Psychology of Men & Masculinities
2023, Vol. 24, No. 1, 1–15

ISSN: 1524-9220 https://doi.org/10.1037/men0000407

Precarious Manhood and Men's Physical Health Around the World

Joseph A. Vandello[1], Mariah Wilkerson[1], Jennifer K. Bosson[1], Brenton M. Wiernik[1], and Natasza Kosakowska-Berezecka[2]

[1] Department of Psychology, University of South Florida
[2] Institute of Psychology, University of Gdańsk

Cultural beliefs about the requirements of manhood may have implications for men's physical health. In a cross-cultural examination of 62 countries, we explored whether country-level endorsement of precarious manhood beliefs (PMBs) was associated with various country-level risk-related health behaviors and outcomes. In countries that more strongly endorsed PMBs, men had higher rates of risky health behaviors (e.g., smoking, venomous animal contact) and risk-related health outcomes (e.g., liver cirrhosis mortality, drownings), and lower life expectancy. The average size of correlations of PMB with health behaviors and outcomes was moderate (*r*s = .21, .26), while correlations of PMB with men's life expectancy were relatively strong (*r*s = −.56, −.57). Overall, men live over six fewer years in countries higher versus lower in PMB. The relationships between PMB and health behaviors and outcomes were attenuated but did not completely disappear when controlling for country-level indicators of development and gender equality. These findings suggest that country-level beliefs about gender, and not just men's own masculinity and masculinity-related beliefs, may have important connections to men's health.

Public Significance Statement
Country-level beliefs about the precariousness of manhood status are related to men's risk-related health behaviors and outcomes across cultures. In countries in which people most strongly endorse precarious manhood beliefs, men live over six fewer years than in cultures in which people least endorse such beliefs.

Keywords: precarious manhood beliefs, country-level indicators, health outcomes, risk behaviors, life expectancy

Supplemental materials: https://doi.org/10.1037/men0000407.supp

Men the world over have poorer health outcomes than women, particularly for life-threatening conditions (Kruger & Nesse, 2006; Vandello et al., 2019). Women outlive men globally by an average of over 4 years, a gender gap that holds in virtually every nation (Mateos et al., 2020). At least part of the reason for this gender disparity is that men make riskier health choices than women do. In the United States, behavioral risks account for about half of all mortality (Mokdad et al., 2004). Men's relatively poorer health is well-documented, but we still lack an understanding of how culturally shared beliefs about manhood (i.e., the social status of being a male adult) are associated with men's risky health choices and poor outcomes. Here, we test the hypothesis that country-level beliefs about the requirements of manhood—specifically, the belief that manhood is a precarious status that must be proven and defended (Vandello et al., 2008)—predict men's risky behaviors and poor health outcomes. Specifically, in this preregistered study (see https://osf.io/746a5) we examine precarious manhood beliefs (PMBs) across 62 countries to see if they predict nation-level variation in risky behaviors and health outcomes for men.

This article was published Online First August 1, 2022.
Joseph A. Vandello https://orcid.org/0000-0001-9318-4002
This research was funded by a grant from the National Science Center in Poland (Grant 2017/26/M/HS6/00360) awarded to Natasza Kosakowska-Berezecka. No portion of ideas or data appearing in the article were previously disseminated at conferences or other publications.
The data are available at https://osf.io/b5nh2/files/.
The preregistered design and analysis plan are accessible at https://osf.io/746a5.
Correspondence concerning this article should be addressed to Joseph A. Vandello, Department of Psychology, University of South Florida, 4202 E. Fowler Avenue, Tampa, FL 33620, United States. Email: vandello@usf.edu

Masculinity and Health

Researchers have long implicated aspects of male gender roles in men's risky behaviors (i.e., behaviors like binge drinking or reckless driving which may impact a person's health) and relatively poor health outcomes (e.g., liver cirrhosis, heart disease; Courtenay, 2000; Harrison, 1978; Levant & Wimer, 2014).

However, masculinity has a complex relationship with health (Gerdes & Levant, 2018); reviews of widely used scales measuring male role norm endorsement (Levant et al., 1992; Mahalik et al., 2003) yield mixed findings. Endorsement of some male role norms (e.g., self-reliance, self-sufficiency) predicts increases in substance use problems and lower rates of health-promoting behaviors (Gerdes & Levant, 2018; Himmelstein & Sanchez, 2016), whereas other male role norms (e.g., emotional control) appear to buffer men from some negative health outcomes (Levant & Wimer, 2014) or simultaneously promote both healthy and unhealthy behaviors (Gerdes & Levant, 2018).

Research examining the association of self-ascribed masculine traits with health also paints a complex picture. For instance, agentic traits such as competitiveness and assertiveness, which are prescribed for men more strongly than women (Bosson et al., 2022; Prentice & Carranza, 2002), tend to be associated with better health, more health-promoting behaviors, and better adjustment to illness (Helgeson & Lepore, 1997, 2004). However, unmitigated agency, an extreme focus on the self to the neglect of others, is associated with poorer health behaviors and outcomes (Helgeson, 2012; Helgeson & Fritz, 1999). For example, college students higher in unmitigated agency reported more risky health behaviors (e.g., reckless driving, substance use; Danoff-Burg et al., 2006), and male prostate cancer survivors high in unmitigated agency experienced adverse changes in urine and bowel function (Helgeson & Lepore, 2004).

Some work also examines associations between masculinity and health outcomes at the country level. Perhaps the most well-known work comes from Hofstede's (2011) dimensions of national cultures. Hofstede described a dimension of masculinity (vs. femininity) as "related to the division of emotional roles between women and men" with masculine cultures being those in which there is maximum emotional and social role differentiation between the genders. In masculine cultures, men are expected (much more than women) to be assertive and ambitious, whereas in feminine cultures both men and women are expected to be modest and caring. Because a cultural emphasis on masculinity is associated with greater male gender role stress (Arrindell et al., 2013), men may experience cultural pressure to respond to gender role violations in ways that risk their health. However, correlations of cultural masculinity with country-level health behaviors and outcomes are modest, and other Hofstede dimensions (e.g., individualism, power distance) predict county-level health better than the masculinity dimension does (Mackenbach, 2014).

Collectively, these studies suggest that traditional masculine norms and traits are often, but not always, associated with risky health behaviors and poorer health outcomes. However, this research is predominantly conducted in Western, educated, industrialized, rich, democratic (Henrich et al., 2010) nations and may not generalize to other cultures or countries. In addition, past studies have focused on specific masculine norms and traits (such as self-reliance, unmitigated agency). In contrast, research on precarious manhood (Bosson et al., 2021; Vandello & Bosson, 2013) emphasizes general beliefs about the nature of manhood itself. The precarious manhood hypothesis argues that people around the world conceptualize manhood (more than womanhood) as a social status that must be earned and defended rather than a biological state or developmental stage. Here, we ask whether this conceptualization of manhood predicts behaviors that can be harmful to men's physical health. Specifically, we test whether country-level PMBs predict men's risky behaviors and poor health outcomes. Individuals and countries differ in their endorsement of PMBs, and exploring variation in this endorsement may shed light on the connection between masculinity and men's health.

Precarious Manhood, Risk, and Physical Health Across Countries

Precarious manhood refers to the belief that manhood is an achieved social status that must be earned and constantly defended, because it can be lost or taken away. While this belief is pervasive in varying degrees across cultures (Bosson et al., 2021), comparable beliefs about womanhood status are rare (Gilmore, 1990; Vandello & Bosson, 2013; Vandello et al., 2008). According to precarious manhood theory, when men's gender status is threatened, they may become motivated to restore manhood by broadcasting masculine competence to others. One effective way of doing this is by enacting aggressive or risky behaviors that demonstrate toughness and courage (e.g., Bosson et al., 2009; Weaver et al., 2013). This may help explain why men are stereotyped as more risk-seeking than women (Siegrist et al., 2016).

Of course, risky behaviors can have consequences for health in both the short- and long term. Men, compared with women, disproportionately participate in risky hobbies such as hunting and extreme sports, and they take more risks across a range of domains, such as driving, drug and alcohol use, and smoking (Byrnes et al., 1999; Frick, 2021). All of these activities heighten risks to health. Some risk-taking behaviors can result in immediate injury or death, such as with accidents or drug overdoses, whereas others accumulate over time to affect health more gradually, as with a lifetime of heavy drinking, smoking, or unhealthy dietary choices (Hu & Willett, 2002; Klatsky et al., 1992; Woloshin et al., 2008). Ultimately, a lifetime of risk-taking can shorten men's life expectancy.

Here, we ask if PMBs have links with country-level variation in men's risky behaviors and health outcomes. If men use risky behaviors as a means of proving their manhood, then we should find that men's rates of risky behaviors and risk-related health outcomes are higher in countries that more strongly endorse PMBs. Countries that view manhood as more precarious likely exert more pressure on men to uphold male role norms of toughness and courage via regular risk-taking activities, pursuit of risky occupations, and lower rates of preventive and health-promoting behaviors (e.g., Gilmore, 1990). Cumulatively, these country-level pressures should be evident in men's poorer physical health outcomes and shorter life spans.

Although PMBs are evident around the world (Gilmore, 1990; Vandello & Bosson, 2013), there is cross-country variance in the extent to which people endorse these beliefs. Recently, we validated a brief four-item measure of PMB scale in a sample of over 33,000 participants in 62 countries (Bosson et al., 2021). The items conveyed beliefs that manhood is difficult to earn ("Other people often question whether a man is a 'real man'", "Some boys do not become men no matter how old they get") and easy to lose ("It is fairly easy for a man to lose his status as a man," "Manhood is not assured—it can be lost"). Importantly, the PMB displayed metric isomorphism across the individual and country levels, meaning that scores collected from individuals represent a meaningful property attributable to the country as a whole (Tay et al., 2014). Moreover, country-level PMB scores correlated negatively with country-level gender equality and human development (United Nations Development Program, 2019; World Economic Forum, 2021), and they correlated positively with ambivalent gender ideologies about women and men (Glick & Fiske, 1996, 1999). Thus, people view manhood as harder to earn, and easier to lose, in countries characterized by more patriarchal gender hierarchies and traditional sex-based labor divisions; lower wealth, education, and life expectancy; and more traditional, binary gender stereotypes and ideologies. To explain these correlations, we theorize that country-level PMBs function to socialize boys and men to internalize qualities—such as toughness and competition—that will facilitate their success in countries where the male gender role requires more danger, struggle, intragroup competition, and risk (Gilmore, 1990).

This study makes several novel contributions. First, although past investigations ask how individual men's masculinity-related beliefs and traits are connected to health, we ask here whether broader, culturally shared beliefs about the nature of manhood—beliefs shared by both men and women—relate in a theoretically meaningful way to men's health behaviors and outcomes. This is important because country-level PMBs may shape men's outcomes independently of their personal masculine gender role endorsement or self-perceived masculine traits. After all, one need not see oneself as masculine, nor endorse traditional male gender role norms (of say, assertiveness, aggression, stoicism), to be affected by a cultural milieu that views manhood as a tenuous and impermanent status that is hard to earn and easy to lose. In the present study, we use countries as a convenient shorthand for cultures, though we acknowledge that countries are imperfect approximations of cultures, which exist within and across national boundaries. Second, we connect these cultural beliefs to country-level, objective measures of men's health behaviors and outcomes, rather than to men's subjective, self-reported perceptions of or attitudes toward health. Third, we explore the links between PMBs and men's physical health in a globally diverse sample of 62 countries, many of which are underrepresented in investigations of psychology, culture, and health.

The Role of Women

Although the focus of the present study is on men's health, the precarious manhood perspective assumes that both men's *and* women's beliefs about manhood should play vital roles in men's health. Consider that women, as socializers of children, play an important role in teaching children about gender-relevant beliefs and values (e.g., Gelman et al., 2004; Witt, 1997). Women also valorize men's risk-taking in the context of romantic relationships (Bassett & Moss, 2004; Sylwester & Pawlowski, 2011), and penalize men who violate gender roles in lab experiments (cf. Rudman et al., 2012). Thus, women who view manhood as precarious may question the masculinity of men who wear masks to guard against COVID-19, or who eat salads instead of steaks, or who back down from a fight. If so, then women's evaluations may contribute to the pressure that men feel to take health-related risks to "be a real man" Women's perceptions of the precarity of manhood likely influence men's risky behaviors and health outcomes indirectly by shaping cultural masculinity norms. More directly, women's beliefs about manhood may influence men's health outcomes if women act as primary health care navigators for the male members of their families (Norcross et al., 1996).

For these reasons, and unlike past studies on masculinity and health, the present research uses samples consisting of responses from both men and women. Specifically, we examined the country-level PMBs of both men and women. Men's and women's PMBs within countries tend to be strongly correlated (Bosson et al., 2021), and in countries lower in gender equality and human development, women tend to endorse PMBs even more strongly than men. Thus, it is important to include women's beliefs in predicting men's health behaviors outcomes. In cultures in which women, as well as men, endorse precarious manhood most strongly, we expected men to take greater risks with their health.

Overview and Hypotheses

This study, which uses data from a large-scale, cross-cultural investigation of gender beliefs (see https://osf.io/fqd4p/), examined the links of country-level PMB (Bosson et al., 2021) with men's objective rates of health-related risk behaviors and risk-related health outcomes across 62 countries. We distinguished between "risky behaviors" and "health outcomes" as an organizational device for analyses, while recognizing that some variables straddle the line between behavior and outcome (e.g., do "transportation accidents" reflect a *behavior*—risky driving—or an *outcome*—possible injury or death?).

For use as outcome measures, we identified as many variables as possible, reported at the aggregated country-level for most of the countries in our data set that could serve as health-related risk behaviors and risk-related health outcomes. See Table 1, for operationalizations, sources, numbers of countries for which data are available, and health-relevance of these variables. Note that our selection of outcome measures was theoretically driven, and we initially considered a larger set of variables than those described in Table 1. However, some relevant variables reflecting our constructs of interest (e.g., condom or seatbelt use as indices of health-related risk behaviors) were ultimately abandoned due to insufficient availability of country-level data or lack of clear association with risk-taking (e.g., heart disease). The final preregistered risk-related variable set included four *health-related risk behaviors* (smoking, high volume drinking, substance use disorders, and venomous animal contact) and eight *risk-related health outcomes* (lung cancer, liver cirrhosis mortality,[1] drowning, death from venomous animal contact, death from injuries,[2] transportation accidents, COVID-19 infections, and COVID-19 deaths). We also included overall and healthy life expectancy as exploratory health outcomes.

We included several controls. First, to establish the discriminant validity of the PMB, we compared the PMB's association with risk-related behaviors and health outcomes to its association with nonrisk behaviors and outcomes. We reasoned that, if country-level PMB is a cultural ideology that socializes men to prove manhood via risk-taking, then PMB should correlate more strongly with men's risky behaviors and health outcomes than with men's nonrisk behaviors

[1] In our preregistration, we incorrectly listed this variable as "prevalence of liver cirrhosis" rather than mortality from liver cirrhosis.

[2] In our preregistration, we incorrectly listed this variable as "death from accidents" rather than death from injuries.

Table 1
Health-Related Risk Behaviors and Risk-Related Health Outcomes

Variable	Index	Data source	Associated health outcomes	Behavioral risk factor
Behavior (Number of countries)				
Smoking (n = 58)	Percentages of men and women (aged 15+) who smoke any form of tobacco	World Health Organization (2018a)	Cancer, heart disease, strokes, diabetes (Centers for Disease Control [CDC], 2021a)	
High-volume drinking (n = 26)	Percentages of men and women drinking more than 1 ounce of ethanol (or equivalent) per day for the preceding year	Wilsnack et al. (2009)	Accidents, injuries, poisoning, heart disease, cancer, and cirrhosis (Centers for Disease Control [CDC], 2021b)	
Substance use disorders (n = 59)	Percentages of men and women diagnosed with drug use disorders	Institute for Health Metrics and Evaluation (2018b)	Accidents, injuries, heart disease, strokes, and cancer (National Institute of Drug Abuse [NIDA], 2020)	
Venomous animal contact (n = 58)	Age standardized rates of venomous animal contact resulting in injuries	Institute for Health Metrics and Evaluation (2018a)	Injury, neurological, muscular, and gastrointestinal damage, paralysis, and death (Harris & Goonetilleke, 2004)	
Health outcome (Number of countries)				
Lung cancer (n = 59)	Rates of lung cancer per 100,000 people	International Agency for Research on Cancer (2021)		Smoking (Mayo Clinic, 2021)
Liver cirrhosis (n = 59)	Death rates (aged 15+) from liver cirrhosis per 100,000 people	World Health Organization (2021c)		Long-term alcohol use (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2021)
Drowning (n = 47)	Death by drowning per 100,000 people	World Health Organization (2021b)		Risky water activities (WHO, 2021b)
Death from venomous animal contact (n = 58)	Mortality rate from contact with venomous animals	Institute for Health Metrics and Evaluation (2018a)		Agriculture, hunting, and outdoor work ()
Death from injuries (n = 59)	Death by injury as a percent of population	World Bank (2021a)		Risk-taking in work or leisure activities (Turner et al., 2004)
Transportation accidents (n = 47)	Transportation accidents per 100,000 people	World Health Organization (2021c)		Risky and aggressive driving (National Highway Traffic Safety Administration, 2021)
COVID-19 infections (n = 53)	Percentage of confirmed COVID cases that are male	GlobalHealth5050 (2021)		Mask, social distancing, and vaccination refusal (Centers for Disease Control [CDC], 2021c)
COVID-19 deaths (n = 52)	Percentage of confirmed COVID deaths that are male	GlobalHealth5050 (2021)		Mask, social distancing, and vaccination refusal; avoidance of hospitals (CDC, 2021c)
Life expectancy (n = 58)	Average number of years a newborn could be expected to live	World Health Organization (2021a)		
Healthy life expectancy (n = 58)	Average number of years that a person can expect to live in "full health" by taking into account years lived in less than full health due to disease and/or injury.	World Health Organization (2021a)		

and health outcomes. For *nonrisk behaviors,* we used five behaviors: borrowing money, saving money, shopping online, literacy, and living in urban areas. Note that some of these behaviors may reflect a degree of risk-taking (e.g., borrowing money can be risky), and some show cross-cultural gender differences (e.g., literacy gaps favor boys and men globally; Schwab et al., 2017). Nonetheless, we selected these variables because they have less direct relevance for physical health compared to the set of risky behaviors. For *non-risk-related health outcomes*, we used leukemia, multiple sclerosis, psoriasis, Alzheimer's disease, appendicitis, and mortality rates from air pollution. The causes of these health outcomes vary, but importantly, they are generally unassociated with risk-taking and gender (see https://www.mayoclinic.org).

As additional controls, we also examined whether the PMB's links with men's risk-related behaviors and health outcomes would remain once accounting for cross-country differences in (a) women's rates of risk-related behaviors and health outcomes, (b) human development (the inequality-adjusted Human Development Index [IHDI]; United Nations, 2021), (c) access to physicians, and (d) gender inequality (the Global Gender Gap index [GGGI]; World Economic Forum, 2021). We reasoned that, if country-level PMB imposes unique pressures on men's gendered behaviors, then links of PMB with men's risk behaviors and health outcomes should persist when controlling for women's rates of the same behaviors and outcomes. Moreover, country-level human development, access to physicians, and gender inequality reflect (to varying degrees) a country's wealth, access to desirable resources such as education and health care, and traditional gender arrangements and beliefs. These are all theoretically relevant third variables that could at least partially explain the links between PMB and men's health outcomes.

Preregistered hypotheses (https://osf.io/746a5/?view_only=f879165889ee4aa4ac8206f5493a54a9) were as follows:

> *Hypothesis 1:* Country-level PMB will positively predict men's rates of health-related risk behaviors.
>
> *Hypothesis 2:* Country-level PMB will positively predict men's rates of risk-related health outcomes.
>
> *Hypothesis 3:* On average, country-level PMB will positively predict men's rates of health-related risk behaviors more strongly than they will predict men's rates of nonrisk behaviors.
>
> *Hypothesis 4:* On average, country-level PMB will positively predict men's rates of risk-related health outcomes more strongly than they will predict men's rates of nonrisk-related health outcomes.
>
> *Hypothesis 5:* The above associations (H1–H4) will hold when controlling for women's rates of the same behaviors and health outcomes.

We posed several exploratory questions: Does country-level PMB predict general overall and healthy life expectancy? Will tests of Hypotheses 1–4 remain significant when controlling for country-level indices of human development (IHDI), physician availability, and gender equality (GGGI)?

Method

As part of another project (see https://osf.io/fqd4p/), we surveyed college student samples from 62 nations (N = 33,417) on their gender beliefs and attitudes. Data were collected between January 2018 and February 2020. From that data set, Bosson et al. (2021) created country-level PMB scores. To locate worldwide behavior and health data, we searched publicly available databases for country-level data split by binary gender. For most variables, data were available for most, but not every, country for which we had PMB scores, and thus sample sizes vary across individual analyses.

Precarious Manhood Beliefs

Table 2 presents scores on the four-item PMBs Scale for the 62 countries in our sample, along with three country-level control variables: IHDI, physicians, and GGGI. PMB scores were derived from a confirmatory factor analysis and are presented as factor scores (theoretical range is −2.1 to 2.1; $M = 0$, $SD = 1.00$). For each country, a PMB score was calculated by taking the mean factor score from the student samples. See Bosson et al. (2021), for details regarding sample composition and psychometric validation of the PMB.

Health-Related Risk Behaviors and Risk-Related Health Outcomes

Table 1 details how we operationalized and retrieved all the risk behaviors and health outcomes.

Nonrisk Behaviors and Health Outcomes

For nonrisk behaviors, we retrieved men's and women's data from the World Bank's (2021a) Gender Data Portal as follows. *Borrowed money*: percentage (Age 15+) who borrowed any money in the past year. *Saved money*: percentage (Age 15+) who saved any money in the past year. *Shopped online*: percentage (Age 15+) who bought something online in the past year. *Adult literacy rates*: percentage (Age 15+) who are literate. *Living in urban areas*: percentage who live in urban areas. For nonrisk health outcomes, we retrieved prevalence rates for men and women per 100,000 people from the Institute for Health Metric and Evaluation (2021) for *appendicitis*, *psoriasis*, *leukemia, Alzheimer's disease and other dementias*, and *multiple sclerosis*. We retrieved *mortality attributed to household and ambient air pollution* for men and women per 100,000 people from the World Bank's (2021a, 2021b) Gender Data Portal.

Control Variables

The IHDI indexes a nation's development, comprising measures of health, education, and economics, adjusted for inequalities on each dimension (United Nations, 2021). Scores can range from 0 to 1, with higher scores indicating more developed countries. Physicians per 1,000 people (World Bank, 2021b) indexes the health resources available to a country's citizens. The GGGI indexes women's disadvantages, relative to men's, in economic, educational, health, and political domains (World Economic Forum, 2021).

Table 2
Precarious Manhood Beliefs and Other Country-Level Variables for 62 Countries

Country	*N*	PMB *M*	PMB *SD*	IHDI	GGGI	Physicians per 1,000
Albania	239	0.72	1.09	.71	.77	1.2
Argentina	424	−0.32	1.04	.73	.75	4.0
Armenia	282	0.05	1.07	.70	.68	4.4
Australia	664	0.04	1.01	.87	.73	3.7
Belgium	1,951	−0.30	0.93	.86	.75	3.1
Bosnia and Herzegovina	219	−0.12	1.28	.67	.71	2.2
Brazil	1,150	−0.03	1.01	.57	.69	2.2
Canada	913	0.03	0.89	.85	.77	2.6
Chile	237	−0.06	1.09	.71	.72	2.6
China	600	0.17	0.78	.64	.68	2.0
Colombia	615	−0.16	1.02	.60	.76	2.2
Croatia	363	0.47	0.89	.78	.72	3.0
Czechia	423	−0.04	1.00	.86	.71	4.1
Denmark	255	−0.30	0.87	.88	.78	4.0
England	744	−0.10	0.98	.86	.77	2.8
Finland	314	−0.78	0.86	.89	.83	3.8
France	422	−0.41	0.97	.82	.78	3.3
Georgia	197	0.39	1.17	.72	.71	7.1
Germany	1,864	−0.49	0.94	.87	.78	4.2
Ghana	329	0.53	1.12	.44	.67	0.1
Greece	282	−0.20	0.92	.79	.70	5.5
Hungary	768	0.41	0.95	.79	.68	3.4
India	388	−0.01	0.97	.59	.69	0.9
Indonesia	255	0.18	0.81	.70	.70	0.4
Iran	174	0.66	0.90	.69	.58	1.6
Ireland	571	0.10	0.94	.89	.80	3.3
Italy	2,419	0.07	0.95	.78	.71	4.0
Japan	397	0.49	0.72	.84	.65	2.4
Kazakhstan	344	0.52	0.98	.77	.71	4.0
Kosovo	433	0.80	1.05	—	.77	—
Lebanon	134	0.42	0.98	—	.60	2.1
Lithuania	355	0.19	1.12	.79	.75	6.4
Luxembourg	181	−0.06	1.11	.83	.73	3.0
Malta	254	0.23	1.01	.82	.69	2.9
Mexico	343	−0.18	0.99	.61	.75	2.4
Morocco	294	0.05	1.04	—	.61	0.7
Nepal	219	0.21	0.96	.45	.68	0.7
Netherlands	893	−0.36	0.89	.88	.74	3.6
New Zealand	216	0.05	0.85	.86	.80	3.6
Nigeria	461	0.65	1.06	.35	.64	0.4
Northern Ireland	303	−0.06	1.01	.86	.77	—
Norway	210	−0.42	0.95	.90	.84	2.9
Pakistan	573	0.18	0.88	.38	.56	1.0
Philippines	468	0.26	0.94	.59	.78	0.6
Poland	843	0.34	1.00	.81	.74	2.4
Portugal	173	−0.39	0.86	.76	.74	5.1
Romania	253	0.36	1.03	.73	.72	3.0
Russia	698	0.41	1.03	.74	.71	4.0
Serbia	720	0.27	1.12	.71	.74	3.1
Slovakia	622	0.29	0.98	.81	.78	3.4
South Africa	415	0.40	0.97	.47	.72	0.9
Spain	1,235	−0.52	0.95	.78	.80	3.9
Suriname	182	0.32	1.02	.56	.71	1.2
Sweden	671	−0.46	0.98	.88	.82	4.0
Switzerland	581	−0.44	0.94	.89	.78	4.3
Turkey	1,495	−0.34	1.11	.68	.64	1.8
UAE	510	0.38	1.00	—	.72	2.5
Ukraine	285	0.55	0.94	.73	.66	3.0
Uruguay	187	−0.32	0.84	.71	.72	5.1
United States	786	0.15	1.01	.81	.74	2.6
Vietnam	408	0.17	0.85	.59	.70	0.8
Wales	213	0.07	1.05	.86	.77	—
Total sample	33,417	0.00	1.00			

Note. PMB = Precarious Manhood Beliefs Scale (Bosson et al., 2021); IHDI = Inequality adjusted Human Development Index (United Nations, 2021); GGGI = Global Gender Gap Index (Mateos et al., 2020).

Scores can range from 0 to .99, with higher scores indicating more gender parity.

Results

Analysis Plan

To test Hypotheses 1 and 2, we estimated simple correlations between PMB and each behavior or outcome. Hypotheses 3 and 4 concern differences in mean correlations between risk-taking and non-risk-taking behaviors or outcomes. After consulting with a statistician (Author 4) about the most appropriate method, we estimated the average correlation for each category of behaviors/outcomes by fitting multilevel models with outcomes nested within countries, with random intercepts for countries and random slopes for behaviors/outcomes. This approach accounts for multiple testing by partially pooling correlations across outcomes (see Gelman et al., 2012). In the multilevel models, the key parameter of interest is the coefficient for the PMB × Risk category (non-risk-taking vs. risk-taking) interaction. This coefficient indicates the difference in mean PMB correlations between the two risk categories. For these analyses, we standardized the PMB and behavior/outcome variables across countries so that model parameters can be interpreted in the correlation metric. Because standardized variables have $M = 0$ by definition, we fixed the global intercept in the models to 0 and did not include random intercepts for behaviors/outcomes. We fit these models using the lme4 packages in R (Bates et al., 2015; R Core Team, 2021).

To test Hypothesis 5 and the exploratory hypotheses related to robustness when controlling for other country-level factors, we estimated partial correlations of PMB with each outcome, controlling for one control variable at time, and re-estimated the above multilevel models adding one control variable at a time as a fixed covariate.

Given our limited sample size (*n*s = 26–61 countries per correlation), we did not necessarily expect *p* values for all individual correlations to reach statistical significance at the critical α level of $p < .05$. In presenting results, we therefore attend primarily to the average correlations for each risk category estimated from the multilevel model and focus interpretation on the estimated effect sizes and confidence intervals, paying less attention to *p* values (e.g., McShane et al., 2019). In keeping with the latest empirical benchmarks for effect sizes in social psychological research (where correlations of .12, .25, and .42 can be taken as thresholds for "small," "medium," and "large" effects; see Lovakov & Agadullina, 2021), and in cross-cultural research (where average group-level main effects are around $\rho = .21$; Taras et al., 2010), we consider an $r \geq .20$ to be a medium effect and an $r \geq .30$ to be a large effect (cf. Funder & Ozer, 2019).

Correlations of PMB With Men's Risk Behaviors and Health Outcomes

Hypotheses 1 and 2 state that country-level mean PMB positively predicts men's rates of the four risk behaviors and the eight physical health outcomes. Table 3 reports the bivariate correlations of PMB with the behaviors and health outcomes, as well as results from multilevel models. Examining Hypothesis 1, PMB showed moderate-to-strong positive correlations with men's health risk-taking behaviors (mean $r = .21$, 95% confidence interval, CI [.06, .36], $p = .006$, based on the multilevel model), particularly smoking ($r = .30$), high volume drinking ($r = .31$), and injuries from venomous animal contact ($r = .34$). Examining Hypothesis 2, PMB also showed moderate-to-strong positive correlations with men's risk-related health outcomes (mean $r = .26$, 95% CI [.04, .48], $p = .021$, based on the multilevel model), particularly liver cirrhosis deaths ($r = .48$), drownings ($r = .47$), and transportation accidents ($r = .40$).

Exploratory analyses revealed that PMB correlated strongly negatively with men's general life expectancy and healthy life expectancy (see Table 3). Stated differently, in countries high (1 *SD* above the mean) versus countries low (1 *SD* below the mean) in PMB, men live on average 6.69 fewer years (70.68 vs. 77.37 years, 95% CI [4.03, 9.35]), and 6.17 fewer healthy years (62.69 vs. 68.86 years, 95% CI [3.80, 8.55]). Figure 1 shows a scatterplot of the association of country-level PMB with men's general life expectancy (the figure for men's healthy life expectancy is nearly identical).

Overall, there was support for Hypotheses 1 and 2, in that that country-level PMB positively predicted men's rates of health-related risk behaviors and risk-related health outcomes, with average correlations in the moderate range. Moreover, exploratory analyses on life expectancy yielded large effects such that men live shorter lives in countries higher in PMB. Given the limited number of countries available for some behaviors and outcomes, we urge caution against overinterpreting differences in the strength of PMB correlations with measures within a risk category (e.g., PMB-smoking vs. PMB-venomous animal contact) and recommend focusing on the estimated mean correlations for each risk category instead.

Comparing Risk-Related to Low-Risk Behaviors and Outcomes

Hypotheses 3 and 4 state that country-level mean PMB will positively predict men's rates of health-related risk behaviors and risk-related health outcomes more strongly than they will predict men's rates of non-risk-related behaviors and health conditions. Based on the multilevel models (see Table 3) and supporting Hypothesis 3, risk-related behaviors were much more strongly positively related to PMB than non-risk-related behaviors (difference in mean correlations $\beta = .56$, 95% CI [.39, .73], $p < .001$), with risk-related behaviors showing a moderate positive mean correlation with PMB (mean $r = .21$, 95% CI [.06, .36], $p = .006$) and non-risk-related behaviors showing a strong *negative* mean correlation with PMB (mean $r = -.34$, 95% CI [−.48, −.21], $p < .001$). Similarly, supporting Hypothesis 4, risk-related health outcomes (mean $r = .26$, 95% CI [.04, .48], $p = .021$) were more strongly positively related to PMB than non-risk-related health outcomes (mean $r = -.08$, 95% CI [−.36, .20], $p = .588$; difference in mean correlations $\beta = .34$, 95% CI [.00, .68], $p = .063$).

Note, however, that the non-risk-related behaviors correlated strongly *negatively* with PMB. With some nonrisk variables—for instance, saving money and shopping online—these negative correlations may reflect the higher economic development of countries lower in PMB (PMB correlated with IHDI $r = -.42$, $p < .001$). Thus, although Hypotheses 3 and 4 were technically supported, the large differences between the PMB's association with risk-related and non-risk related variables were driven as much by negative

Table 3
Correlations of Precarious Manhood Beliefs With All Outcomes

Category	Measure	*n*	r/Coefficient	95% CI	*t*	*p*
		Behaviors				
Risk-related	Smoking	58	.30	[.04, .52]	2.32	.024
	High-volume drinking	26	.31	[−.09, .62]	1.60	.123
	Substance use disorders	59	−.05	[−.30, .21]	−0.36	.723
	Venomous animal contact	58	.34	[.09, .55]	2.71	.009
	Mean r		**.21**	**[.06, .36]**	**2.75**	**.006**
Non-risk-related	Borrowing money	59	−.27	[−.49, −.02]	−2.14	.037
	Saving money	59	−.36	[−.57, −.12]	−2.94	.005
	Shopping online	59	−.48	[−.66, −.26]	−4.16	<.001
	Literacy	36	−.26	[−.54, .08]	−1.55	.129
	Living in urban areas	58	−.32	[−.53, −.06]	−2.51	.015
	Mean r		**−.34**	**[−.48, −.21]**	**−5.06**	**<.001**
MLM parameters	Mean correlation (all behaviors)		−.07	[−.17, .03]	−1.21	.227
	Difference: Mean *r* (risk) − Mean *r* (nonrisk)		**.56**	**[.39, .73]**	**5.88**	**<.001**
	Random *SD* of correlations		.06	[.00, .17]		
		Outcomes				
Risk-related	Lung cancer	59	−.03	[−.28, .23]	−0.20	.843
	Liver cirrhosis mortality	59	.48	[.26, .66]	4.14	<.001
	Drowning	47	.47	[.21, .67]	3.57	<.001
	Death from venomous animal	58	.20	[−.06, .44]	1.53	.132
	Death from injuries	59	.17	[−.09, .41]	1.34	.187
	Transportation accidents	47	.40	[.12, .61]	2.90	.006
	COVID-19 infections	53	.18	[−.09, .43]	1.31	.195
	COVID-19 deaths	52	.26	[−.02, .50]	1.88	.065
	Mean r		**.26**	**[.04, .48]**	**2.31**	**.021**
Non-risk-related	Leukemia	61	−.55	[−.70, −.34]	−5.05	<.001
	Multiple sclerosis	60	−.34	[−.55, −.09]	−2.74	.008
	Alzheimer's disease	61	.34	[.10, .55]	2.79	.007
	Appendicitis	61	−.34	[−.54, −.09]	−2.74	.008
	Death from air pollution	59	.51	[.29, .68]	4.48	<.001
	Mean r		**−.08**	**[−.36, .20]**	**−0.54**	**.588**
MLM parameters	Mean correlation (all behaviors)		.09	[−.08, .26]	1.01	.312
	Difference: Mean *r* (risk) − Mean *r* (nonrisk)		**.34**	**[.00, .68]**	**1.86**	**.063**
	Random *SD* of correlations		.29	[.17, .44]		
		Cumulative life outcomes				
	General life expectancy	58	−.56	[−.71, −.35]	−5.04	<.001
	Healthy life expectancy	58	−.57	[−.72, −.37]	−5.21	<.001

Note. MLM = multilevel model; *n* = number of countries providing data for the behavior/outcome; r/Coefficient = Pearson correlation or multilevel model parameter (mean *r* for risk-related and non-risk-related categories estimated from the multilevel models); 95% CI = 95% confidence interval (Fisher z-based for bivariate correlations, profile likelihood-based for multilevel model results), *p* values for multilevel model parameters computed using normal approximation; focal parameters of interest highlighted in bold.

associations of PMB with nonrisk variables as they were by positive associations of PMB with risky behaviors and health outcomes.

Controlling for Women's Behaviors and Outcomes

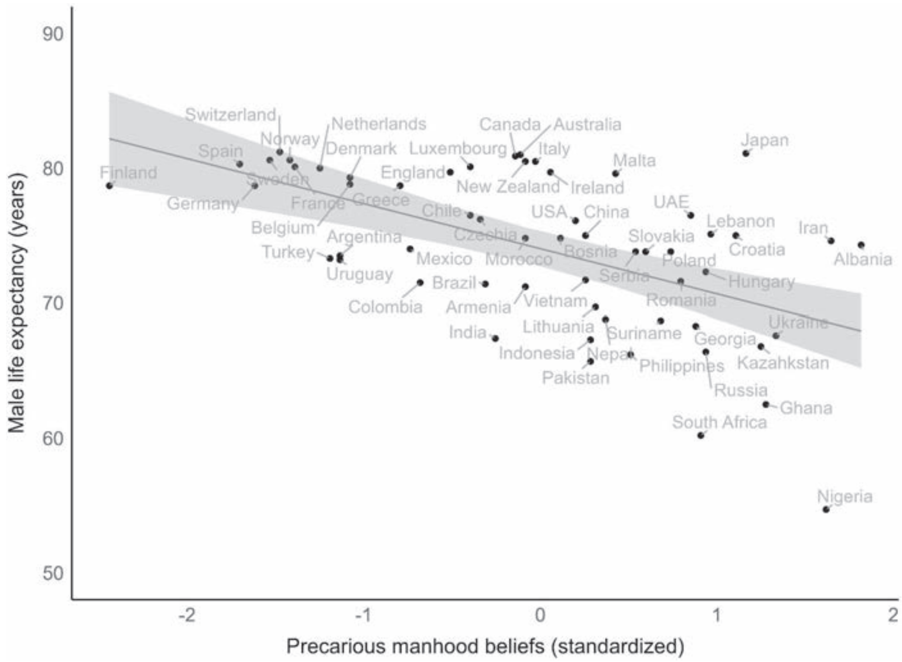
Hypothesis 5 states that the associations observed in tests of Hypotheses 1–4 should remain when controlling for women's rates of the same behaviors and outcomes. We tested this hypothesis using partial correlations and by adding the women's rate as a covariate to the multilevel models (except for analyses on COVID-19 infections and deaths, as these rates are operationalized as "percentage that are male," and thus already control for women's rates).

As shown in Table 4, correlations of PMB with men's risk-related behaviors were weakened when controlling for women's rates (mean $r = .17$, 95% CI [−.00, .35], $p = .060$), with only the individual correlation between PMB and men's smoking remaining substantial ($r = .33$). PMB correlations with non-risk-related behaviors were much smaller when controlling for women's rates of these behaviors (mean $r = -.07$, 95% CI [−.23, .09], $p = .376$), so the difference in mean correlations between risk-related and non-risk-related behaviors was reduced in magnitude by nearly half (difference in mean correlations $\beta = .25$, 95% CI [.00, .48], $p = .047$).

Similarly, correlations of PMB with men's risk-related health outcomes were weakened when controlling for women's rates (mean $r = .13$, 95% CI [−.00, .26], $p = .068$). The difference in mean correlations between risk-related and non-risk-related health outcomes was also reduced in magnitude by nearly half when controlling for women's rates (difference in mean correlations $\beta = .16$, 95% CI [−.03, .36], $p = .100$).

Correlations of PMB with men's life expectancy were also reduced when controlling for women's life expectancy, but nevertheless remained moderately negative (general life expectancy $r = -.22$, 95% CI [−.45, .04]; healthy life expectancy $r = -.30$, 95% CI [−.52, −.04]).

Figure 1
Male Life Expectancy by Country-Level Mean Precarious Manhood Beliefs



Together, these results provide little support for Hypothesis 5, in that most associations of PMB with men's behaviors and health outcomes were attenuated when controlling for women's rates of these behaviors and outcomes. However, the PMB's links with men's life expectancy remained moderate when controlling for women's life expectancy.

Controlling for Human Development, Physicians, and Gender Equality

As a further test of the robustness of the relationships of PMB to men's health behaviors and outcomes, we conducted a series of partial correlations and multilevel model analyses to examine if and how these relationships change when controlling for human development (the IHDI), physicians per 1,000 people, and gender equality (the GGGI). Table 5 summarizes these analyses. In all cases, results did not meaningfully change when controlling for any of these potential confounding factors. Accordingly, these analyses suggest that resource and gender equality-related contextual variables cannot account for the observed relationships of country-level mean PMB and men's risk-related behaviors and health outcomes.

Exploratory Analyses With Cultural Masculinity

Although Hofstede's (2011) cultural masculinity dimension was not of primary interest, we conducted exploratory analyses examining its association with PMB and with men's health outcomes. The bivariate correlation between country-level masculinity and PMB was $r = .46$, $p = .003$, indicating that these two variables share conceptual overlap. However, as detailed in the Supplemental Material analyses document, PMB was a stronger and more consistent predictor of men's health outcomes than cultural masculinity.

Discussion

The precarity of manhood relative to womanhood is a widely held belief around the world (Bosson et al., 2021; Gilmore, 1990; Vandello et al., 2008). If members of a country endorse this belief in general, they may socialize and pressure boys and men to prove and defend their manhood status to others. Men in such cultures may thus learn to perform risky behaviors that have short- and long-term consequences for their health. In this preregistered study, we tested this logic by examining whether country-level PMBs are associated with men's risky health behaviors and negative health outcomes.

As predicted, we found that country-level PMBs predicted men's country-level risky health behaviors and risky health outcomes, with moderate mean correlations (mean *r*s = .21 and .26). While these average effect sizes may seem modest in conventional terms, they are near the median of the distribution of effects observed in social and cross-cultural psychology research, and there is an increasing recognition that what have traditionally been considered small statistical effects can be important when considered at a larger scale and over time, particularly for health behaviors (Gotz et al., 2022).

Moreover, the accumulation of various physical health risk factors can add up to substantial effects. When considering overall life expectancy as an outcome, there were strong associations

Table 4
Partial Correlations of Precarious Manhood Beliefs With All Outcomes, Controlling for Women's Rates

Category	Measure	*n*	r/Coefficient	95% CI	*t*	*p*
			Behaviors			
Risk-related	Smoking	58	.33	[.08, .54]	2.61	.012
	High-volume drinking	26	−.02	[−.41, .37]	−0.12	.908
	Substance use disorders	59	.11	[−.15, .36]	0.87	.394
	Venomous animal contact	58	.05	[−.21, .31]	0.41	.686
	Mean r		**.17**	**[−.00, .35]**	**1.88**	**.060**
Non-risk-related	Borrowing money	59	−.36	[−.56, −.11]	−2.91	.006
	Saving money	59	−.07	[−.32, .19]	−0.55	.586
	Shopping online	59	−.06	[−.31, .20]	−0.48	.637
	Literacy	35	−.18	[−.49, .16]	−1.08	.297
	Living in urban areas	58	.11	[−.15, .36]	0.84	.410
	Mean r		**−.07**	**[−.23, .09]**	**−0.89**	**.376**
MLM parameters	Mean correlation (all behaviors)		.05	[−.07, .17]	0.81	.418
	Difference: Mean *r* (risk) – Mean *r* (nonrisk)		**.25**	**[.00, .48]**	**1.99**	**.047**
	Random *SD* of correlations		.16	[.07, .27]		
			Outcomes			
Risk-related	Lung cancer	59	.13	[−.13, .38]	1.02	.315
	Liver cirrhosis mortality	59	.13	[−.13, .38]	1.01	.322
	Drowning	47	.21	[−.08, .47]	1.47	.152
	Death from venomous animal	58	.09	[−.17, .34]	0.68	.504
	Death from injuries	59	.22	[−.04, .45]	1.67	.103
	Transportation accidents	47	.06	[−.23, .34]	0.38	.708
	Mean r		**.13**	**[−.00, .26]**	**1.83**	**.068**
Non-risk-related	Lukemia	61	−.30	[−.51, −.05]	−2.40	.020
	Multiple sclerosis	60	.17	[−.09, .41]	1.31	.199
	Alzheimer's disease	61	.35	[.11, .56]	2.89	.006
	Appendicitis	61	−.37	[−.57, −.13]	−3.04	.004
	Death from air pollution	59	.31	[.06, .53]	2.50	.016
	Mean r		**−.04**	**[−.18, .11]**	**−0.49**	**.624**
MLM parameters	Mean correlation (all behaviors)		.04	[−.06, .15]	0.86	.392
	Difference: Mean *r* (risk) – Mean *r* (nonrisk)		**.16**	**[−.03, .36]**	**1.65**	**.100**
	Random *SD* of correlations		.14	[.07, .23]		
			Cumulative life outcomes			
	General life expectancy	58	−.22	[−.45, .04]	−1.67	.103
	Healthy life expectancy	57	−.30	[−.52, −.04]	−2.35	.024

Note. MLM = multilevel model; *n* = number of countries providing data for the behavior/outcome; r/Coefficient = Pearson correlation or multilevel model parameter (mean *r* for risk-related and non-risk-related categories estimated from the multilevel models); 95% CI = 95% confidence interval (Fisher z-based for bivariate correlations, profile likelihood-based for multilevel model results), *p* values for multilevel model parameters computed using normal approximation; focal parameters of interest highlighted in bold.

between country-level PMBs and men's total and healthy life expectancy. Men in countries high in PMBs can be expected to live over six fewer years than men in countries low in PMBs. Notably, this association held and remained medium-to-large in size even when controlling for country-level variation in women's life expectancy, human development, availability of physicians, and gender equality. Although not preregistered and thus exploratory, this finding is perhaps the most exciting and powerful to emerge from this study: country-level endorsement of the belief that manhood is "hard won and easily lost" uniquely and strongly predict how long men in that country will live a healthy life.

To test the discriminant validity of these associations, we examined relationships between PMBs and behaviors and outcomes that have no obvious direct relationship to risk. These nonrisk behaviors and health outcomes were sometimes positively correlated, sometimes uncorrelated, and sometimes unexpectedly negatively correlated, with country-level PMBs. Unfortunately, the unexpected negative associations muddied the conclusions we can draw from analyses that compared the PMB's link with risk-related versus nonrisk-related behaviors and outcomes (though the negative association with low-risk outcomes was minimal). Although the sets of correlations differed significantly from each other, this was likely driven as much by their opposite signs as by their differing effect sizes. Nonetheless, the PMB displayed discriminant validity insofar as it associated positively with risk-related behaviors and health outcomes, and negatively with behaviors and health outcomes unassociated with risk. As noted earlier, some of the variables we selected to reflect nonrisk behaviors and outcomes are factors that likely covary meaningfully with the economic development of a country, such as literacy rates and death from air pollution. Thus, it makes sense that these variables would correlate negatively with PMBs, which presumably reveal something about the competitiveness of daily life in environments that are physically difficult or have scarce resources.

Table 5
Partial Correlations of Precarious Manhood Beliefs With All Outcomes, Controlling for IHDI, Physicians, or GGGI

		IHDI			Physicians per 1,000			GGGI		
Category	Measure	r/Coef.	95% CI	*p*	r/Coef.	95% CI	*p*	r/Coef.	95% CI	*p*
			Behaviors							
Risk-related	Smoking	.28	[.01, .51]	.041	.33	[.07, .54]	.013	.19	[−.07, .43]	.159
	High-volume drinking	.16	[−.24, .51]	.450	.14	[−.26, .50]	.514	.05	[−.35, .43]	.828
	Substance use disorders	−.01	[−.27, .25]	.928	−.07	[−.32, .20]	.628	−.09	[−.34, .17]	.479
	Venomous animal contact	.14	[−.13, .39]	.313	.23	[−.03, .46]	.085	.19	[−.08, .42]	.168
	Mean r	**.19**	**[.02, .37]**	**.027**	**.22**	**[.07, .37]**	**.005**	**.21**	**[.06, .37]**	**.006**
Non-risk-related	Borrowing money	−.15	[−.40, .12]	.273	−.28	[−.50, −.02]	.035	−.10	[−.35, .16]	.449
	Saving money	−.20	[−.45, .06]	.138	−.35	[−.56, −.11]	.007	−.18	[−.41, .08]	.188
	Shopping online	−.28	[−.50, −.01]	.044	−.38	[−.58, −.13]	.004	−.31	[−.52, −.05]	.020
	Literacy	−.13	[−.45, .22]	.472	−.10	[−.41, .24]	.579	−.13	[−.44, .21]	.460
	Living in urban areas	−.14	[−.39, .13]	.320	−.23	[−.46, .03]	.092	−.25	[−.48, .00]	.057
	Mean r	**−.36**	**[−.51, −.20]**	**<.001**	**−.34**	**[−.48, −.20]**	**<.001**	**−.34**	**[−.48, −.21]**	**<.001**
MLM	Mean correlation (all behaviors)	−.08	[−.20, .04]	.191	−.06	[−.17, .05]	.281	−.07	[−.17, .04]	.242
	Difference: Mean *r* (risk) – Mean *r* (nonrisk)	**.55**	**[.33, .77]**	**<.001**	**.56**	**[.37, .75]**	**<.001**	**.56**	**[.39, .73]**	**<.001**
	Random *SD* of correlations	.10	[.00, .21]		.05	[.00, .17]		.06	[.00, .17]	
			Outcomes							
Risk-related	Lung cancer	.24	[−.02, .47]	.076	.15	[−.11, .39]	.259	−.00	[−.26, .26]	.994
	Liver cirrhosis mortality	.35	[.10, .56]	.008	.44	[.21, .63]	< .001	.38	[.14, .58]	.003
	Drowning	.36	[.09, .59]	.013	.50	[.24, .69]	< .001	.45	[.18, .65]	.002
	Death from venomous animal	−.18	[−.43, .09]	.190	−.02	[−.27, .24]	.904	−.08	[−.33, .19]	.578
	Death from injuries	−.12	[−.37, .15]	.385	.04	[−.21, .30]	.741	.12	[−.14, .37]	.367
	Transportation accidents	.20	[−.09, .46]	.172	.39	[.12, .61]	.007	.20	[−.09, .46]	.179
	COVID-19 infections	−.02	[−.30, .26]	.868	.03	[−.25, .30]	.864	−.10	[−.36, .17]	.465
	COVID-19 deaths	−.01	[−.29, .27]	.932	.02	[−.26, .30]	.895	.05	[−.23, .31]	.752
	Mean r	**.27**	**[.04, .49]**	**.019**	**.26**	**[.04, .49]**	**.020**	**.26**	**[.04, .49]**	**.021**
Non-risk-related	Lukemia	−.39	[−.59, −.14]	.003	−.44	[−.63, −.21]	< .001	−.36	[−.56, −.12]	.005
	Multiple sclerosis	−.04	[−.30, .22]	.756	−.24	[−.47, .01]	.067	−.10	[−.34, .16]	.457
	Alzheimer's disease	.41	[.17, .60]	.002	.41	[.17, .60]	.001	.23	[−.03, .45]	.083
	Appendicitis	−.20	[−.44, .06]	.132	−.26	[−.48, −.00]	.049	−.24	[−.46, .01]	.066
	Death from air pollution	.34	[.08, .55]	.012	.39	[.15, .59]	.003	.35	[.11, .56]	.007
	Mean r	**−.08**	**[−.36, .20]**	**.553**	**−.07**	**[−.35, .20]**	**.606**	**−.08**	**[−.36, .20]**	**.590**
MLM	Mean correlation (all behaviors)	.09	[−.09, .27]	.318	.10	[−.08, .27]	.295	.09	[−.08, .27]	.310
	Difference: Mean *r* (risk) – Mean *r* (nonrisk)	**.35**	**[−.00, .71]**	**.054**	**.34**	**[−.02, .69]**	**.063**	**.34**	**[−.02, .69]**	**.063**
	Random *SD* of correlations	.29	[.17, .44]		.29	[.17, .44]		.29	[.17, .44]	
			Cumulative life outcomes							
	General life expectancy	−.45	[−.64, −.21]	<.001	−.48	[−.66, −.26]	<.001	−.43	[−.62, −.20]	<.001
	Healthy life expectancy	−.45	[−.64, −.21]	<.001	−.49	[−.67, −.27]	<.001	−.43	[−.62, −.20]	<.001

Note. MLM = multilevel model parameters; IHDI = Inequality-Adjusted Human Development Index; GGGI = Global Gender Gap Index. n = number of countries providing data for the behavior/outcome; *r*/Coef. = Pearson correlation or multilevel model parameter (mean *r* for risk-related and non-risk-related categories estimated from the multilevel models); 95% CI = 95% confidence interval (Fisher z-based for bivariate correlations, profile likelihood-based for multilevel model results), *p* values for multilevel model parameters computed using normal approximation; focal parameters of interest highlighted in bold.

As additional tests of the robustness of the associations of PMBs with men's health behaviors and outcomes, we examined these associations when controlling for women's health behaviors and outcomes, as well as for indicators of human development (IHDI), access to doctors (physicians per 1,000 people), and gender equality (GGGI). In contrast to the robustness of the PMB life-expectancy associations—which remained medium-to-large in size against all control variables—associations of the PMB with men's behaviors and health outcomes were attenuated when controlling for women's rates. While the PMB's association with men's smoking rates and death by injuries, drowning, and COVID-19 remained medium-to-large when controlling for women's rates, most other individual-level associations were negligible in size when women's rates were controlled. This may be because men's and women's health behaviors and outcomes are, on the whole, strongly correlated within cultures. When accounting for the shared variance of women's behaviors and outcomes, the relationship of PMB to men's risk behaviors and health decreases substantially, suggesting that nongendered cultural influences on behaviors and health may be accounting for at least some of these relationships. Notably, however, the PMB's associations with men's risk behaviors and health remained robust when controlling for country-level variables including human development (IHDI), physicians per 1,000 people, and gender equality (GGGI).

This study demonstrates the usefulness of the PMB as a country-level indicator of beliefs about manhood (Bosson et al., 2021). Previous research has established links between individual men's endorsement of male role norms (Levant et al., 1992; Mahalik et al., 2003) or self-ascribed masculinity (Helgeson, 2012; Helgeson & Lepore, 1997, 2004) and health outcomes, yielding complex relationships depending on the specific male norms or masculinity constructs under investigation. The current findings are thus impressive because country-level PMB scores reflect a widespread belief, shared by individuals of different genders, about the elusive and tenuous nature of manhood. Moreover, our outcome measures—health-related risk behaviors and risk-related health outcomes—are objective indicators that bypass people's self-reports. However, we must caution against drawing conclusions at the *individual* level from the present country-level findings (the well-known ecological fallacy; Robinson, 1950). Although the present study supports the hypothesis that country-level variation in PMBs predicts country-level aggregate measures of men's risky behaviors and health, it remains to be seen whether these relationships hold at the individual level, though at least one study has shown that men higher in PMBs show larger stress (cortisol) reactivity following feedback that they lack masculinity (Himmelstein et al., 2019).

Limitations and Future Directions

A major limitation of this research is the fact that observations are limited to 62 nations. On the one hand, the 62 nations from which we drew manhood beliefs and health behaviors represent an impressive sample of the globe, and data sets of this size and variability are rare in the psychological literature. On the other hand, 62 observations (or fewer, when accounting for missing data for some variables) severely limited the types of analyses we could conduct. For example, we were unable to test for interaction patterns. And yet, country-level factors may moderate the associations between PMB and men's health. To speculate, differences in the collectivism or tightness of countries might influence whether PMBs more or less strongly predict men's behaviors and outcomes (e.g., Stamkou et al., 2019). While our sample size did not allow for such moderator analyses, future studies should test more complex models using multilevel modeling techniques that allow for cross-level interactions between country- and individual-level variables.

In addition, the country-level precarious manhood scores were drawn from college student samples, which are unrepresentative of the larger populations of these nations (usually younger, wealthier, and of higher social status than the average citizen). Thus, one might question the generalizability of the present findings. Despite this limitation, the associations of these country-level PMB scores with health outcomes (which were based on the general population) were often quite striking. This strengthens our confidence that the country-level PMB scores indeed capture widely shared beliefs about manhood.

Another limitation of this study is that the PMB was unexpectedly negatively associated with some of the nonrisk variables we selected for use in control analyses. Our selection of variables was necessarily limited to data that are publicly available, globally tracked, standardized, and aggregated by gender. This did not leave many options for non-risk-related variables against which to compare the risk-related variables. Nonetheless, in retrospect, the set of variables we chose was not ideal. Future exploration with other behaviors and outcomes not expected to be related to PMB would strengthen the case for discriminant validity.

A common concern of large cross-national data sets is that country-level comparisons are crude, as national boundaries are imperfect reflections of cultures (Taras et al., 2016) and they are not strictly independent observations. Ideally, we would have liked to conduct hierarchical linear models that nested nations in cultural regions, such as the World Values Survey's nine cultural regions (Haerpfer et al., 2020) or the United Nations' classification of countries into 17 subregions (United Nations Statistics Division, 2021). However, multilevel models require around 30 observations per cluster to make meaningful comparisons (Peterson et al., 2012), which precluded such an analysis in the present data set. Nevertheless, even without more sophisticated analysis options, comparing relationships across such a large representation of the globe can uncover relationships that might go unnoticed if studies are limited to samples within a single culture.

Relatedly, by focusing on between-country variation, we ignore within-country variation. Countries typically have rich and nuanced cultures within cultures (Cohen, 2014; Kitayama et al., 2006). The current broad cross-country study provides a blueprint for how future research can sort out how relationships might differ among subcultures within countries. For instance, one could conduct finer, regional-level analyses to compare subcultures within nations. Alternatively, as mentioned previously, moderator variables can add nuance to aggregate-level analyses of nations.

Finally, as noted earlier, we view the robust associations of PMB with men's life expectancy to be an especially exciting direction for future research. We treated life expectancy as an exploratory variable in analyses, given that it is influenced by many factors that may be unrelated to gender and risk-taking. And yet, our preliminary findings suggest that country-level variations in PMBs may hold promise for unpacking the global gender gap in longevity. For instance, one study found that alcohol consumption and life satisfaction significantly predicted gender differences in life expectancy across 54 countries (Rochelle et al., 2015), with medium-to-large effects comparable to those reported here. From the perspective of precarious manhood theory, country-level PMB might plausibly predict both alcohol use and life satisfaction among men, thereby offering a theoretical framework to help interpret these findings.

Conclusions

The present cross-cultural study found evidence that a single gender belief—the belief that manhood is a precarious social status—relates to the health habits and outcomes of people in countries representing over 80% of the global population. While past research has linked masculinity to health, this is the first study, and the largest in scale, to show that a basic belief about the nature of manhood may have far-reaching implications for men around the world. While we must be cautious in drawing causal conclusions from correlational data, and health outcomes are invariably complex and multiply determined, we hope that the present results act as a catalyst for research that will further tease apart these associations using diverse methods.

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Received February 23, 2022
Revision received June 13, 2022
Accepted June 15, 2022 ■