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Gender inequality and cultural values in explaining gender differences in positive and negative emotions: A comparison of 24 countries during the COVID-19 pandemic

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Abstract
The coronavirus pandemic posed a major challenge to mental health. Existing evidence shows that COVID-19 is related to poor emotional well-being, particularly among women. However, most work on the subject uses single-country samples, limiting the ability to generalize the disparity or explain it as a function of societal variables. The present study investigates the expression of positive and negative emotions during the pandemic as a function of gender and across 24 countries (N=49,637). Strong gender differences emerged across countries, with women reporting more negative emotions (anxious, depressed, nervous, exhausted) and less positive emotions (calm, content, relaxed, energetic) than men. The gender gap in positive emotions was significantly wider in countries higher in individualism and narrower in countries higher in power distance. For instance, differences in emotions were larger in Western countries high in individualism, such as the USA, the UK, Italy, and France, and smaller in countries with higher collectivism and power distance, such as China, Malaysia, and South Korea, with a few exceptions like Japan and Brazil. These gender differences across countries were not explained by country-level gender inequalities indicators (GGGI and GII). Interestingly, the national severity of the pandemic, an epidemiological factor, reduced gender differences in positive emotions. These results underscore the importance of considering cultural and national factors when assessing gender differences in well-being.

Keywords COVID-19 · Mental health · Gender · Emotions · Culture · Well-being

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The COVID-19 pandemic had a negative impact on the emotional well-being of many people around the world (Rajkumar, 2020; Tambunan et al., 2021). A combination of isolation associated with social distancing and protective measures, as well as the danger of the virus itself, predicted heightened stress (Gamonal-Limcaoco et al., 2022), increased depressive symptoms (Ettman et al., 2020; Salari et al., 2020), increased loneliness (Buecker & Horstmann, 2021; Ernst et al., 2022), increased anxiety symptoms (Salari et al., 2020), heightened general negative emotionality (Jahrami et al., 2021), and reduced sleep quality (Oliveira Carvalho et al., 2021).

However, the pandemic's deleterious effects on well-being were also gendered. Both early in the pandemic (Etheridge & Spantig, 2022; Kolakowsky-Hayner et al., 2021) and during lockdowns (Ausín et al., 2020; Gamonal-Limcaoco et al., 2022; Mazza et al., 2020; Szabo et al., 2020), women reported higher levels of depression, anxiety, and distress, as compared to men (Dal Santo et al., 2022; Dekeyser et al., 2023). Similarly, loneliness during lockdowns was particularly deleterious for positive emotionality among women (Losada-Baltar et al., 2020; Wollast et al., 2024). These gendered discrepancies in well-being may be due to the widening gender inequalities spurred by the COVID-19 pandemic, as demonstrated by the increased time women spent performing domestic labor, women's greater risk of unemployment, and their predominance as essential workers (Carli, 2020; Fisher & Ryan, 2021; Fisher et al., 2024; Haney & Barber, 2022; Hossain, 2021).

Although studies have documented the gendered impact of the COVID-19 pandemic, on well-being, the literature involving cross-national comparisons, specifically on emotional reactions, remains scarce. Thus, this research aims to investigate the extent to which gender differences in positive and negative emotions vary in a large and diverse panel of 24 countries (N=49,637). The gendered nature of the pandemic impact suggests that country-level factors associated with gender (e.g., gender inequality, cultural dimension values) could moderate the negative well-being experienced by women during the pandemic. Specifically, countries with greater gender inequality might show larger discrepancies in well-being between men and women during the COVID-19 pandemic. This expectation stems from evidence that the pandemic was particularly burdensome for individuals with care-taking duties, as well as those facing economic and health stressors (Boca et al., 2020; Power, 2020; Adams-Prassl et al., 2020). These responsibilities and concerns are typically more pronounced for women in gender-unequal societies. For instance, in such contexts, women often bear a disproportionate share of childcare and household responsibilities, which intensified during lockdowns and school closures (Collins et al., 2021). Additionally, women in these societies may be more vulnerable to economic shocks due to lower labor force participation and overrepresentation in precarious employment (Alon et al., 2020; Houssain, 2021). Thus, it is plausible that these compounded pressures might lead to more pronounced gender differences in emotional well-being in countries with higher levels of gender inequality.

However, the opposite pattern could also emerge, aligning with the gender equality paradox observed in previous research (e.g., Stoet & Geary, 2018). The gender equality paradox suggests that in more gender-equal societies, gender differences in well-being may actually be more pronounced than in less gender-equal societies. This counterintuitive finding has been explained by the idea that in more egalitarian societies, individuals have greater freedom to express their personal preferences and differences, which can lead to more distinct gender-based emotional experiences. During the pandemic, this paradox could be reflected in the way women disproportionately shouldered the increased care and domestic burden associated with school and childcare closures, even in societies with high gender equality. Men, by contrast, did not experience the same increase in caring and domestic responsibilities (Collins et al., 2021; Garcia, 2022; Xue & McMunn, 2021). This occurred in both egalitarian and inegalitarian societies, which might lead to gender differences in emotions that are either amplified or consistent across different contexts.

Gender differences could also occur for different reasons in different countries. Women in more egalitarian countries might have experienced greater stress from trying to balance professional obligations with these intensified domestic and caring responsibilities. They may also have experienced the disproportionate care and domestic burden as uniquely disempowering, leading to greater gender disparities in well-being (Fisher et al., 2024). This is in contrast to women in less gender equal countries, for whom such a gendered division of labor may be more normative and therefore less disruptive to well-being.

Evidence supporting either perspective is somewhat limited, as existing studies often rely on single-country samples. One key exception is the study by Galasso and colleagues (2020), which found that gender differences in the perceived seriousness of the COVID-19 pandemic were both strong and consistent across countries. However, most cross-national comparisons, including that of Galasso and colleagues, did not account for countries that are characterized by low gender equality and high-power distance—a notable cultural dimension. In such countries, like China, Malaysia, and Indonesia, gender differences in emotional well-being might be expected to manifest differently. While low gender equality would typically suggest larger discrepancies between men and women, the high-power distance

in these societies could potentially mute these differences, as hierarchical social structures might limit the expression of individual preferences and emotional experiences. The present study overcomes these limitations and examines how individual-level differences, in emotional well-being, during the COVID-19 pandemic, are predicted by country-level gender equalities, cultural factors, and epidemiological indicators.

The current research adopts a cross-national perspective to investigate gender differences in positive and negative emotions during the COVID-19 pandemic. Our primary aim is to investigate how these gender differences manifest across a diverse sample of 24 countries, investigating the robustness and variability of gender disparities in well-being under heightened societal pressure. This study is one of the first to empirically test the expression of positive and negative emotions among men and women across such a wide range of cultural contexts during a global crisis. Importantly, we seek to explain observed variations through national levels of gender equality, cultural value dimensions, and indicators related to the severity of the pandemic. By including a strong presence of non-Western samples, we provide greater variation in gender egalitarianism than typically found in cross-cultural research. This approach allows us to test whether country-level indicators of gender equality moderate the relationship between gender and emotional well-being during challenging circumstances. As a result, this research offers a snapshot into how gender differences in well-being vary across countries, particularly in times of widespread stress likely to disproportionally affect women.

Gender inequality and well-being

Societies that promote gender equality show greater subjective well-being for both men and women (Audette et al., 2019). However, the extensive literature on gendered *differences* in subjective well-being across the globe yields inconsistent findings (Batz & Tay, 2018). For instance, in the largest meta-analyses on gender and subjective well-being, Batz and colleagues (2018) found that greater national gender equality, measured via the Gender Inequality Index, significantly predicts reduced gender differences in job satisfaction, but not life satisfaction. Other high-powered studies show more nuanced effects of gender equality. Tesch-Römer and colleagues (2008) observed that increased gender equality in the labor market predicted decreased gender differences in well-being, but mainly just in countries with strong support for gender equality. In nations where citizens did not support gender equality, greater labor market equality was associated with larger gender differences in subjective well-being. Similarly, Zuckerman and colleagues (2017) examined how a composite index of societal conditions (of which gender inequality was an indicator) moderated gender differences in well-being. This research uncovered a curvilinear effect: women reported lower life satisfaction and positive affect than men, when societal conditions were moderately favorable, but equal life satisfaction and positive affect compared to men when conditions were either at their best or worst. Regarding negative affect, women reported less negative affect than men in the worst conditions, equal negative affect in middling conditions, and more negative affect in the best conditions.

Other studies show clearer effects, but are at odds with theories that predict a diminishment of gender differences in well-being with equality. This pattern has been labelled the *Gender-Equality Paradox* (Stoet & Geary, 2018). For instance, Zuckerman and colleagues (2017) observed that women's disadvantage in subjective well-being was greater in countries with higher female participation in the workforce, and with value orientations that promoted equality and personal freedom. Moreover, in experimental studies tested in five countries, Guimond and colleagues (2007) observed strong gender differences in the USA, France, Belgium and the Netherlands, but no differences whatsoever between men and women in Malaysia– a culture that has always been ranked low on several indicators of gender-egalitarianism. Similarly, cross-country paradoxical relationships have been found with a range of other gender gaps: more gender-egalitarian and wealthier countries also experience higher gender gaps in basic human values (Schwartz & Rubel-Lifschitz, 2009), self-esteem (Zuckerman et al., 2016), and depression (Hopcroft & Bradley, 2007; but see also Fischer & Manstead, 2000). In this context, Duflo (2012) concluded that advances toward material gender equality do not directly ensure better psychological outcomes for women due to the persistence of discriminatory gendered social norms and traditions.

Given the implications of the COVID-19 pandemic for gender (in)equality and well-being, it provides a useful context to test the applicability of the Gender-Equality Paradox. On the one hand, evidence may be completely consistent with the Gender-Equality paradox. If this were true, an increase in gender egalitarianism would be associated with an increase in gender disparities in negative and positive well-being. This would happen as a function of increased negative well-being and decreased positive well-being in women commensurate with increases in gender equality, with a more muted effect among men. On the other hand, socio-cultural theories of gender expect *decreases* in gender differences in negative and positive well-being to accompany increases in gender equality (Audette et al., 2019; Costa et al., 2001). Finally, it is possible that societal gender egalitarianism does not moderate gender differences

in negative and positive well-being at all (see Batz et al., 2018).

In the context of a pandemic, gender equality is unlikely to be the only societal variable that conditions gender differences in well-being. Therefore, we also discuss and empirically test two complementary factors: The first includes cultural dimension values that can be associated with both societal-level gender inequality and well-being among men and women. The second includes the pandemic itself, in terms of its severity and associated restrictions.

Cultural dimension values

Individualism and collectivism Individualistic cultures emphasize personal goals, and individuals in these cultures tend to view themselves as atomized individuals focused on personal development. By contrast, collectivistic cultures emphasize group goals by sacrificing personal objectives and by displaying loyalty to the ingroup (Singelis et al., 1995; Triandis & Gelfand, 1998). Some studies report that individuals in collectivistic cultures feel lonelier, and can experience poor psychological well-being, than those in individualistic countries (e.g., Lykes & Kemmelmeier, 2014, but see also Heu et al., 2019). More concretely, people living in collectivistic cultures tend to develop an interdependent self which leads to a need for stronger relationships with others, in contrast to those having an independent self (Markus & Kitayama, 1991). People with an independent self-construal view internal attributes, such as traits, abilities, values, and attitudes as central to their sense of self. By contrast, individuals with an interdependent self-construal view their close relationships, social roles, and group memberships as central to their sense of self.

The COVID-19 pandemic negatively impacted relationships (Hwang et al., 2020). Thus, people who have an interdependent self, such as people in collectivistic cultures, can be expected to suffer more than their counterparts. Individuals in collectivistic cultures also experience less gender egalitarianism, and benefit less from it (Davis & Williamson, 2019), implying that collectivism may explain some of the role of gender inequality in producing gender disparities in well-being.

Other research suggests that it is more socially expected and acceptable for women in individualistic (vs. collectivist) countries to express a wider range and intensity of negative and positive emotions relative to men (Fischer & Manstead, 2000), especially those emotions that correspond with low power (e.g., fear, sadness; Fischer et al., 2004). Hence, it is plausible that individualistic cultures would show greater gender disparities in emotions in times of widespread stress, as these cultures have more clearly differentiated emotional display rules between genders.

Power distance Individualistic and collectivistic cultures can be further characterized by horizontal orientation (seeing the self as equal to other ingroup members) or vertical orientation (seeing the self as unequal to fellow ingroup members). The horizontal dimension is marked by a sense of social cohesion and cooperation with members of the ingroup (Singelis et al., 1995; Triandis, 1995). Individuals high in horizontal cultural orientations strive to be unique without desiring or expecting special status, emphasize interdependence, perceive all members of the collective equivalently, and generally support egalitarianism between groups. The vertical dimension is marked by an emphasis on hierarchy and competition, in which the self must sometimes sacrifice ingroup needs, in order to move up in the ranks. Individuals high in vertical cultural orientations accept and expect hierarchy and inequality (Singelis et al., 1995; Triandis, 1995).

The vertical dimension is associated with power distance – the degree to which inequalities in power are accepted either as unavoidable or as functional (Clugston et al., 2000; Hofstede, 1980). While gender inequality remains a feature of all societies, it is particularly pronounced in societies high in power distance (Trzebiatowski & Triana, 2020). In high-power distance societies, women embrace more conservative concepts of gender (e.g., the fair sex, complementarity of masculinity and femininity) and aspire to more traditional roles (e.g., wife, mother, see Rudman & Phelan, 2010). Because individuals from hierarchical countries tend to accept more inequality, any increased domestic labor caused by COVID-19 may be less likely to result in negative emotions, or a reduction in positive emotions, among women. Therefore, we predict fewer gender differences in positive and negative emotions in countries high in power distance, as well as countries with greater levels of inequality more generally.

Masculinity versus femininity Traditional gender roles are key elements in hierarchical structures in societies and creating power distance between gender groups. Masculinity describes a preference in society for achievement, heroism, assertiveness, and material rewards for success whereas femininity refers to a preference for cooperation, modesty, caring for the weak, and quality of life. Measured using Hofstede's scale, this dimension captures a societal prioritization of masculine over feminine values and life goals (Hofstede, 2001). In masculine contexts, we would expect fewer gender differences in positive and negative emotions when compared to less masculine contexts. Consistent with

our hypothesis concerning power distance, more masculine countries may accept gender inequalities between gender groups, and therefore, rising domestic labor and caring responsibilities during COVID-19 may be less likely to result in emotional discrepancies between men and women.

The COVID-19 pandemic itself

Finally, we may expect the severity of the COVID-19 pandemic, including the societal restrictions that followed, to be a competing moderator of gender differences in well-being during the pandemic. The pandemic resulted in widespread social distancing restrictions, including school closures, forcing parents to devote more time and energy to childcare. Even in pre-pandemic times, gendered divisions of labor were more pronounced in countries with larger gender inequality, but still present to some extent in all countries (Iversen & Rosenbluth, 2006). However, the exogenous increase in responsibility disproportionately affected women. Even in contexts where both parents were able to work from home, women disproportionately devoted more time to domestic labor and childcare than men (Collins et al., 2021; Waddell et al., 2021; Yaish et al.,2021). Such an increase in labor can result in increased stress and reduced well-being for women compared to men (Mikula et al., 2011; United Nations, 2020), both independent from and in conjunction with societal gender inequality.

Overview of the present work and hypotheses

The present research examines gender differences, in a diverse set of countries, in the context of the COVID-19 pandemic. Specifically, this study is the first to empirically test the expression of positive and negative emotions among men and women, using a diverse, multi-country sample (resulting in greater variation in gender egalitarianism), and to explain them via national level indicators of gender-equality, cultural value dimensions, pandemic severity, and societal restrictions during COVID-19. This research has the potential to contribute to the psychology of pandemics, and their interface with gender and culture. Based on theories developed in the relevant literatures, we formulated the following hypotheses:

Hypothesis 1. Pooling across contexts, men experience more positive emotions (H1a) and less negative emotions (H1b) than women.

Hypothesis 2. Gender differences predicted in H1 vary between countries. Competing alternative frameworks suggest that gender differences in emotional well-being are either more muted (H2a) or more pronounced (H2b) as gender inequality increases.

Hypothesis 3. Gender differences predicted in H1 are larger in more individualistic countries compared with more collectivistic countries.

Hypothesis 4. Gender differences predicted in H1 are weaker in countries with more vertical cultural orientations (i.e., high power) as opposed to more horizontal orientations.

Hypothesis 5. Gender differences predicted in H1 are weaker in countries with more masculine cultural orientations as opposed to more feminine orientations.

Hypothesis 6. Gender differences predicted in H1 are stronger in countries where the pandemic is more severe.

An empirical test of these six hypotheses requires data with three critical features: (1) a large panel of countries with ample cultural variation on indicators related to gender inequality and cultural value dimensions; (2) adequate statistical power to test gender differences in each country; and (3) high-quality measures of emotional well-being adapted to the coronavirus pandemic. The data from the PsyCorona project meet all three criteria. The project analyzes the psychological impact of the coronavirus spread across more than 100 countries. The associated data therefore provide a useful way to explore the relationship between gender inequality, cultural value dimensions and subjective well-being[1].

Method

Participants

In total, 49,637 people (29,946 women [60.3%] and 19,691 men [39.7%]) from 24 countries participated in this study from March 2020 through the end of the year. We initially collected samples in each of the following countries: Argentina, Australia, Brazil, Canada, China, France, Germany, Greece, Indonesia, Italy, Japan, Kazakhstan, Malaysia, Netherlands, Philippines, Serbia, Romania, Russia, South Africa, South Korea, Turkey, Ukraine, UK, and the USA. The survey was translated by native speakers and distributed via online panels aiming to collect about $n \sim 1000$ baseline

[1] It is important to note that while this study shares data with other research within the larger PsyCorona project, such as studies on positive and negative emotions, the research objectives of these studies are distinct (see Han et al., 2021; Reitsema et al., 2023; Westgate et al., 2023). Thus, the data used in this study is repurposed in a novel way to specifically explore the relationship between gender inequality, cultural value dimensions, and positive and negative emotions as indicators of subjective well-being.

responses per country. Table 1 reports nation-specific sample characteristics.

Materials and procedure

Raw data, syntax, code, full question wording and additional elements can be found in the online supplementary material https://osf.io/26tma.

Country-level indicators We utilized publicly available national-level gender-equality indicators (Global Gender Gap Index [GGGI], Gender Inequality Index [GII]) as well as country-level cultural value dimensions (Hofstede's Cultural Value indicators). We used indicators that were published for the year 2020 or closest to 2020 if the data were not available for this year (see Table 1).

Gender-equality indicators To assess gender-equality across countries, we first used the *Global Gender Gap Index* (GGGI) which is designed to measure the size of gender gaps in access to resources and opportunities in four key areas: economic participation and opportunity, educational attainment, political empowerment, and health and survival (Retrieved from World Economic Forum, 2020). GGGI scores theoretically range from 0 (inequality) to 1 (equality). In the present sample, they span from 0.63 (Turkey) to 0.79 (Germany). Second, we used the UNDP (2020)'s *Gender Inequality Index* (GII) which measures gender inequalities in three important aspects of human development—reproductive health (i.e., maternal mortality ratio and adolescent birth rates), empowerment (i.e., proportion of parliamentary seats occupied by females), and economic status (i.e., labour market participation). GII scores theoretically range from 0 (equality) to 1 (inequality) (UNDP, 2019). In the present sample, GII scores ranged between 0.04 (Netherlands) and 0.45 (Indonesia).

Cultural value dimensions We used the cultural value dimensions introduced by Hofstede (1980, 2001). First, *power distance* (POW) indexes the degree to which less powerful members of a society accept and expect that power is distributed unequally, with a theoretical range from 0 (no acceptance) to 100 (full acceptance). In the present sample, power distance scores ranged between 35 (Germany and United Kingdom) and 100 (Malaysia). Second, we used the *individualism-collectivism* (IND) dimension. The theoretical range of the scale spans 0 (full collectivism) to 100 (full individualism). In the present sample, IND scores ranged

Table 1 Sample characteristics

				Cultural factors				
Nation	N	♀(%)	SLD	GGGI	GII	IND	POW	MAS
Argentina	1347	57.0	19 March	0.75	0.35	46	49	56
Australia	1197	53.6	23 March	0.73	0.10	90	38	61
Brazil	1357	57.3	Region-specific	0.69	0.39	38	69	49
Canada	1514	58.2	Region-specific	0.77	0.08	80	39	52
China	1547	54.1	Region-specific	0.68	0.16	20	80	66
France	1749	58.3	17 March	0.78	0.05	71	68	43
Germany	1675	56.7	23 March	0.79	0.08	67	35	66
Greece	2804	67.9	23 March	0.70	0.12	35	60	57
Indonesia	2293	51.9	Region-specific	0.70	0.45	14	78	46
Italy	1941	60.4	9 March	0.71	0.07	76	50	70
Japan	1310	47.7	No formal lockdown	0.65	0.10	46	54	95
Kazakhstan	768	56.4	Region-specific	0.71	0.20	20	88	50
Malaysia	877	71.4	18 March	0.68	0.27	26	100	50
Netherlands	2962	65.3	23 March	0.74	0.04	80	38	14
Philippines	1478	57.1	15 March	0.78	0.42	32	94	64
Serbia	2036	66.9	16 March	0.74	0.16	25	86	43
Romania	2623	61.3	23 March	0.72	0.32	30	90	42
Russia	1366	61.9	28 March	0.71	0.25	39	93	36
South Africa	1374	57.1	26 March	0.78	0.42	65	49	63
South Korea	1437	57.3	No formal lockdown	0.67	0.06	18	60	39
Turkey	1757	60.7	Region-specific	0.63	0.30	37	66	45
Ukraine	1320	60.8	Region-specific	0.72	0.28	25	92	27
UK	1915	61.5	23 March	0.77	0.12	89	35	66
USA	10,990	62.5	Region-specific	0.72	0.18	91	40	62

Note. ♀ = % percentage of female respondents in the sample; SLD=Start lockdown date; GGGI=Global Gender Gap Index; GII=Gender Inequality Index. IND=individualism vs. collectivism; POW=power distance; MAS=masculinity vs. femininity

between 14 (Indonesia) and 91 (United States of America). Third, we used the *masculinity versus femininity (MAS) dimension.* Masculinity describes a preference in society for achievement, heroism, assertiveness, and material rewards for success whereas femininity refers to a preference for cooperation, modesty, caring for the weak, and quality of life. The theoretical range of the scale spans from 0 (femininity) to 100 (masculinity). In the present sample, MAS scores ranged between 14 (Netherlands) and 95 (Japan).

Severity of the pandemic We used three indicators of COVID-19 pandemic severity: the percentages of confirmed cases, death cases, and recovered cases in relation to the population at the time of data collection for each participant. Although one might wonder if a high number of reported recoveries indicates decreasing severity, high recovery rate typically reflects a large number of active cases, which indicates a more severe situation overall. Thus, more new cases, death cases, and reported recoveries can all correspond with severity. In addition, we measured COVID-19 restrictions using the COVID-19 Containment and Health Index (Hale et al., 2021), a composite measure based on thirteen policy response indicators including school closures, workplace closures, travel bans, testing policy, contact tracing, face coverings, and vaccine policy rescaled to a value from 0 to 100 (100 = strictest, see Table 1).

Emotions We assessed the emotions that the participants experienced during the past week. Participants were asked "How did you feel over the last week?" and rated eleven emotions on a Likert-scale (1 = *Very slightly or not at all*; 2 = *A little*, 3 = *Moderately*, 4 = *Quite a bit*, 5 = *Extremely*). Six items assessed positive emotions (*calm*, *content*, *energetic*, *excited*, *inspired*, *relaxed*) and five items assessed negative emotions (*anxious*, *bored*, *depressed*, *nervous*, *exhausted*). For parsimony, we retained the four emotions that loaded highest on their respective dimensions and across countries (see Fig. 1). A principal component analysis with Varimax orthogonal rotation yielded two factors explaining a total of 63.10% of the variance for the entire set of variables which supports the a priori classification of these items into two scales in the pooled sample. Loadings were strong on each factor, ranging from 0.73 to 0.79 for positive emotions, and 0.71 to 0.81 for negative emotions. Confirmatory factor analyses by country confirmed factor loadings were significant and ≥0.40 across countries. Measures of positive and negative emotions demonstrated adequate composite reliability across countries (see Table 2).

Results

Descriptive statistics

Table 3 reports the frequency of positive and negative emotions for men and women for each country. On an average, 26% of individuals across countries scored very low on positive emotions (2 or lower on a 5-point scale), and 9% scored very high on negative emotions (4 or higher on a 5-point scale). Italy (40%), Brazil (37%), the USA (35%), Turkey (35%), the UK (33%), Canada (33%) and Argentina (30%) featured the highest rates of low positive emotions. Turkey (15%), the USA (14%), Brazil (13%), the UK (11%) South Africa (11%), and Canada (10%) showed the highest rates of high negative emotions. In line with Hypothesis 1, women reported lower levels of positive emotions ($p < .001$) and higher levels of negative emotions than men ($p < .001$).

This difference is reproduced across countries (see Figs. 2 and 3 for positive and negative emotions, respectively). There is no subsample in which women reported higher levels of positive emotions or lower levels of negative emotions. The difference is statistically significant according to Bonferroni-corrected *p*-values in 19/24 comparisons for positive emotions and 18/24 comparisons for negative emotions. For positive emotions, gender differences were smallest in China (M_{diff}=-0.04, $p_{corrected}$=1.000), Malaysia (M_{diff}=-0.07, $p_{corrected}$=0.898), and Australia (M_{diff}=-0.11, $p_{corrected}$=0.217), and largest in Brazil (M_{diff}=-0.37, $p_{corrected}$<0.001), the

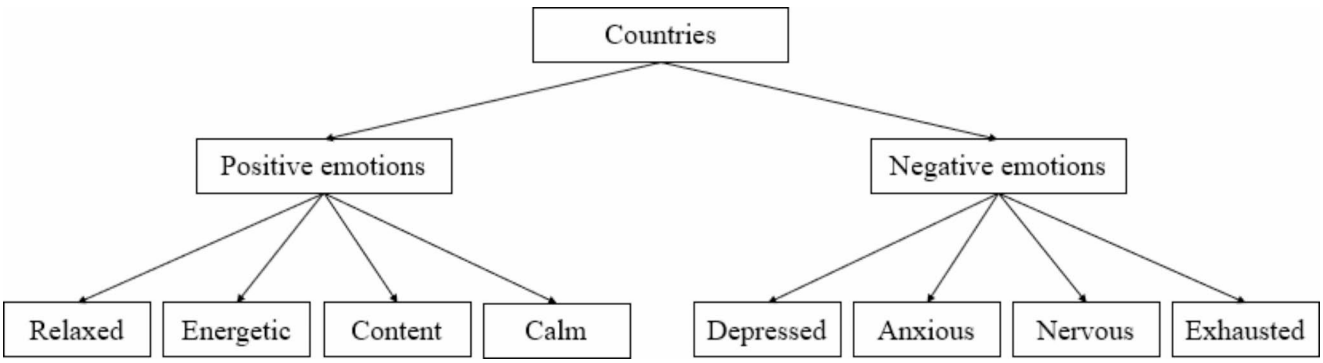

Fig. 1 Model for positive and negative emotions

Table 2 McDonald's omega coefficients for each country

Country	Positive emotions	Negative emotions
All	0.80	0.82
Argentina	0.79	0.79
Australia	0.85	0.87
Brazil	0.80	0.81
Canada	0.82	0.85
China	0.75	0.83
France	0.81	0.82
Germany	0.81	0.82
Greece	0.81	0.78
Indonesia	0.82	0.73
Italy	0.79	0.82
Japan	0.81	0.83
Kazakhstan	0.77	0.87
Malaysia	0.78	0.84
Netherlands	0.82	0.83
Philippines	0.78	0.79
Republic of Serbia	0.83	0.80
Romania	0.78	0.82
Russia	0.75	0.89
South Africa	0.76	0.83
South Korea	0.75	0.84
Turkey	0.81	0.81
Ukraine	0.76	0.86
United Kingdom	0.81	0.86
United States of America	0.85	0.86

United Kingdom (M_{diff}=-0.33, $p_{corrected}$<0.001), and the United States (M_{diff}=-0.33, $p_{corrected}$<0.001). For negative emotions, gender differences were smallest in South Korea (M_{diff}=0.06, $p_{corrected}$=1.000), Indonesia (M_{diff}=0.11, $p_{corrected}$=0.202), and China (M_{diff}=0.11, $p_{corrected}$=0.599), and largest in Brazil (M_{diff}=0.43, $p_{corrected}$<0.001), Turkey (M_{diff}=0.38, $p_{corrected}$<0.001), and the United Kingdom (M_{diff}=0.37, $p_{corrected}$<0.001).

Gender differences across countries

Regression models with country fixed effects (dichotomous variables denoting each country) were used to test H1-H6. This analytic strategy was used because it is unlikely that the emotions measures carry the same conceptual meaning across cultures in our sample. For instance, the same measures of emotions could reflect relationships in more interdependent cultures, yet individual states in more individualist cultures (Markus & Kitayama, 2010). In effect, employing country fixed effects controls for time-invariant country-level factors that confound estimations of a gender gap in emotions. Some of these confounders will affect the manner in which participants interpret the items, meaning that inferential issues that come with failure to achieve measurement equivalence are mitigated.

Statistically speaking, through employing country fixed effects, the coefficient for gender reflects a weighted average of within-country gender effects, weighted by the number of observations in the country. The more familiar multilevel model does something similar. However, instead of solely using within-country variation, a multilevel model partially pools information, across contextual units, to preserve statistical power. This is particularly useful when there are few observations per contextual unit (Clark & Linzer, 2014). However, such partial pooling can distort estimates when the outcome measure is not fully comparable between contexts. Therefore, those efficiency gains can come at the cost of bias.

First, we tested the main effect of gender on positive and negative emotions. Fixed effects and variance components are presented in Table 4. In line with Hypothesis 1, holding country constant, men reported significantly greater positive emotions (Hypothesis 1a) and lower negative emotions (Hypothesis 1b) than women (p<.001). Figures 2 and 3 show that men report significantly greater positive emotions and lower negative emotions than women, across all countries.

To test the roles of country-level egalitarianism (Hypothesis 2), individualism-collectivism (Hypothesis 3), power distance (Hypothesis 4), and masculinity (Hypothesis 5) in moderating gender differences in positive and negative emotions, we included country-level gender equality variables (GGGI and GII) and country-level cultural value variables (IND, POW, MAS) as moderators of the effect of gender. To test the moderating role of pandemic severity (Hypothesis 6), we included country-level COVID-19 case rates, COVID-19 death rates, and rates of recovered COVID-19 cases as different indicators of high case count. Models tested one contextual predictor at a time (see Table SI1 in the Supplemental Information for correlations between contextual measures). Gender was coded (0.5 for women and −0.5 for men). Contextual predictors were centered at the grand mean for ease of interpretability. Standard errors were clustered at the country level. Given that the cultural and gender inequality measures were perfectly collinear with country, main effects of power distance, individualism, the Gender Gap Index, and the Gender Inequality Index were not estimated. However, this collinearity does not impede the estimation of interaction terms. Given that pandemic severity varied over time within-country, main effects for pandemic severity could be estimated. These analyses also contained date fixed effects. As an exploratory measure, we also tested interactions between gender and quadratic contextual variables. Full models can be found in Tables SI2-SI10 of the Supplemental Information.

There was no support for H2, as there was no moderating effect of gender inequality on gender differences in positive

Table 3 Frequency of positive and negative emotions

		Positive emotions			Negative emotions		
Nation	Gender	Low	Middle	High	Low	Middle	High
Total	Female	30%	62%	8%	36%	53%	11%
Total	Male	20%	67%	13%	46%	47%	7%
Argentina	Female	35%	60%	5%	39%	53%	8%
Argentina	Male	24%	69%	7%	49%	46%	5%
Australia	Female	30%	59%	11%	44%	45%	11%
Australia	Male	27%	60%	13%	51%	41%	8%
Brazil	Female	45%	50%	5%	30%	53%	17%
Brazil	Male	27%	64%	9%	45%	49%	6%
Canada	Female	36%	60%	4%	33%	55%	12%
Canada	Male	30%	62%	8%	45%	47%	8%
China	Female	10%	71%	19%	52%	42%	6%
China	Male	9%	70%	21%	55%	41%	4%
France	Female	27%	66%	7%	44%	50%	6%
France	Male	19%	70%	11%	57%	38%	5%
Germany	Female	21%	71%	8%	44%	50%	6%
Germany	Male	15%	75%	10%	57%	41%	2%
Greece	Female	20%	70%	10%	30%	59%	11%
Greece	Male	13%	73%	14%	41%	53%	6%
Indonesia	Female	24%	61%	15%	37%	55%	8%
Indonesia	Male	16%	64%	20%	40%	53%	7%
Italy	Female	44%	53%	3%	37%	54%	9%
Italy	Male	34%	61%	5%	49%	46%	5%
Japan	Female	32%	63%	5%	27%	61%	12%
Japan	Male	20%	72%	8%	34%	59%	7%
Kazakhstan	Female	25%	69%	6%	50%	44%	6%
Kazakhstan	Male	15%	76%	9%	58%	36%	6%
Malaysia	Female	12%	75%	13%	47%	46%	7%
Malaysia	Male	8%	78%	14%	49%	46%	5%
Netherlands	Female	16%	68%	16%	52%	43%	5%
Netherlands	Male	9%	63%	28%	65%	32%	3%
Philippines	Female	19%	70%	11%	35%	55%	10%
Philippines	Male	12%	73%	15%	42%	52%	6%
Serbia	Female	31%	61%	8%	30%	60%	10%
Serbia	Male	18%	71%	11%	46%	49%	5%
Romania	Female	16%	71%	13%	44%	46%	10%
Romania	Male	12%	71%	17%	56%	39%	5%
Russia	Female	28%	68%	4%	41%	48%	11%
Russia	Male	19%	74%	7%	55%	39%	6%
South Africa	Female	29%	61%	10%	35%	51%	14%
South Africa	Male	17%	70%	13%	46%	48%	6%
South Korea	Female	32%	61%	7%	43%	49%	8%
South Korea	Male	25%	68%	7%	43%	50%	7%
Turkey	Female	39%	56%	5%	19%	62%	19%
Turkey	Male	28%	64%	8%	31%	60%	9%
Ukraine	Female	24%	72%	4%	46%	48%	6%
Ukraine	Male	15%	78%	7%	56%	41%	3%
UK	Female	38%	55%	7%	37%	49%	14%
UK	Male	24%	65%	11%	50%	44%	6%
USA	Female	40%	54%	6%	28%	56%	16%
USA	Male	27%	61%	12%	38%	51%	11%

Note: Low = Very slightly or not at all (less than 2 out of 5); Middle (between 2.01 and 3.99); High = Extremely (4 or more)

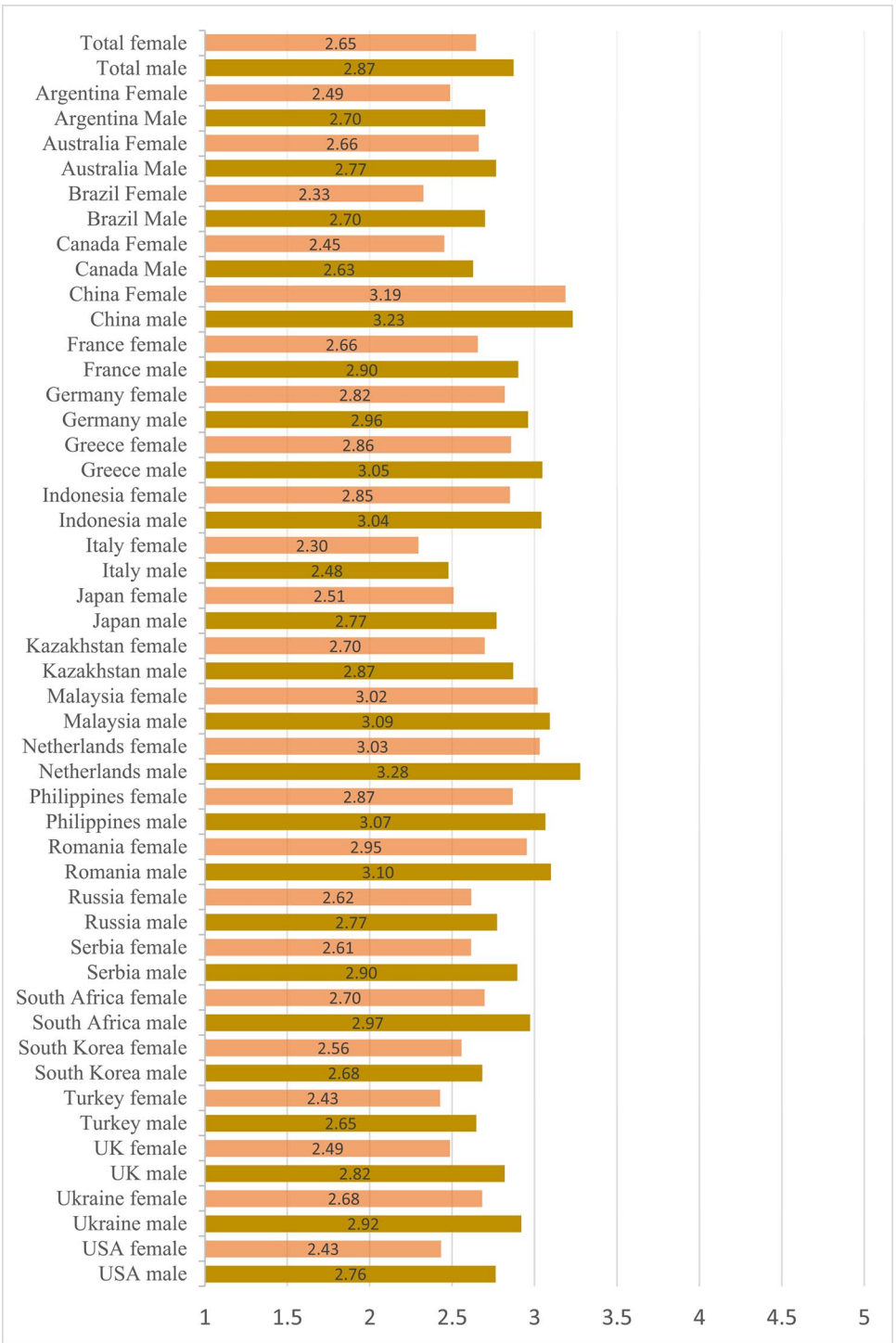

Fig. 2 Mean ratings on positive emotions for male and female across countries

or negative emotions ($ps \geq 0.308$). In partial support of H3, there was a negative and statistically significant gender x individualism interaction for positive emotions (t = -2.867, p = .009), and a negative and significant gender x individualism^2 interaction for negative emotions (t = -3.801, p < .001). As depicted in Fig. 4, the gender gap in positive emotions was wider in countries higher in individualism, whereas the gap for negative emotions was widest in countries with middling levels of individualism. In partial support of H4, there was a positive, statistically significant gender x power distance interaction for positive emotions (t = 2.104, p = .047). As depicted in Fig. 4, the gender gap in positive emotions was narrower in countries higher in power distance. Power distance did not moderate gender differences in negative emotions ($ps \geq 0.135$). There was no support for H5, as there was no moderating effect of county-level

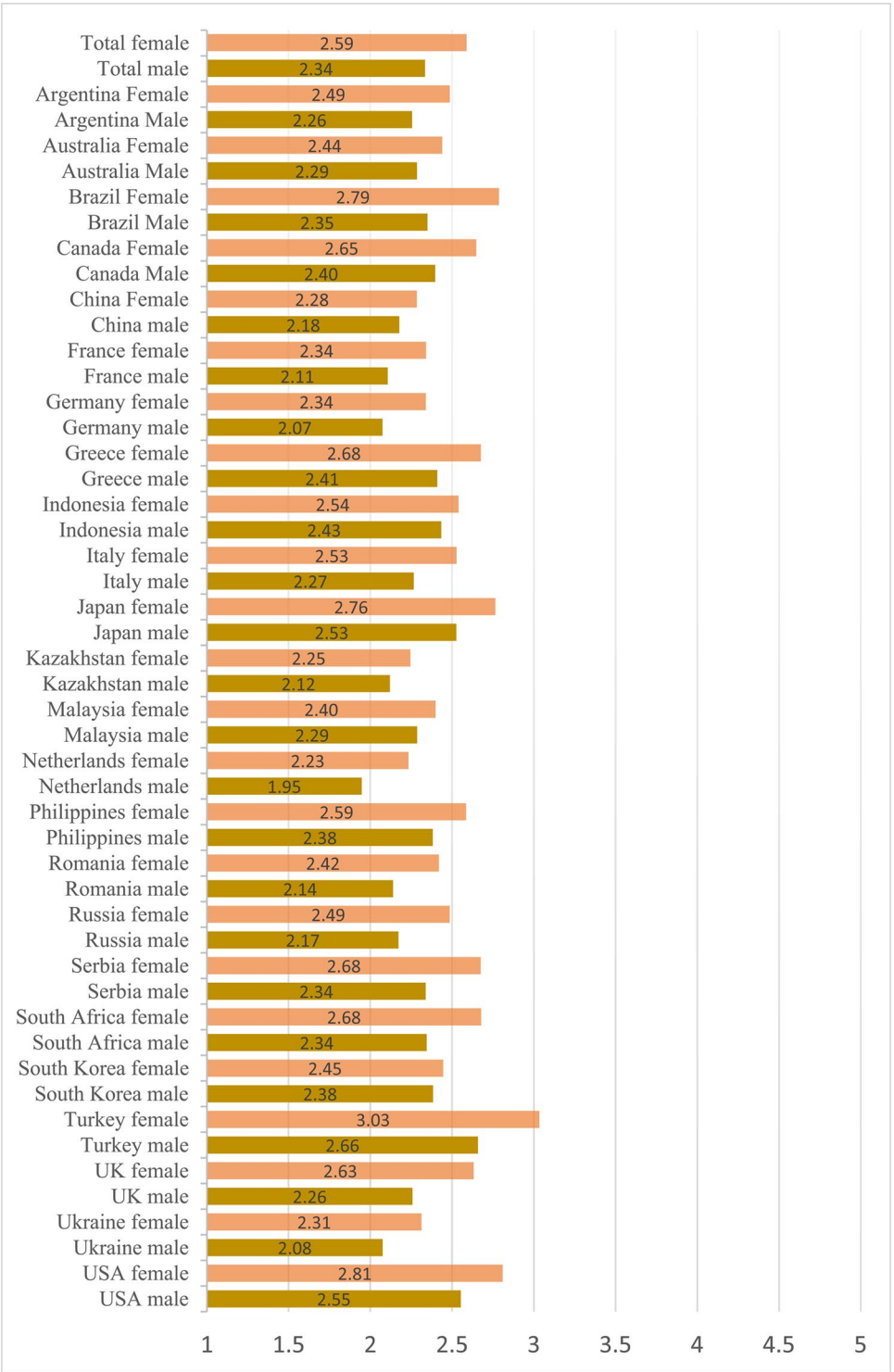

Fig. 3 Mean ratings on negative emotions for male and female across countries

masculinity on gender differences in positive or negative emotions ($ps \geq 0.397$).

We find no support for H6. However, additional analyses indicated more muted gender differences in positive emotions (but not in negative emotions) in countries with higher numbers of active and recovered cases: In a model containing a quadratic term, there was a positive and significant gender x active cases (linear term) interaction for positive emotions ($t = 2.345$, $p = .028$). There was also a positive and significant gender x recovered cases interaction ($t = 4.563$, $p < .001$). As depicted in Fig. 4, the gender gap in positive emotions was narrower in countries with more active and recovered cases. There were no detectable moderating effects of COVID-19 deaths on gender differences in

Table 4 Fixed effects modelling of gender differences in emotions with country fixed effects

	β	*SE*	*p*	95% CI
Gender (Positive emotions)	−0.231	0.026	<0.001	[-0.281; −0.181]
Gender (Negative emotions)	0.252	0.015	<0.001	[0.222; 0.281]

Note: N participants = 49637, N clusters = 24. β = Standardized coefficients; SE = Standard errors

positive or negative emotions (*p*s≥0.071), or moderating effects of COVID-19 active or recovered cases on gender differences in negative emotions (*p*s≥0.356). Moreover, we examined whether the observed patterns for pandemic severity can be attributed to societal restrictions at the time, as they were concomitant with cases. To this end, we used the COVID-19 Containment and Health Index (Hale et al., 2021) as a moderator, but there was no evidence that societal restrictions pertained to gender differences in positive or negative emotions (*p*s≥0.097).

Discussion

This study is the first to empirically tested the expression of positive and negative emotions among men and women using a large multi-country sample, and to explain these gender disparities through national levels of gender equality, cultural value dimensions, and indicators related to the severity of the pandemic. In line with a growing body of research (e.g., Czepiel et al., 2024; Kolakowsky-Hayner et al., 2021; Talevi et al., 2020), we observed poor emotional well-being, whether related to the COVID-19 pandemic context or not, among a greater proportion of individuals, and particularly women, across each of the 24 countries sampled in this study. Indeed, in line with prior literature (e.g., Laufer & Shechory Bitton,, 2021; Mazza et al. 2020), women reported higher levels of negative emotions (anxious, depressed, nervous, exhausted) and lower levels of positive emotions (calm, content, relaxed, energetic) than men.

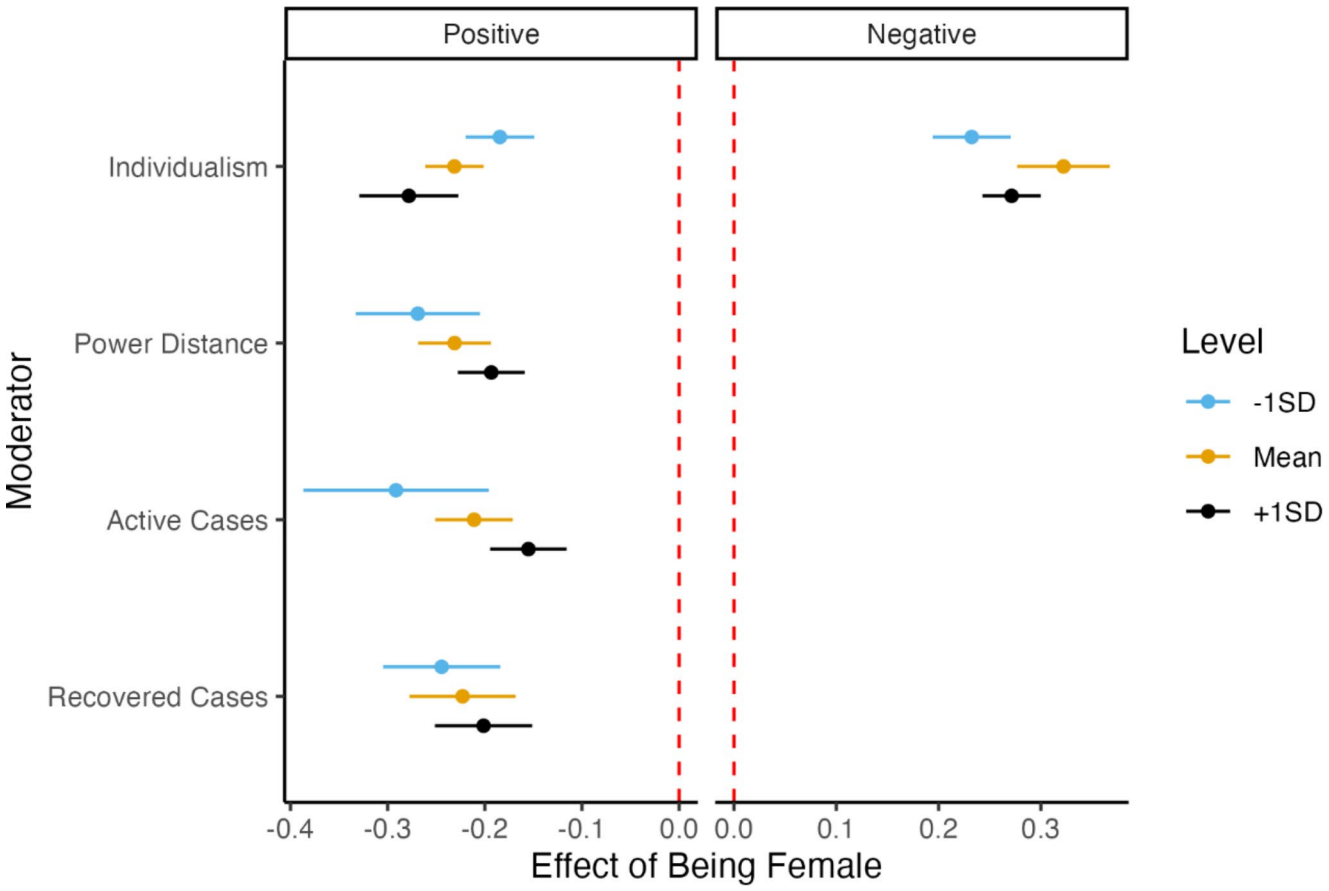

Fig. 4 Gender gap in COVID-19 emotions by moderating variable. Red line = zero effect. Level = level of moderating variable

Gender inequality

Contrary to prior findings (e.g., Czepiel et al., 2024), our study did not observe significant variations in gender differences across countries based on their level of gender equality. This suggests that the gender-equality paradox—where gender disparities in well-being are more pronounced in more egalitarian societies—did not emerge in our data. One possible explanation for these null effects is that different mechanisms may be influencing emotional well-being. In more egalitarian countries, heightened expectations and increased responsibilities placed on women might have led to greater frustration and disempowerment compared to men (Cichocka et al., 2018). Conversely, in less egalitarian countries, women may have faced more significant adverse effects due to the pandemic's disproportionate impact on their livelihoods and job security (Houssain, 2021; Seck et al., 2021).

Furthermore, it is important to recognize that subjective well-being is not solely determined by objective country-level gender equality but also by individuals' perceptions of their own expectations versus reality. This means that emotional well-being may be influenced by the gap between what individuals expect from their social roles and what they actually experience, highlighting the importance of considering individual perceptions alongside objective conditions.

Cultural dimension values

Importantly, and as expected, we observed that the gender gap in positive emotions was significantly wider in countries higher in individualism and narrower in countries higher in power distance. We also found that the gender gap in negative emotions was higher in more individualistic cultures. For instance, large gender differences in emotions were evident in Western countries high in individualism, such as the USA, the UK, Italy, and France, and were comparatively muted in countries with higher collectivism and power distance, such as China, Malaysia, and South Korea, with a few exceptions like Japan and Brazil. This suggests that individualistic cultures, which emphasize personal goals, foster greater gender disparities in emotional expression, whereas collectivistic cultures, which prioritize group goals, show less disparity.

In high power distance countries, the gender gap in emotions can be more muted for several reasons. High power distance cultures emphasize hierarchical relationships and clear social roles, leading to greater acceptance of hierarchy through gender-specific roles and expectations (Clugston et al., 2000; Hofstede, 1980). Women in these societies may be more accustomed to traditional roles that involve emotional restraint, reducing the visibility of emotional disparities between genders (Rudman & Phelan, 2010; Trzebiatowski & Triana, 2020). Furthermore, these cultures often discourage the open expression of emotions, particularly among those lower in the social hierarchy, which includes women. This cultural norm leads to a general suppression of emotional expression, making gender differences less pronounced. Additionally, the social structure in high power distance societies often involves strong, centralized authority figures and rigid societal norms, creating a more uniform emotional climate across genders. Women in these societies may internalize societal expectations and roles more deeply, leading to emotional regulation that aligns with their prescribed social positions, resulting in less variability in emotional expression between men and women.

Men in individualistic cultures often demonstrate restrictive emotionality, tending to suppress certain emotions and being reluctant to share intimate feelings (Jansz, 2000). It is more socially acceptable for women in individualistic countries to express a wider range and intensity of emotions relative to men (Fischer & Manstead, 2000). Men may feel pressured to conform to traditional roles as providers and display emotional strength, discouraging them from openly sharing their emotional struggles. Expressing vulnerability, especially emotions associated with low power (e.g., fear, sadness; Fischer et al., 2004), might be perceived as a weakness, further discouraging men from sharing their emotional well-being.

Alternatively, these results may speak to the unique and universal experience of the early COVID-19 pandemic. With the onset of the pandemic, progress toward global gender equality stalled and, in some cases, reversed (Fisher & Ryan, 2021). Women around the world were burdened with increasing pandemic-related domestic and caring responsibilities to a greater extent than were men (e.g., caring for ill loved ones, home schooling and childcare, increased cleaning demands related to COVID and stay-at-home measures; Collins et al., 2021; United Nations, 2020). At the same time, female-dominated employment sectors were hit hardest by nation-wide lockdowns and pandemic restrictions (United Nations, 2020). Women were more likely than men to experience pandemic-related financial instability and unemployment (Azcona et al., 2020). Thus, the universally observed gender difference in positive and negative emotions in this study could potentially be attributed to the disproportionate impact of the pandemic on women's well-being and livelihood globally.

Furthermore, our findings indicate that gender differences in emotional responses varied with the severity of the pandemic. Specifically, we observed more muted gender differences in positive emotions (but not in negative emotions) in countries with higher numbers of active and recovered cases. This means that in countries experiencing a higher

severity of the pandemic, as reflected by more active and recovered cases, the disparity in positive emotions between genders was smaller. Initially, we suggested that societal restrictions might have predicted positive emotions, potentially explaining this phenomenon. However, our analyses indicating that differences in COVID-19 restrictions, as measured by the COVID-19 Containment and Health Index (Hale et al., 2021), did not account for the moderating effect of pandemic severity on gender differences in positive emotions. Perhaps there were interpersonal processes, related to the pandemic's progression and its impact on daily life and societal norms, that influenced the effects of pandemic severity on gender differences (e.g., increased solidarity, shared experiences of coping, shifts in work-life balance, or changes in social support systems).

Limitations

Although the present study contributes to the study of gender differences in emotional well-being, particularly during times of widespread stress, there were limitations in our approach. First, participants only completed the questionnaire only once, in 2020, with different times of completion between individuals and countries. Whereas the present study provides a snapshot, longitudinal data can help to detect changes in emotions at both the country-level and the individual level (for instance, identifying heterogeneity in well-being indicators using group-based trajectory modeling; see Wollast et al., 2023a, 2023b).

Second, one could question whether this gender effect is associated with the gendered death rates, given that more men died (Jin et al., 2020), especially in gender-unequal countries. Unfortunately, this is impossible to parse with our data, alone, due to uneven availability of daily COVID-19 death tolls by gender across countries.

Third, while the present study tests the influence of country-level variables using Hofstede's cultural dimensions, these indicators may not be the most valid due to their age (up to 40 years old), and the specific population from which they were derived (businesses). Given recent cultural changes and gender progress, more recent indices like Minkov's individualism–collectivism scores (Minkov et al., 2017), Vignoles' self-construal scores (Vignoles et al., 2016), or open society scores (Krys et al., 2019) might provide a better test of cultural influences.

Fourth, it is important to mention that the initial PsyCorona sample included more than 100 countries. We only retained countries that (1) contained enough men and women for sufficient power to detect effects and (2) demonstrated good model fit statistics when comparing factor scores for positive and negative emotions across countries. Specifically, using confirmatory factor analyses with latent variables on the whole sample, two positive (excited, inspired) and one negative (bored) emotions were loading too weakly in several countries. We therefore selected 24 countries for which the four positive emotions (calm, content, energetic, relaxed) and four negative emotions (anxious, depressed, nervous, exhausted) loaded above the conventional threshold of 0.40. Such strict selection provided excellent factor loadings and overall good composite reliability, so we averaged positive and negative emotions instead of relying on latent variables. However, such averaging might lead to potential cultural biases– previous research has highlighted substantial cross-cultural differences in the valuation, expression, and meaning of emotions (e.g., Mesquita & Frijda, 1992). In non-Western cultures, emotions may relate more to relationships than individual experiences (Markus & Kitayama, 2010), and may not constitute "well-being" similarly (Kuppens et al., 2008). In this context, three out of four retained positive emotions are low-arousal, fitting better in East Asian than Western cultures. Still, the statistical approach selected in the current work is considerably less vulnerable to cross-cultural differences in measurement meaning, compared to more traditional approaches.

Efficient strategies to tackle the gender gap in emotional well-being must first consider that men and women do not encounter the same challenges. For instance, Galasso and colleagues (2020) found that women are more likely to perceive COVID-19 as a very serious health problem, to agree with restraining public policy measures, and to comply with them. Women being more likely than men to suffer from poor emotional well-being during the pandemic compared to men also represents a symptom of the more general issue of gender inequality in society (Fisher & Ryan, 2021). Although the results of the present study did not support this claim, it remains possible that country-level indicators do not accurately assess individual self-perception of gender inequalities, power distance or hierarchical relations. Specifically, our global approach considers that all participants from a single country have the same score on power distance (e.g., all Malaysian participants have 100) which may not adequately capture individual variations on these indicators. Measuring self-reported endorsement and perception of societal inequalities at the individual level may more precisely explain gender differences in emotional well-being.

Conclusion

Our findings suggest that women experience weaker positive emotions and stronger negative emotions than men across countries. Contrary to traditional theoretical perspectives, gender disparities in emotional well-being were influenced by objective cultural factors, such as individualism

and power distance, rather than solely by gender inequality. This study highlights the importance of considering cultural and national contexts at the global level, alongside subjective self-perception at the individual level, when examining gender differences in emotional well-being, revealing the complex relationships between culture, gender, and emotional experiences.

Data availability The online version of this article contains supplementary material, which is available at https://osf.io/26tma.

Declarations

Ethical approval and consent to participate The study was approved by the Ethics Committees of the University of Groningen (grant no. PSY-1920-S-0390) and New York University Abu Dhabi (grant no. HRPP-2020-42). All participants provided informed consent electronically.

Conflict of interest The authors declare that they have no conflict of interest

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