women with family, and that the difference in response times reflects implicit gender stereotypes about career and family.

To quantify the strength of participants' implicit stereotypes, we use the individual D-score provided by Project Implicit, and computed for each participant by dividing the difference in mean response latency between the two IAT conditions by the participant's latency standard deviation inclusive of the two conditions (see Greenwald et al. (2003) for more details, see also SI). Positive D-scores correspond to implicit gender stereotypes about career-family. We first restrict the sample based on participants' reaction times and error rates using the criteria described in Nosek et al. (2002). We then restrict the sample to participants with full demographic information (gender, age, country of residence). Finally, individual data is aggregated to national level, and we keep countries with IAT data for at least 100 observations, as in, e.g., Ackerman and Chopik (2021), Charlesworth and Banaji (2022) and Nosek et al. (2009). This cutoff is arbitrary, and we show in robustness checks that our findings are robust to a range of minimum observations thresholds. We also prove the robustness to the consideration of other restrictions about performance, to the addition of thresholds of internet users by country or the removal of the condition of full demographic information. Restricting our attention to male or female participants and proceeding analogously provides us with a country-level measure of males' and females' implicit gender stereotypes about career-family.

The final sample for our main analysis includes 111 countries with 1,489,721 observations and a median of 497 observations per country. More than 1 million observations are from the U.S. The sample is 63% women, 62% take an implicit association test for the first time, the mean age is 29, and half of the tests were taken after 2015. In robustness checks, we restrict our attention to specific subsamples of participants (young, first IAT test takers, recent test dates, males, females).

Measures of explicit GCF stereotypes. In addition to the administration of the IAT, sessions of Project Implicit include a brief questionnaire about explicit attitudes and stereotypes (see SI). In the questionnaire, participants are explicitly asked how strongly they associate career with men or women. Answers are given on a seven-point Likert scale, providing us with a measure of the explicit stereotype associating men with career. Participants are asked the same question about family, providing us with a measure of the explicit stereotype associating women with family. Note that smaller scores indicate a greater tendency to associate family with women, thus we consider the opposite of these scores as a measure of explicit stereotype about family. The measure of explicit gender stereotype about career and family (GCF) is defined as the difference between the Career response and the Family response (see SI for details). We consider sessions from the Project Implicit between 2005 and 2020, as we do for the measure of implicit stereotype. We apply the same exclusion criteria as for implicit stereotypes and the same robustness checks are performed. The three individual measures of explicit stereotypes are averaged across participants to estimate country-level explicit stereotypes and we restrict our attention to countries with more than 100 observations, as we do for implicit stereotypes. The final sample consists of 1,460,046 observations in 110 countries. Proceeding analogously for male and female participants separately provides us with measures of male and female explicit gender stereotypes about career, about family and about career-family.

Measures of economic development. To measure country economic development, we mainly consider the standard Gross Domestic Product (GDP) as well as the Human Development Index (HDI), which incorporates measures of education and life expectancy on top of economic wealth. Detailed descriptions of these indicators as well as those considered in robustness checks are provided in the SI.

Measures of gender imbalances. We consider gender differences in family values, relying on data about the importance of family in one's life from the World Value Survey (Wave 7, 2017-2022). We retrieve data about communal values from the World Value Survey (Wave 5, 2005-2009 and Wave 6, 2010-2014), and more precisely about the importance of helping the people with whom one is in frequent personal contact.

Among the big-five personality traits, we focus on the agreeableness trait, that is related to the concern for family and others, a person with a high level of agreeableness tending to be more cooperative, helpful and caring. We also consider traits from the HEXACO personality inventory (Lee & Ashton, 2020), and in particular the dependence, the sentimentality and the sociability traits. The sentimentality and sociability traits belong to the communality dimension, the former assessing a tendency to feel strong emotional bonds with others, the latter a tendency to enjoy conversation and social interaction. The dependence scale assesses one's need for emotional support from others. Low scorers feel self-assured and able to deal with problems without any help or advice. Dependence is often associated

with girls and to the fact that they are assigned domestic chores, including the care of their siblings whereas independence is associated with boys and to the fact that they are assigned tasks that take them outside the home. We retrieve data about gender differences in self-reported agreeableness from Lipka (2010) and about HEXACO traits from Lee and Ashton (2020).

Finally, we rely on PISA data for measuring men's and women's preferences for health-related occupations. PISA asks students what occupation they expect to be working in by the time they are 30 years old.

Details about all these measures of gender differences are provided in the SI.

Models. Models mostly consist of linear regression models and are detailed in the SI, Appendix C.

RESULTS

Table S1 (in the SI) provides the average D-scores by country, for the 111 countries in our sample. In all countries of our sample, men are implicitly more associated with career and women with family. Unlike data about implicit stereotypes, data about explicit stereotypes make it possible to disentangle the two dimensions of career and family. Table S2A presents the three measures of national explicit stereotypes for the 110 countries in our sample. In all countries we observe an explicit (average) men-career stereotype (col.1, scores above 4) and an explicit women-family stereotype (col.2, scores below 4), hence an explicit gender stereotype about career-family (col.3, positive scores). Country-level explicit GCF stereotypes are positively and significantly related to implicit GCF stereotypes ($r=0.41$, Table S2B), consistent with the fact that implicit and explicit stereotypes are separate but related constructs.

Cross-country relations between GCF stereotypes and country level of economic development

We first analyze how GCF stereotypes vary with country level of economic development.

Main results. Table 1 shows that a one standard deviation increase of (the log of) GDP is associated with an increase of +0.56SD of implicit GCF stereotypes ($N=108$, see also Table S3A). This corresponds to an increase in raw country-level D-scores of 0.023. Figure 1A illustrates this result. The relationship also holds and is of the same magnitude for HDI, a one standard deviation increase of HDI being associated with an increase of +0.6SD of implicit GCF stereotypes, corresponding to an increase in raw D-scores of 0.025 ($N=104$, see Tables 1, S3A). See Figure S2 for an illustration.

The relation holds true for stereotypes endorsed by males and females separately (Table 1, Columns 2-3 and Table S3A), the relation seeming stronger for males. A one standard deviation increase of HDI is associated with an increase of 0.63SD of males' IAT GCF stereotypes (i.e., 0.029 in raw D-score) and an increase of 0.43SD of females' IAT GCF stereotypes (i.e., 0.015 in raw D-score). Analogous results are obtained with GDP (Table 1). Figure 1B illustrates the relation between (the log of) GDP and males' and females' GCF stereotypes separately.

Table 1 (see also Table S3B) shows that explicit GCF stereotypes are also stronger in more developed countries, although the relation is weaker than for implicit GCF stereotypes. A one SD increase in HDI (resp. GDP) is associated with an increase of +0.31SD (resp. +0.39SD) of explicit GCF stereotypes. Within the family dimension, the relation is driven by male participants (Table S3B). In wealthier and more developed countries, male participants explicitly associate family significantly more strongly with women ($r=0.47$ with GDP and $r=0.46$ with HDI, see also Table 1), which is not the case for female participants ($r=0.03$ with GDP and $r=-0.15$ with HDI). Figure 1C illustrates the relation between males' explicit family stereotypes and GDP. Regarding the career dimension, female participants explicitly associate career more strongly with men in wealthier and more developed countries ($r=0.37$ with GDP and $r=0.34$ with HDI, see Table 1 and Table S3B), but this is not the case for male participants, who associate significantly less strongly men with career in more economically developed countries ($r=-0.26$ with GDP and $r=-0.33$ with HDI, see Table S3B).

Control for individual heterogeneity: micro-level analysis. To control for individual heterogeneity, we also run the individual-level counterparts of the country-level analyses on the sample of more than 1,450,000 observations.

Previous literature has shown that the IAT scores are stronger (i) for older participants, (ii) for female participants, (iii) when the test is the first IAT test taken by the individual, (iv) for older test dates (Charlesworth & Banaji, 2022; Lewis & Lupyan, 2020). Table S4A confirms these features and also shows that implicit GCF stereotypes are stronger for higher (self-reported) levels of education. To account for these influences on implicit stereotypes, we include as individual controls in the regression models participants' gender and age, number of previous tests taken, self-reported education background, and test date. Table 2 shows that the effect of country levels of wealth or development is robust to the inclusion of these individual control variables (see also S4B).

Controlling for age (Column 7, Table S4B) slightly reduces the effect (by about 10%). Older participants have higher D-scores (Table S4A), and (a small) part of the relationship between D-scores and country wealth or development is due to the fact that members of wealthier or more developed countries are older (Lewis & Lupyan, 2020). Besides, controlling for individual heterogeneity confirms that the relation between implicit GCF stereotypes and country level of wealth and development is stronger for males (Table S4C).

Table S4D shows that the relations of Table 1 between explicit stereotypes and country wealth and development are also robust to controlling for individual heterogeneity.

Robustness to other indicators of economic development and consideration of other macro characteristics. We show in Table S5 that the relations of Table 1 between implicit or explicit gender stereotypes and country level of economic development are robust to the consideration of other measures than GDP or HDI (see SI for detailed description and data sources for the alternative indicators). The relationships for implicit or explicit stereotypes are robust to the consideration of the four subindices of the Human Development Index, concerning economic wealth, education (two subindices), and life expectancy. They also hold for PISA indicator of economic and socio-cultural background denoted by ESCS or for countries' median age (as already observed in (Lewis & Lupyan, 2020)). Table S5 further shows the robustness of the relations to the consideration of historical values, like the GDP value in 1960 or 1970 or the HDI value in 1990, which suggests that the relation is historically founded.

It is instructive to investigate the relations with the importance of the agricultural and service sectors, as they represent structural transformations of labor markets that alter the social roles of men and women. Consistent with Social Role Theory (SRT), implicit and explicit stereotypes are all negatively related to the share of the agricultural sector and positively related to the share of the service sector. For instance, for males' implicit stereotypes, the correlation coefficient is $r = -0.61$ with agricultural employment ($N = 70$) and $r = 0.47$ with employment in services ($N = 70$). Additionally, in line with SRT, GCF stereotypes are mainly positively related to indicators of differentiation in the social roles of males and females around 1990 (i.e., prior to the collection of data about stereotypes in Project Implicit), such as horizontal educational and occupational sex segregation, particularly in fields labeled as male or female (Table S5). Using data from Charles (1992) for occupational sex segregation and Charles and Bradley (2009) for educational sex segregation, we find, for instance, that males' implicit stereotypes have a correlation coefficient of $r = 0.41$ with overall occupational segregation ($r = 0.53$ with segregation in the specific service sector, which is female-labeled, $N = 24$) and $r = 0.29$ with overall educational segregation ($r = 0.34$ with segregation in the specific health field, which is female-labeled, $N = 39$).

Other Robustness checks. We further show in Tables S6Ai and S6Bi that the link between implicit or explicit stereotypes about career and family and measures of wealth and development is mostly robust to (i) the restriction of the sample to recent test dates (last five years), (ii) young participants (younger than 26 y.o.), (iii) the restriction of the sample to participants taking the test for the first time. In our main specification, we restricted the sample of countries to those with a minimum of 100 observations. We show in Tables S6Aii and S6Bii the robustness of our results to various minimum observation thresholds by country (number of observations greater than 50, 100, 200, 400). The relation is robust to the addition of thresholds of internet users by country (Table S6Aiii and Table S6Biii). For implicit stereotypes, we also show the robustness to various restrictions about reaction times and error rates at the test¹ and about demographic information (Table S6Aiv).

¹ We thank Jordan Axt, Director of Data and Methodology for Project Implicit, for detailed information about the IAT and standard exclusion criteria.

Cross-country relations between GCF stereotypes and country level of gender differences in values, personality traits and preferences

We have shown in the previous section that GCF stereotypes are stronger in more economically developed countries. We now analyze whether variations in GCF stereotypes across countries are reflected in variations in gender differences in values, personality traits and preferences, particularly those related to career and family roles.

Gender differences in values: family values, communal values. In most countries in our sample, female participants place on average more importance on family than male participants (67/76 countries), but there are variations across countries. We show in Table 3 (Panel A) and Table S7.A that countries where the gender gap in the importance placed on family is higher are those where implicit GCF stereotypes are higher, the relation being driven by males' implicit GCF stereotypes. We obtain similar results if we replace males' implicit GCF stereotypes by males' explicit family stereotypes. An increase of 1SD in implicit GCF stereotypes (resp. males' implicit GCF, males' explicit stereotype about family) is associated with an increase of 0.36SD (resp. 0.57SD, 0.51SD) in the gender gap in the importance of family value.

Analogous results are obtained concerning communal values. In most countries in our sample, female participants hold more communal values than male participants (37/45 countries), in line with e.g. (Block, 2022). Table 3 (Panel A) and Table S7.A show that an increase of 1SD in implicit GCF stereotypes (resp. males' implicit, females' implicit, males' explicit family stereotypes) is associated with an increase of 0.6SD (resp. 0.6SD, 0.39SD, 0.64SD) in the gender gap in the importance of helping close people. Figure 2A illustrates this result for males' implicit stereotypes, where the relationship is stronger than for females'.

Gender differences in self-reported personality traits. Women are found to be on average more agreeable (Costa et al., 2001; Lippa, 2010), more dependent, sentimental and sociable than men (Lee & Ashton, 2020), although there are variations in the gender differences across countries. Table S7.B shows that gender differences in these self-reported personality traits are higher in countries where the implicit GCF stereotypes are higher, especially males' stereotypes (see also Table 3 Panel A for two of these traits) as well as in countries where males' explicit stereotypes about family are higher. An increase of 1SD in implicit GCF stereotype (resp. males' implicit GCF stereotype, males' explicit family stereotype) is associated with an increase in the gender gap in personality traits of 0.47SD (resp. 0.56SD, 0.43SD) for agreeableness, of 0.54SD (resp. 0.65SD, 0.56SD) for dependence, of 0.42SD (resp. 0.42SD, 0.44 SD) for sentimentality and of 0.37SD (resp. 0.53SD, 0.45SD) for sociability. Figure 2B illustrates this point for dependence and males' implicit stereotypes.

Gender differences in occupational preferences. In all countries in our sample, 15-year-old girls expect on average more than boys a career in health at 30. This is in line with the underrepresentation of men in 'caring' occupations. Table S7.C and Table 3 (Panel A) show that countries where the ratio of girls to boys is higher among 15-year-olds who expect a career in health at 30 are those where gender career-family stereotypes are higher, and this is especially true for males' stereotypes. An increase of 1SD in implicit GCF stereotype (resp. males' implicit GCF stereotype, males' explicit stereotype about family) is associated with an increase of 0.35 SD (resp. 0.48SD, 0.59SD) of the girls-to-boys ratio. Figure 2C illustrates this result for males' implicit stereotypes. (Block, 2022) shows that gender differences in communal values are related to gender differences in 'caring' occupations, and this is one of the likely channels through which GCF stereotypes can impact gender differences in choices of occupations.

Furthermore, we verify in Table 3 (Panel B) and Table S8 (rows (2) and (3)) that these relations are mostly robust to controlling for measures of wealth or development or vertical gender equality (as measured by the Gender Gap Index), even though they are of weaker strength. This suggests that the relation between GCF stereotypes and these imbalances exists *per se* and is not (only) due to their (possible) common relation with country wealth or development.

The Gender Equality Paradox

Since we have shown that GCF stereotypes are stronger in more economically developed countries and that gender differences in traits and preferences related to career and family are greater in countries with stronger GCF stereotypes, we now analyze whether the GEP in these domains (i.e., the paradox of greater gender differences in more economically developed countries) may be related to GCF stereotypes.

The GEP in personality traits. Several works in the literature have shown the existence of a Gender Equality Paradox in personality traits (Costa et al., 2001; Kosakowska-Berezecka et al., 2022; Mac Giolla & Kajonius, 2019; Schmitt et al., 2008). Consistent with these findings, we observe in Table 4 and Table S8.B a positive and significant relationship between gender differences in the personality traits we considered and country wealth: an increase of 1SD in country wealth is associated with an increase of 0.35SD in gender differences in agreeableness (0.4SD in dependence, 0.32SD in sociability and 0.34SD in sentimentality).

These effects of wealth on gender differences in traits are however systematically lower than those of (males') implicit GCF stereotypes or males' explicit stereotypes about family.

Table 4 and Table S8.B further show that when a control for (males') GCF stereotypes is introduced in the regression of gender differences in personality traits on country level of wealth, the effect of wealth tends to disappear, its coefficient becoming not significant (Table S8.B, rows 1B and 1C), while the effect of gender stereotypes on gender differences in personality traits tends to remain significant (Table S8.B, row 2A, see also Table 4, column 2).

For instance, when a measure of males' implicit GCF stereotypes is introduced as a control, the estimated association between countries' wealth and gender differences in agreeableness is greatly reduced (from 0.35 to 0.07) and becomes close to zero in magnitude and no longer significant. In contrast, when a measure of countries' wealth is included as a control, the association between males' implicit GCF stereotypes and gender differences in agreeableness is virtually unchanged (from 0.56 to 0.52) and still statistically significant. This latter association is also robust to controlling for HDI or for the GGI (rows 2B and 3).

These simple mediation analyses suggest that GCF stereotypes can account for the paradoxical relation between economic development and gender imbalances in personality traits.

The GEP in preferences for 'caring' occupations. In line with the Gender Equality Paradox in preferences for health-related or 'caring' occupations (Block, 2022; Charles & Bradley, 2009), we find a positive and significant effect of country wealth on the gender gap in expectations at 15 of a career in health (Table 4, Column 3 and Table S8.C, row 1A). This effect mostly disappears or is at least greatly reduced when a control for males' implicit GCF stereotypes (or males' explicit stereotypes about family) is introduced in the regression (Table 4, Column 4 and Table S8.C, rows 1B-1C), while the relation between gender differences and the considered GCF stereotypes is robust to the control by country wealth (Table S8.C, rows 2-3). This suggests that the Gender Equality Paradox for 'caring' occupations (expectations of a career in health) might also be at least partly accounted for by (males') GCF stereotypes.

Pisa data allow for a separate analysis of males' and females' expectations of a career in health. The relationship between gender differences and country wealth is driven by lower males' expectations of a career in health in wealthier countries (Table S8.D). Specifically, there is no significant relation between country wealth and females' expectations of a career in health, whereas a one SD increase in GDP is associated with a decrease of 0.42SD in males' expectations of a career in health² (see also Table 4). As with personality traits (Kosakowska-Berezecka et al., 2022; Schmitt et al., 2008), cross-country variations in gender differences in preferences for a career in health are driven by variations in males' preferences. Moreover, as shown in Table 4 (Column 6), the effect of wealth on males' preferences disappears with the introduction of a control for males' implicit GCF stereotypes, while the effect of these stereotypes remains significant. This suggests that males' implicit GCF stereotypes can account for both the lower males' preferences for a career in health and the larger gender differences in preferences for a career in health in wealthier countries.

² Using the typology adopted by Ilmarinen and Lönnqvist (2024), this means that the GEP in career occupations in health satisfies a Type B pattern (i.e., no relationship for females and a significant relationship for males)

DISCUSSION

The main results and implications of our analysis

Using data from more than 1,400,000 participants collected between 2005 and 2020 in more than 110 countries, the current study shows that implicit and explicit gender stereotypes associating women with family and men with career (i) are stronger in more economically developed countries, (ii) are related at the country level to gender differences in values, traits or preferences related to career and family roles and (iii) may contribute to explaining the Gender Equality Paradox in these domains.

For the first point, we have shown the robustness of the relation between GCF stereotypes and economic development to various indicators of present economic development (such as GDP, HDI, and several other measures of countries' socioeconomic level), historical measures of economic development (such as HDI in 1990), controls for individual heterogeneity, and the consideration of specific subgroups (such as male, female, young or recent participants).

For the second point, we have shown that countries with greater GCF stereotypes are also those with greater gender differences in family or communal values, in self-reported personality traits like agreeableness, and in preferences for health-related occupations. These relationships between GCF stereotypes and gender imbalances in values, personality traits and occupational preferences are especially compelling given that the indicators of GCF stereotyping and the estimates of the gender imbalances stem from distinct samples.

For the third point, we have considered the GEP in personality traits (Costa et al., 2001; Kosakowska-Berezecka et al., 2022; Mac Giolla & Kajonius, 2019; Schmitt et al., 2008) and the GEP in health-related occupations (Block, 2022; Charles & Bradley, 2009). In both settings, we have shown that controlling for GCF stereotypes in the regression of gender differences on country economic development renders the coefficient of economic development insignificant, while the coefficient of stereotypes remains significant. This indicates in particular that the Gender Equality Paradox in personality traits, which is considered as 'the most robust Gender Equality Paradox' (Herlitz et al., 2024), tends to disappear when controlling for GCF stereotypes and suggests more generally that GCF stereotypes might at least partly explain the paradoxical relation between development and gender imbalances related to career and family roles.

The analysis by gender helps interpret the results and provides insights into possible mechanisms. Specifically, the robust relation we found between males' stereotypes and gender differences in self-reported personality traits or in intentions to pursue a health-related occupation can clarify why variations of gender differences in these domains across countries are primarily driven by males (Kosakowska-Berezecka et al., 2022; Schmitt et al., 2008). Additionally, consider, for example, the gender equality paradox observed in health-related occupations. Our analysis shows that in more economically developed countries, men have lower expectations of pursuing a career in health (whereas women do not have significantly higher expectations) and hold stronger stereotypes associating family and communal roles with women. When we control for these stereotypes in the regression of men's health career expectations or gender differences in health career expectations on economic development, the coefficient for economic development becomes insignificant. A plausible interpretation, supported (but not shown) by our analysis, is that the stronger gender-career-family (GCF) stereotypes endorsed by men in more developed countries lead them to shy away from health-related occupations, thereby increasing the gender imbalance in these fields. Note that this gender imbalance may, in turn, reinforce the GCF stereotypes.

Our work points to the importance of gender stereotypes about career and family in economically developed countries and to their possible role in the maintenance of gender imbalances and in the Gender Equality Paradox. In economically developed countries, while there is progress in gender equality concerning rights and values, there are also more prevalent gender stereotypes about career and family, which are associated with stronger gender differences in personality traits, and preferences, and may at least partially account for the GEP.

Note that our analysis focuses on gender stereotypes associating men with career and women with family and on their possible role in accounting for the Gender Equality Paradox in outcomes related to career and family roles. The same mechanism relating gender essentialist ideology, which could be more prevalent in economically developed countries, and gender differences could be extended to other domains considering other stereotypes than those about career and family, as explored in Breda et al. (2020) for gender stereotypes in math.

Consistency of our results with theoretical perspectives

Our results align well with the predictions of SRT. The observed relationship between gender stereotypes and psychological gender differences at the country level (Result (ii)) supports SRT's assertion that sex differences and similarities in traits and behavior reflect underlying gender role beliefs. The observation that gender stereotypes about career and family are stronger in more economically developed countries (Result (i)) is also consistent with SRT. As detailed above and argued in Eagly et al. (2020), in more economically developed countries, the social roles of men and women regarding family and career are likely perceived as more differentiated, which according to SRT, should lead to stronger gender career-family stereotypes. The significant relationships we found between structural changes in the economy (such as the share of the labor force in agriculture or services) and GCF stereotypes, and especially between horizontal segregation in education and occupations and GCF stereotypes, are fully consistent with SRT predictions.

Our analysis suggests that, contrary to what is often argued (Balducci, 2023; Costa et al., 2001; Falk & Hermle, 2018; Lippa, 2010; Schmitt et al., 2008, 2017; Stoet & Geary, 2022), the predictions of SRT are not incompatible with the existence of the GEP in personality traits or in occupational choices.

Our results are even fully consistent with an SRT-based explanation of the GEP along the following mechanism (even though they do not prove its validity): as societies develop, changes in the economy and cultural environment lead men and women to occupy more differentiated family and work roles, resulting in stronger gender stereotypes about career and family, and thus, stronger gender differences in personality traits and preferences. Since gender differences in psychological attributes and preferences lead to gender differences in labor and domestic work, our results are also consistent with the notion of a 'vicious cycle' linking stereotypes and gender imbalances (Eagly & Koenig, 2021). Future research employing a more causal approach would be valuable for further exploring the validity of this mechanism.

Regarding evolutionary arguments to explain the Gender Equality Paradox, they rely on the hypothesis that more economically developed countries allow men and women to more freely and autonomously express inherent gender differences (Balducci, 2023; Falk & Hermle, 2018; Lippa et al., 2010; Mac Giolla & Kajonius, 2019; Schmitt et al., 2008, 2017; Stoet & Geary, 2022). Our results do not refute the possibility that intrinsic biological gender differences related to sexual selection and related mechanisms might exist, and such explanations can fruitfully complement those relying on sociocultural arguments. However, our results challenge the notion that all social constraints are reduced in more economically developed countries (Falk & Hermle, 2018; Mac Giolla & Kajonius, 2019) and that individuals necessarily have greater freedom to express their true preferences in these contexts. In fact, the stronger GCF stereotypes observed in more economically developed countries (Result (i)) suggest that individuals do not necessarily have greater freedom to express their preferences, but that on the contrary, social pressures may be stronger.

Our results align with the literature highlighting the multidimensional nature of gender equality (Charles & Bradley, 2009; Cotter et al., 2011; England, 2010; Grusky & Charles, 2004; Ridgeway, 2009). In more economically developed countries, more gender egalitarian values and practices can coexist with stronger GCF stereotypes and greater gender imbalances (Results (i) and (ii)). Note that GCF stereotypes do not necessarily assume that men and women are unequal and as argued in Grusky and Charles (2004) and Knight and Brinton (2017), there is no dissonance between the belief that men and women are equal and the belief that they are on balance different and associated with different roles.

Our findings are also consistent with the cultural moderation hypothesis according to which culture shapes the contents of gender stereotypes, such that men are perceived as possessing more of the traits that are culturally valued. First, given that family values are granted less importance in more economically developed countries, our finding that gender stereotypes associating women with family are stronger in these countries (Result (i)) is fully consistent with the hypothesis. Moreover, relying on

the data in Williams and Best (1990a), Cuddy et al. (2015) show that the stereotype associating men with individualistic (resp. collectivistic) characteristics is stronger in more individualistic (resp. collectivistic) countries. Recently, Kosakowska-Berezecka et al. (2024) confirmed the cultural moderation hypothesis relying on recent data on prescriptive gender stereotypes in 62 countries. Our findings are in line with these empirical works since career vs family characteristics can be considered as individualistic vs collectivistic characteristics and more economically developed countries are more individualistic.

Practical implications

The presence of strong gender career-family stereotypes in economically developed countries (Result (i)) as well as the relation of these stereotypes with gender imbalances (Results (ii) and (iii)) indicate that gender equality is unlikely to be reached without appropriate policies.

Our analysis first highlights the importance of trying to reduce GCF stereotypes in highly developed countries, or at least to minimize their impact or to be aware of their presence to reach higher gender equality. Being aware of the presence of strong GCF stereotypes in developed countries is important when considering possible gender equality policies. For example, easier or longer parental leave may backfire and reinforce labor market imbalances if, due to the presence of strong GCF stereotypes, women make more use of it than men (Olsson et al., 2023).

Directly attacking gender stereotypes is difficult, but our findings also confirm that they are not fixed and rigid. As suggested in Eagly and Koenig (2021), England et al. (2020), Fisk & Ridgeway (2018) and Koenig & Eagly (2014), and in line with Social Role Theory, effective strategies could consist in policies and programs that change the distributions of men and women in social roles, thereby changing stereotypes at their source. Such programs could aim at increasing men's participation - especially high status men - in domestic and care work, for instance by encouraging more fathers to take up parental leave (Bertrand, 2018; Croft et al., 2015). Of particular interest for this issue, the recent study by Farre et al. (2023) shows that paternity leave reforms are associated with lower gender stereotypes (measured by the gender career-family IAT) among men born post-paternity leave implementation.

Limitations

Measuring stereotypes is difficult, especially in a cross-country context, and no measure of GCF stereotypes is exempt from criticism, including those adopted in our analysis, even though they are widely used. Explicit measures are subject to the usual criticism that they can be biased by social desirability (Nosek, 2005; Paulhus, 1984), which can vary across countries depending on, e.g., the salience of gender issues. Moreover, stereotypes do not have to be held with awareness to impact behaviors and choices, which cannot be captured by explicit associations. Measures relying on the IAT, which is widely recognized as the standard technique for measuring stereotypes, have been criticized for its administration in English to largely non-English speaking participants, and for its low reliability (Fazio & Olson, 2003; Lane et al., 2007). It is important to note that in our study, we use the IAT to measure country-level differences rather than as an individual differences measure. Research has shown that group-level estimates obtained through the IAT are stable, and the IAT measures are considered "meaningful, valid and reliable measures of situations rather than persons" (Payne et al., 2017). This mitigates issues of reliability within our study context. Regarding the validity of the specific stimuli used for the IAT in a cross-country context, the strong (although not perfect) correlations obtained between our measures of implicit stereotypes and measures of explicit stereotypes, which do not involve specific stimuli, is reassuring. More generally, regarding the reliability and validity of the IATs *across countries and cultures*, they have been shown for the gender-science and the gender-career IAT in Lewis and Lupyan (2020), Miller et al. (2015), Nosek et al. (2009), showing in particular their strong links across countries with real-world outcomes, such as lower national-level female enrollment in tertiary science education, lower national-level female employment in the researcher workforce, and lower national-level sex differences in science and mathematics achievement. In our context, the strong link obtained between IAT measures of GCF stereotypes and gender differences in values, traits and choices are very reassuring about their validity across countries. In particular, the strong correlations obtained with gender differences in family or communal values, or in communal personality traits, relying on different data sets (World Value Survey, (Lee & Ashton, 2020; Lippa, 2010)) seem to confirm that our measures capture gender stereotypes about family or communal roles at the country level.

Importantly, even though the datasets are very large, they rely on self-selected Internet samples, which have limited representativeness of national populations, especially if the percentage of Internet users is low. It could be that in less economically developed countries, only individuals especially interested in gender issues self-select while in more economically developed countries a more diverse sample of individuals self-select. The robustness of the results across a wide range of minimum percentages of Internet users, various controls (such as gender and age, number of previous tests taken, self-reported education background, and test date), and different categories (such as young age and recent dates) is however reassuring, as are the significant relations with gender differences observed across distinct datasets.

In our opinion, the most convincing argument is the convergence of the results across various measures of stereotypes based on different constructs, elicitation methods and/or surveys and future work relying on alternative datasets and constructs will helpfully complement the findings presented here.

Another limitation of our work is that it is difficult to establish causal relationships between cultures, and we emphasize that our results are not causal, but only correlational. Concerning the relation with economic development, the effects of cultural environments are inherently challenging to study because they generally cannot be experimentally manipulated. We verified the relations with several indicators of economic development, including historical measures of economic development and measures of structures of the labor force. Moreover, our results are in line with Social Role Theory. Note that as far as the Gender Equality Paradox is concerned, we are not interested in the causal relation between development and stereotypes but just in showing that there are stronger gender stereotypes in more economically developed countries, whatever their origin. Regarding gender imbalances, existing empirical and theoretical literature on gender stereotypes at the individual level show the causal impact of stereotypes on differences of values, traits and choices between men and women, but, as previously underlined, at the country level, a vicious circle (Eagly & Koenig, 2021), i.e., a bidirectional, and mutually reinforcing relation between GCF stereotypes and gender imbalances is very likely.

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Figures and Tables

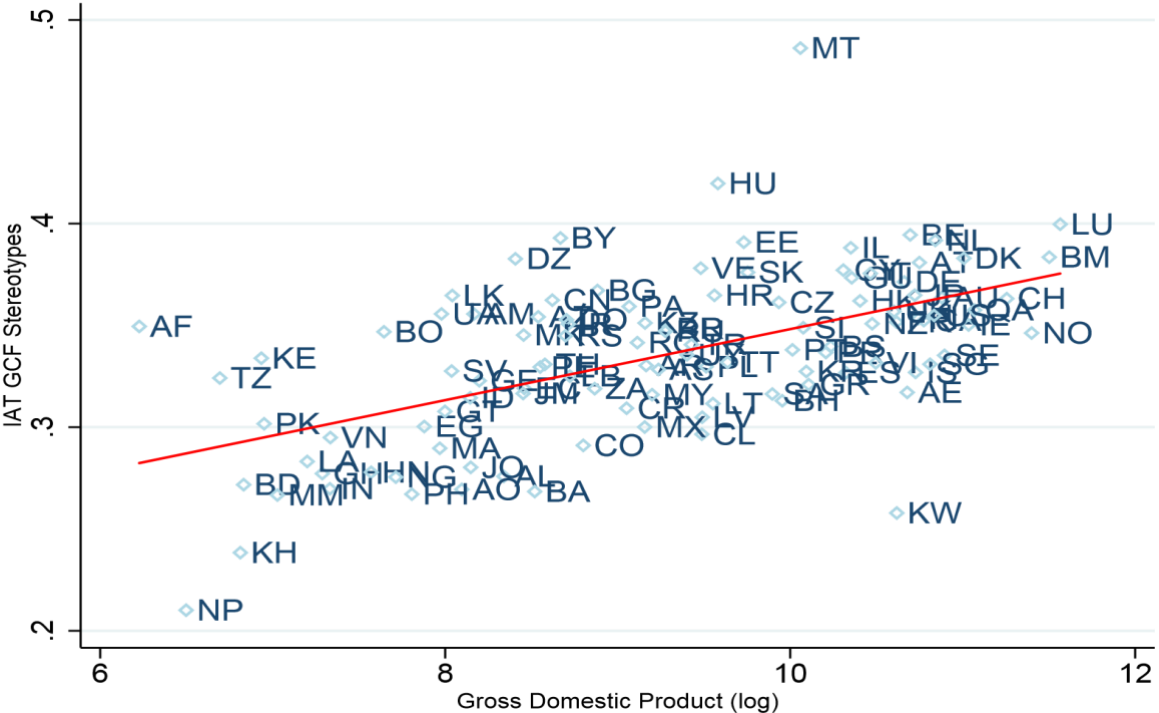


Figure 1A: Country-level implicit GCF stereotypes, as captured by the Implicit Association Test (y-axis), as a function of (the log of) Gross Domestic Product (x-axis). The figure shows the relationship between country-level implicit Gender Career-Family stereotypes, measured by the mean D-score of Implicit Association Test, denoted by IAT GCF Stereotypes, and the (log of) Gross Domestic Product. The sample is reduced to countries with more than 100 observations (N=108). Variables and data sources are described in Appendices A,B. Variables are not standardized. Country codes from ISO3166-1 standard.

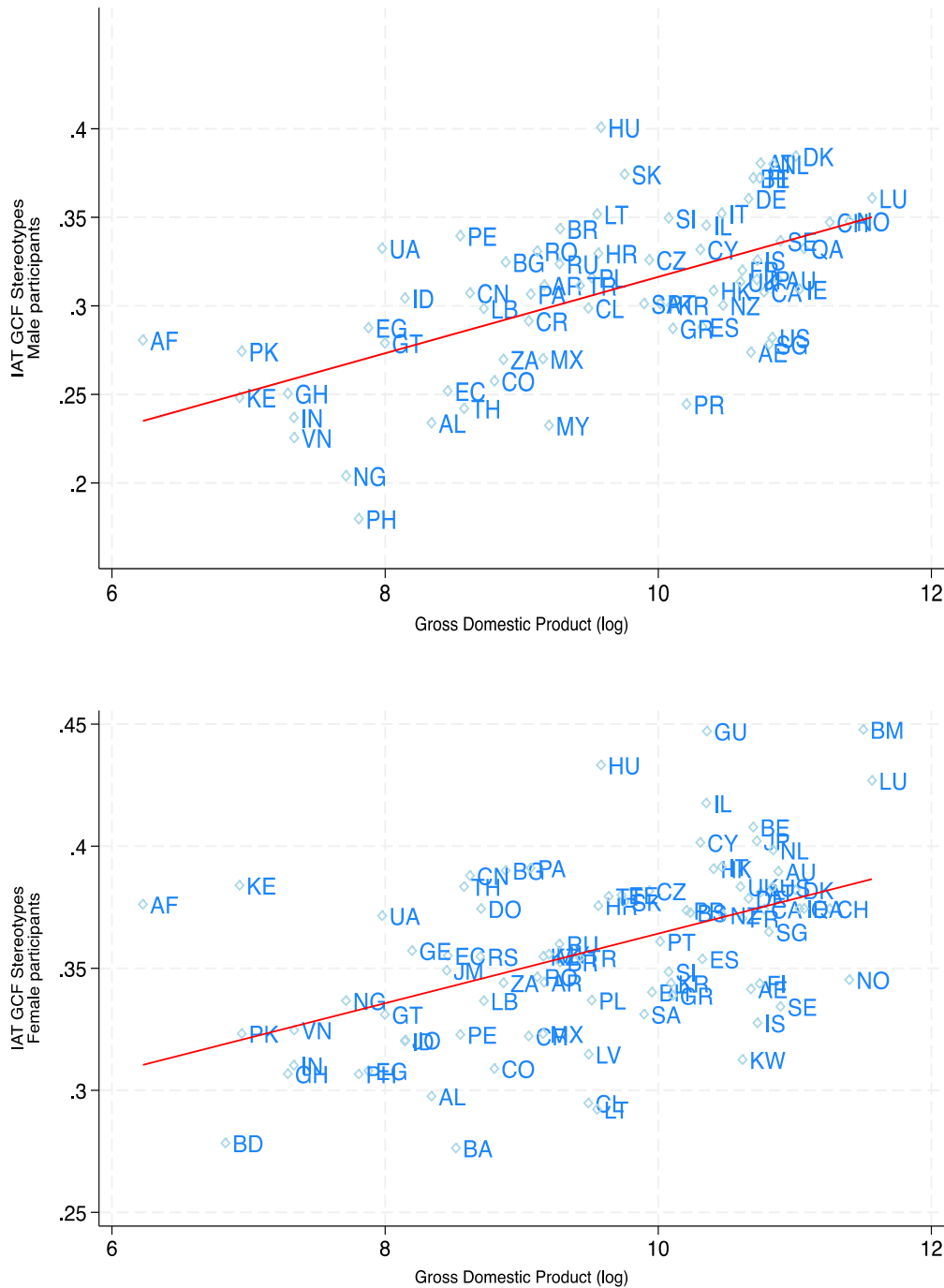


Figure 1B: Country-level implicit GCF stereotypes (y-axis) as a function of (the log of) Gross Domestic Product (x-axis), separately for male participants (top figure) and for female participants (bottom figure). The figure is the analog of Figure 1A restricting the sample to male participants only (top) and female participants only (bottom). It shows the relationship between country-level implicit males' and females' Gender Career/Family stereotypes, measured by the mean D-score of Implicit Association Test and the (log of) Gross Domestic Product. In each setting, we only consider countries with more than 100 observations (N=86 for female participants, and N=70 for male participants). Variables and data sources are described in Appendices A,B. Variables are not standardized. Country codes from ISO3166-1 standard.

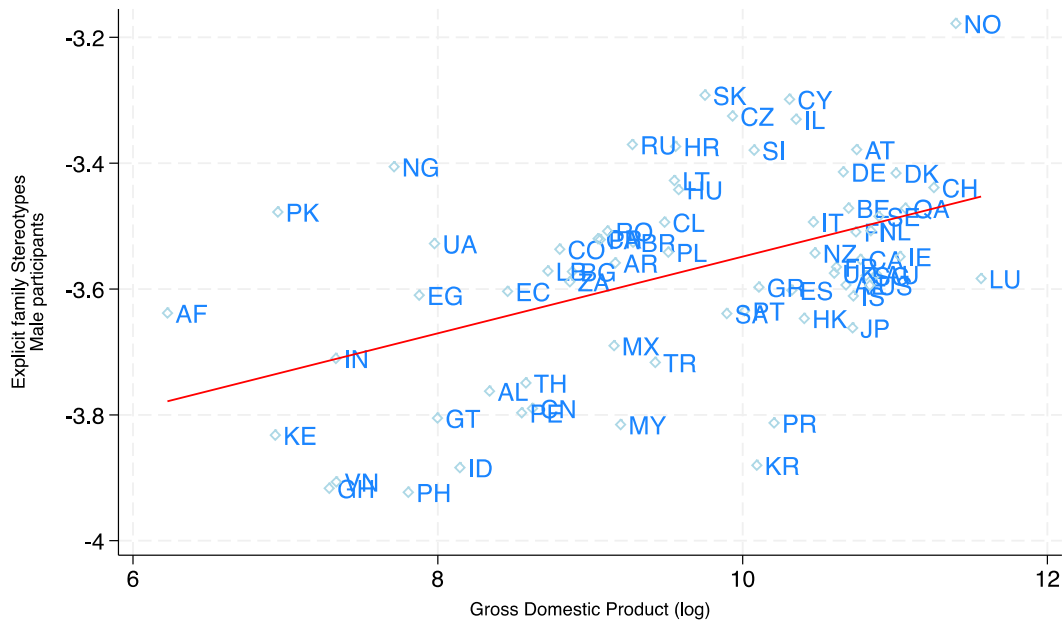


Figure 1C: Country-level males' explicit stereotypes about family (y-axis) as a function of (the log of) Gross Domestic Product (x-axis). The figure is the analog of Figure 1B for male participants (top figure), replacing implicit stereotypes by explicit stereotypes about family. It shows the relationship between country-level males' explicit family stereotypes and the (log of) Gross Domestic Product. We only consider countries with more than 100 observations for explicit stereotypes for male participants (N=70). Variables and data sources are described in Appendices A,B. Variables are not standardized. Country codes from ISO3166-1 standard.

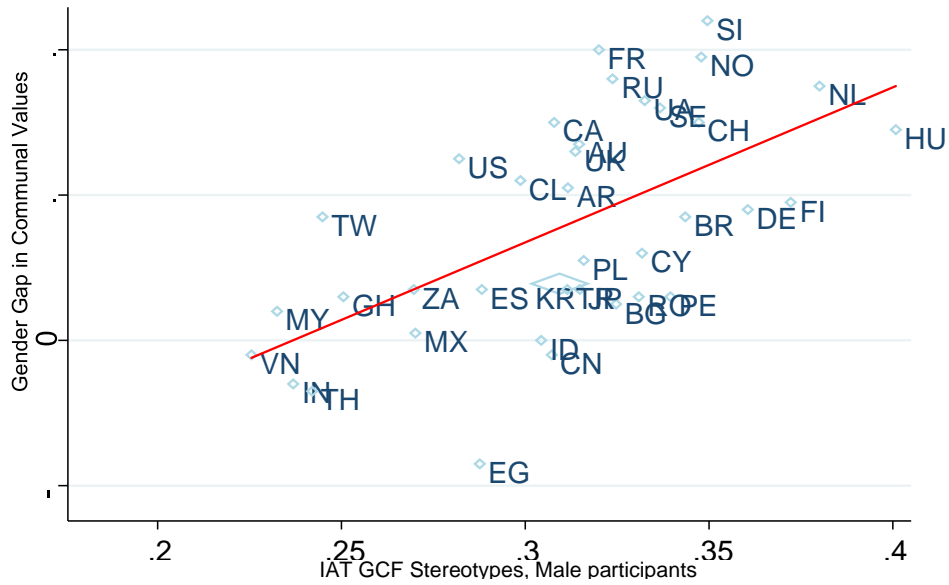


Figure 2A: Country-level gender imbalances in communal values (y-axis) as a function of country-level males' implicit Gender Career-Family stereotypes (x-axis). The figure shows the relationship between gender differences in communal values or more precisely in the importance granted to helping the people with whom one is in frequent personal contact (y-axis), measured by the difference between female and male participants' answers in the World Value Surveys (WVS, Wave 5) and country-level males' implicit Gender Career-Family stereotypes (x-axis), measured by the mean D-score of Implicit Association Test for male participants. Variables are described in Appendices A,B and are not standardized. Country codes from ISO3166-1 standard.

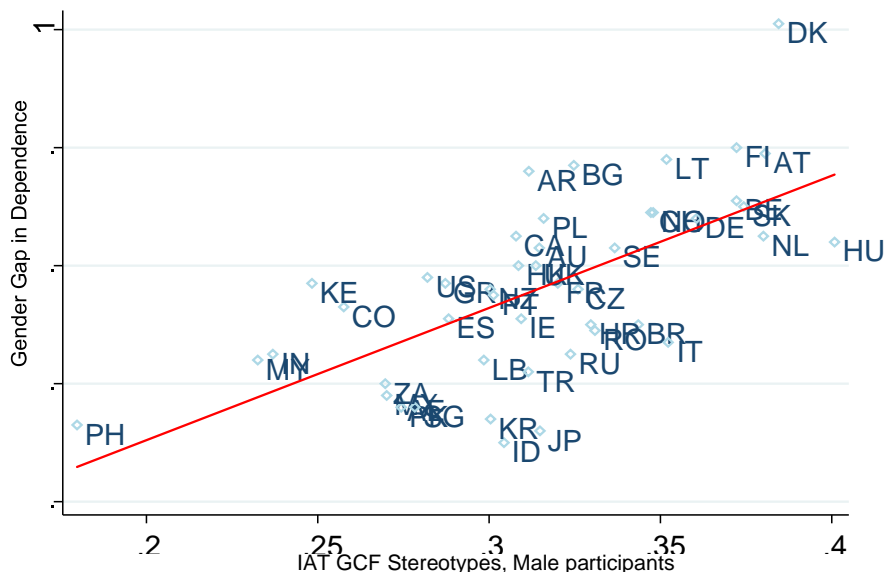


Figure 2B: Country-level gender imbalances in self-reported personality trait Dependence (y-axis) as a function of country-level males' implicit Gender Career-Family stereotypes (x-axis). The figure shows the relationship between gender differences in self-reported HEXACO trait Dependence (y-axis), relying on data from (Lee & Ashton, 2020) and country-level males' implicit Gender Career-Family stereotypes (x-axis), measured by the mean D-score of Implicit Association Test for male participants. Variables and data sources are described in Appendices A,B. Variables are not standardized. Country codes from ISO3166-1 standard.

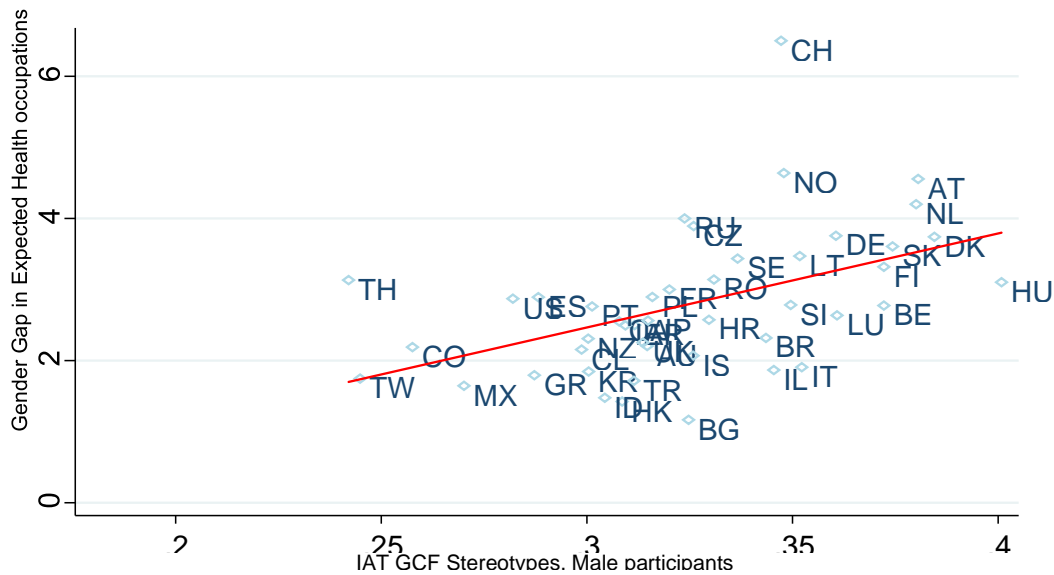


Figure 2C: Country-level gender imbalances in expectations of health-related occupations (y-axis) as a function of country-level males' implicit Gender Career-Family stereotypes (x-axis). The figure shows the relationship between the female-to-male ratio among 15-year-old students participating in the Programme for International Student Assessment (PISA) who expect a health-related occupation at 30 and country-level males' implicit Gender Career-Family stereotypes (x-axis), measured by the mean D-score of Implicit Association Test for male participants. Variables and data sources are described in Appendices A,B. Variables are not standardized. Country codes from ISO3166-1 standard.

Table 1. Estimated effects of country development and wealth on country-level implicit and explicit gender stereotypes about career and family

*Dependent Variable is country-level
Gender stereotypes about career and family*

	Implicit ALL participants	Implicit MALE participants	Implicit FEMALE participants	Explicit ALL participants	Explicit Family MALE participants	Explicit Career FEMALE participants
HDI	0.598***	0.627***	0.432***	0.308***	0.456***	0.336***
GDP (log)	0.560***	0.598***	0.491***	0.387***	0.471***	0.374***

Notes: The table presents estimates of the effect on country-level implicit and explicit gender stereotypes about career and family of measures of country development and wealth (Human Development Index, (log of) Gross Domestic Product). The model is described in the Methods section in the SI, Appendix C (model (1)). As explained in the Methods section, the coefficients also represent correlation coefficients between country-level stereotypes and measures of wealth and development. Implicit gender career-family (GCF) stereotypes are measured by the mean D-score by country of Implicit Association Tests (IAT), for all test-takers in the country (col.1), for male test-takers only (col.2), for female test-takers only (col.3). Males' Explicit Family stereotypes (col. 5) represent how strongly male test-takers explicitly associate family with women, Females' Explicit Career stereotypes (col. 6) represent how strongly female test-takers explicitly associate career with men, and explicit gender career-family (GCF) stereotypes (col. 4) represent how strongly career is explicitly associated with men and family with women in the country. Note that the results for Males' Explicit Career stereotypes and Females' Explicit Family stereotypes are not presented here; they can be found in Table S3 and are discussed in the main text. In each setting, we only consider countries with more than 100 observations. All variables are standardized on the regression sample. See Appendices A,B for the description of all variables and measures. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2. Micro-level analysis. Effects of country development and wealth on implicit GCF stereotypes

<i>Dependent Variable is individual IAT Gender Career/family Stereotypes</i>				
HDI	0.0246*** (0.00330)	0.0198*** (0.00293)		
GDP (log)			0.0227*** (0.00368)	0.0175*** (0.00329)
Girl		0.0635*** (0.00339)		0.0707*** (0.00351)
Age		0.00263*** (0.000213)		0.00247*** (0.000153)
Order		-0.0442 (0.0607)		-0.0416 (0.0607)
Year		-0.00757*** (0.000475)		-0.00726*** (0.000493)
First test		0.0342*** (0.00786)		0.0359*** (0.00720)
Education		0.00206** (0.00101)		0.00207*** (0.000742)
Constant	0.334*** (0.0131)	15.50*** (1.017)	0.335*** (0.0130)	14.88*** (1.055)
Observations	1,486,871	1,462,331	1,487,950	1,463,392
R-squared	0.005	0.029	0.004	0.029
CONTROLS	NO	YES	NO	YES

Notes: The table presents estimates at the individual level of the effect of country measures of development (Human Development Index, HDI) or wealth (Gross Domestic Product, GDP) on implicit gender career/family stereotypes, measured by Implicit Association Tests (IAT), with or without various controls. The regression model is described in the Method section in the SI (model (2)). Controls include gender and age of the participant, the order of the blocks in the test, the year the test is taken, if the test is the first IAT test taken by the individual and the self-reported level of education of the participant. Columns 1 and 3 consider the model without control while columns 2 and 4 consider models with controls (see Appendix A for more details). The sample consists of IAT participants in countries with more than 100 observations. The variables GDP and HDI are standardized. Standard errors, clustered at the country level, in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3. Estimated effects of implicit and explicit country-level gender stereotypes about career and family on country gender differences in values (family, communal values), self-reported personality traits (agreeableness, dependence) and preference for 'caring' occupations (expectations of health-related occupations). Country-level analyses with and without control for country wealth, development, and Gender Gap Index.

Dependent Variable is country-level Gender Gap in ...

	Values		Personality Traits		Preference
	Family	Communal	Agreeableness	Dependence	Health occ.
Panel A. GCF Stereotypes, NO CONTROL					
IAT-GCF, All part.	0.364***	0.599***	0.472***	0.535***	0.346**
IAT-GCF, Male part.	0.568***	0.598***	0.558***	0.649***	0.478***
Explicit Family, Male part.	0.509***	0.636***	0.428***	0.561***	0.592***
Panel B. GCF Stereotypes, CONTROL GDP + HDI+ GGI					
IAT-GCF, All part.	0.128	0.318**	0.423***	0.502***	0.261
IAT-GCF, Male part.	0.345**	0.339**	0.483***	0.633***	0.348**
Explicit Family, Male part.	0.363***	0.349**	0.308**	0.481***	0.510***
Obs.	76	45	53	48	50

Notes: The table presents estimates of the effect of country-level gender stereotypes about career and family on country-level gender differences in values, personality traits and occupational preferences, without control in Panel A and with control for country wealth (log of Gross Domestic Product (GDP)), development (Human development Index (HDI)) and vertical gender equality (Gender Gap Index GGI) in Panel B. The models are described in the Method section in the SI (regression model (3) for Panel A and regression model (5) for Panel B). Regarding stereotypes, we consider implicit gender Career-Family stereotypes as measured by the Implicit Association Tests, for all participants (IAT-GCF, All part.), and for male participants only (IAT-GCF, Male part.), as well as males' explicit Family stereotypes, representing how strongly male participants explicitly associate family with women in the country (Explicit Family, Male part.). Regarding family values, we consider the gender gap in the importance granted to family from the joint European Value Survey-World Value Survey, based on participants' answers to the question 'How important is family in your life?'. Regarding communal values, we consider the gender gap in the importance granted to helping the people with whom one is in frequent personal contact, relying on the World Value Survey (Wave 5). Regarding personality traits, we consider gender gaps in self-reported big five personality trait Agreeableness, relying on data from (Lippa, 2010) and self-reported HEXACO personality trait dependence relying on data from (Lee & Ashton, 2020). Regarding preference for 'caring' occupations, we consider the female-to-male ratio among 15-year-old students who expect a health-related occupation at 30, with data from PISA survey. All variables and data sources are described in Appendices A, B. All variables are standardized on the regression sample. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4. The Gender Equality Paradox in personality trait (Dependence) and in preference for 'caring' occupations (Health-related occupations). Country-level analyses

	<i>Dependent Variable is</i>					
	Gender Gap in trait Dependence	Gender Gap in trait Dependence	Gender Gap in expected Health occupation	Gender Gap in expected Health occupation	Males' Expectation Health occupation	Males' Expectation Health occupation
	(A)	(B)	(A)	(B)	(A)	(B)
GDP (log)	0.397*** (0.135)	0.0699 (0.137)	0.392*** (0.134)	0.236 (0.147)	-0.425*** (0.132)	-0.199 (0.141)
IAT-GCF, Male part.		0.611*** (0.137)		0.362** (0.147)		-0.450*** (0.141)
Constant	3.77e-09 (0.134)	-2.19e-09 (0.113)	-3.52e-09 (0.133)	1.53e-09 (0.133)	4.75e-09 (0.131)	8.06e-09 (0.128)
Observations	48	47	49	44	49	44
R-squared	0.157	0.425	0.153	0.255	0.181	0.314

Notes: The table displays estimates of the effect on country-level gender differences in personality trait (Dependence, col. 1-2), gender differences in expectations of health-related occupations (col. 3-4) and country level of males' expectations of health-related occupations (col 5-6) of country (log of) Gross Domestic Product (GDP, Specification (A)) and of both GDP and males' implicit gender career-family stereotypes, measured by the Implicit Association Test for male participants (IAT-GCF Male part., Specification (B)). The models are described in the Method section in the SI (model (4) for Specification A and model (5) for Specification B). We rely on data from (Lee & Ashton, 2020) for country-level gender differences in the HEXACO personality trait Dependence. Regarding preference for health occupations, we consider in col. 5-6 the share of 15-year-old males who expect a health-related occupation at 30, relying on data from the Programme for International Student Assessment (PISA) and in col. 3-4, we measure the gender gap by the female-to-male ratio among students who expect a health-related occupation. All variables and data sources are described in Appendix B. All variables are standardized on the regression sample. Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$