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Masculine norms predict lower COVID-19 prevention behavior: a longitudinal investigation of American men during phase I of the pandemic

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Abstract

Background: **Gender disparities in COVID-19 prevention were likely driven by male gender socialization, but no research has tested beliefs that prospectively connect endorsement of masculine norms to reduced COVID-19 prevention behavior among men.**

Purpose: **We explored whether men's endorsement of masculine norms influenced COVID-19 prevention behavior via illness-related beliefs and prevention intentions.**

Method: **Early in the COVID-19 pandemic (April 2020), American men ($N = 355$; $M_{age} = 46.61$, 78.9% White) reported their baseline prevention behavior, masculine norms, COVID-19 strength beliefs, and prevention intentions. Two weeks later, they reported participation in CDC (Center for Disease Control)-recommended COVID-19 prevention behaviors (eg, social distancing) and willingness to participate in prevention behavior not yet available (eg, COVID-19 vaccination).**

Results: **Mediation models indicated that masculine norms endorsement serially related to greater belief that strength protects against COVID-19, then lower intentions to participate in prevention behaviors, which predicted lower prevention behavior ($b = -0.0073$, SE = 0.0043, 95% CI, −0.0172 to −0.0004) and future prevention willingness ($b = -0.0073$, SE = 0.0046, 95% CI, −0.0180 to −0.0004).**

Conclusions: **Masculine norm endorsement indirectly predicted lower COVID-19 prevention behaviors and willingness to participate in emerging prevention behaviors via illness-related beliefs and reduced prevention intentions. These results suggest that masculine norms shape pandemic prevention-related decisions via beliefs that being strong can protect against the virus. Results persisted across demographic differences, political orientation, and severity of regional outbreaks. Public health efforts to reduce gender disparities in pandemics should consider how recommended actions interact with masculine norms and how to leverage interventions to promote men's health.**

Key words: masculinity; masculine norms; precarious manhood; COVID-19; mask wearing; vaccination; behavioral intentions

Lay Summary

In the United States, men participated in less COVID-19 prevention compared to women. Early in the COVID-19 pandemic (April 2020), 355 American men reported their endorsement of masculinity, their belief that being strong protects them from the virus, and their intentions to participate in prevention behaviors like social distancing, hand washing and mask-wearing. Two weeks later they reported their participation in these prevention behaviors along with their openness to participate in future interventions like vaccinations. Men who were higher in masculinity had higher beliefs that being strong protected them from the virus, which in turn related to them having lower intentions to participate in prevention behaviors. These lower intentions then predicted lower participation in prevention behavior and openness to future interventions 2 weeks later. These patterns persisted across men of diverse ages, races, locations, and political identities. Importantly, the results show that masculinity shapes men's pandemic beliefs and prevention decisions in ways that put their lives at risk.

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Introduction

The early COVID-19 pandemic disproportionately affected men's morbidity and mortality worldwide.[1,2] In the United States, this disparity was driven, in part, by men's under-engagement in prevention behaviors.[3] Compared to women, men were less likely to participate in Center for Disease Control (CDC)-recommended behavior such as social distancing, frequent handwashing, and wearing masks.[4] Men's reluctance to adopt COVID-19 prevention behaviors aligns with broader patterns of men's lower participation in health promotion.[5,6] The social constructionist perspective of gender posits that traditional beliefs about masculinity in the United States are constructed around strength, stamina, and self-sufficiency, which in turn reduces men's intentions to participate in preventative healthcare to avoid appearing weak.[7,8]

With respect to COVID-related attitudes and behaviors, a 2024 meta-analysis of 8 quantitative studies found that higher masculinity was associated with less mask-wearing and general engagement in COVID-19 prevention behavior.[9] Most studies conceptualized masculinity using masculine role norms scales; for example, early in the pandemic men's endorsement of masculine role norms cross-sectionally related to more negative attitudes toward mask-wearing (data collected 2020[10]). Alternatively, one study conceptualized masculinity using a gender role discrepancy stress scale; later in the pandemic men's higher gender role discrepancy stress associated cross-sectionally with lower odds of having been vaccinated and always or often wearing a mask (data collected 2021[11]).

Across conceptualizations, masculinity endorsement is purportedly a risk factor (ie, antecedent) to unhealthy behavior, yet none of the studies included in the meta-analysis were longitudinal, limiting directional inference as well as ability to determine whether masculinity contributes to behavior change over time. Additionally, studies in the meta-analysis had disparate approaches to covariate inclusion, and internal validity would be strengthened by a fulsome, data-driven examination combining identity (eg, political orientation), behavior (eg, covarying out past behavior to enhance directional inference), and COVID-contextual (eg, outdoor workers could have been both more masculine and less likely to stay at home due to job requirements than indoor workers) covariates. Lastly, few studies exploring masculinity's relation to health behavior have examined the cognitive processes that connect masculinity to behavior change, pathways that are crucial to target interventions promoting healthy decisions among men who more strongly endorse masculinity.

For COVID-19, Jones and Anderson[9] suggest that beliefs about strength may help explain why masculinity predicts lower COVID-19 prevention. Specifically, dimensions of masculine toughness in quantitative[10] and qualitative[12] findings show robust associations with COVID-19 prevention behavior. Gender disparities research also demonstrates that men's belief that mask-wearing shows weakness partially accounted for men's lower mask-wearing intentions when compared to women.[13] Relatedly, research in the domain of men's help seeking highlights how masculinity endorsement can shape beliefs about a particular health issue (eg, mental illness shows weakness) and subsequently reduce intentions to seek help.[14] For COVID-19, prevention behavioral intentions, a central behavioral antecedent in multiple health behavior theories, is an important decision cognition that influences subsequent prevention behavior participation.[15] Together, these findings suggest that masculine identity may shape men's beliefs that strength itself is protective against COVID-19, which could engender lower intentions to participate in prevention behaviors and subsequently reduce prevention behavior participation; this line of reasoning has not been empirically examined for COVID-19 prevention behavior.

The present study investigated the relationship between masculine role norm endorsement ("masculine norms" from now on) and COVID-19 prevention behavior among American men across 2 time points in April 2020, the early phase of the United States pandemic.[16] We explored whether masculine norms predict (1) CDC-recommended prevention behavior and (2) willingness to participate in emerging public health behaviors. We hypothesized that stronger masculine norms (at T1) would relate to higher agreement that strength is protective against the virus (at T1) and subsequent lower prevention intentions (at T1), which in turn would reduce participation in COVID-19 prevention behavior (at T2) and willingness to participate in emerging public health behaviors (at T2).

Methods

Participants and procedure

Participant demographics are listed in Table 1.

Men living in the United States who had not had (or suspected having had) COVID-19 were recruited from Prolific, matched to the United States census by age and race/ethnicity, and were sent 2 surveys via Qualtrics on April 14, 2020 (time 1) and 2 weeks later on April 28, 2020 (time 2; see Ref. 17 for data quality and compensation details). The present study examined the subsample who passed attention checks and reported not having had/suspected having had COVID-19 at both time points ($N = 355$; $M_{age} = 46.61$, $SD_{age} = 15.88$, range 18-82; 78.9% White). Men retained to time 2 (77.9%) were older and more educated ($Ps < .001$) but did not differ on other demographic factors ($Ps \geq .20$).

Measures

Measure descriptive statistics and bivariate relations are provided in Table 2.

Masculinity

Masculine norms were assessed at time 1 using the Male Role Norms Inventory—Very Brief scale[18] with items such as "A man should always be the boss" (1 = Strongly disagree to 5 = Strongly agree; 5 items; $\alpha = .85$; $M = 2.32$, $SD = 0.941$). Participants also completed surveys assessing additional masculinity constructs for alternative model testing. At time 1, men completed the Gender Role Discrepancy scale[19] with items such as "I am less masculine than the average man" (1 = Strongly disagree to 5 = Strongly agree; 5 items; $\alpha = .96$; $M = 2.34$, $SD = 1.033$) and the Gender Role Discrepancy Stress scale[19] with items such as "I worry that people judge me because I'm not like the typical man" (1 = Strongly disagree to 5 = Strongly agree; 5 items; $\alpha = .85$; $M = 1.83$, $SD = 0.832$).

Table 1 Bivariate relations between demographic, past behavior, and COVID-contextual variables (*N*s = 354-355).

		Masculine norms	COVID-19 prevention behaviors	Public health behavioral willingness	*M* (SD) or % (*n*)	Observed range
Age	*r*	**0.145**	**0.193**	**0.116**	46.61 (15.88)	18-82
Social class	*r*	0.039	0.059	**0.106**	2.70 (0.796)	1-5
Education	*r*	−0.070	−0.005	0.070	2.54 (1.100)	1-4
Race	*F*	2.53	0.19	0.74	White = 78.9 (280) Black a/o African American = 12.1 (43) Other = 9 (32)	
Hispanic ethnicity	*r*	**0.106**	0.032	0.012	6.5 (23)	
Sexuality	*r*	**0.221**	0.009	−0.062	91.5 (325)	
Political ideology	*r*	**0.480**	**−0.156**	**−0.388**	3.48 (1.633)	1-7
Community type	*F*	**3.53**	0.35	0.858	Suburb near large city = 41.7 (148) Small city or town = 29.0 (103) Rural area = 9.3 (33) Large city = 20.0 (71)	
Past prevention behaviors	*r*	**−0.176**	**0.750**	**0.321**	4.07 (0.719)	1.67-5.00
Seasonal flu vaccination	*r*	−0.072	**0.165**	**0.221**	43.9 (156)	
Prevention behavior regulations[a]	*r*	−0.034	**0.301**	**0.209**	2.49 (0.749)	0-3
Essential/outside home worker	*r*	**0.188**	**−0.219**	−0.056	31.3 (111)	
Vulnerable group	*r*	−0.049	**0.156**	**0.127**	33.5 (119)	
Indirect coronavirus experience	*r*	−0.002	0.060	0.101	0.25 (0.492)	0-2
Actual infection rate in county[b]	*r*	0.021	0.089	−0.011	158.13 (285.420)	0-2029.53
Perceived state severity	*r*	0.018	**0.225**	**0.143**	2.55 (1.036)	1-5

Bold signifies significant at $P < .05$. Hispanic ethnicity, Straight-identifying sexuality, Vulnerable group, Essential/outside home job, and Seasonal flu vaccine are coded 0,1 with 1 indicating presence of the variable. Ideology is coded such that higher is more conservative, all other continuous variables (social class, education, past behavior, indirect experience, regulations, infection rate in county, perceived severity) are coded such that higher is "more/greater" of the variable. Race and geographic area are categorical variables and *F*-tests from ANOVAs are reported.
[a]Regulations participants reported currently experiencing at time 1 and time 2 or retrospective reports since time 1 (eg, social distancing/stay-at-home order, mask-wearing). [b]Variable log transformed in analyses, but raw value reported here to aid in interpretation.

Table 2 Descriptive statics and correlations for main study variables (*N* = 355).

Variable	*M*	SD	1	2	3	4	5
1. Masculine norms (T1)	2.32	0.941	—				
2. Strength belief (T1)	2.04	1.148	.288[a]	—			
3. COVID-19 prevention behavioral intentions (T1)	4.24	0.755	−.219[a]	−.279[a]	—		
4. COVID-19 prevention behaviors (T2)	4.18	0.737	−.202[a]	−.263[a]	.782[a]	—	
5. Public health behavioral willingness (T2)	3.96	0.927	−.311[a]	−.237[a]	.420[a]	.446[a]	—

[a]$P < .0001$.

Strength belief

Working within a rapidly changing context with no published work on the construct, the strength belief mediator was researcher-authored using a single, face-valid item designed to directly capture perception of strength beliefs to coronavirus. At time 1 men were asked whether "Being strong protects you from the coronavirus" (1 = Strongly disagree to 5 = Strongly agree; *M* = 2.04, SD = 1.148). The item's significant correlation with masculine norms suggests convergent validity ($r = 0.288$, $P < .0001$; Table 2).

Prevention behavioral intentions

At time 1, participants reported their behavioral intentions to participate in CDC-advised COVID-19 prevention behavior (eg, social distancing, mask wearing, hand washing) conditioned on the next 2 weeks, for example, "In the next 2 weeks, I intend to

avoid close contact with all people outside my home" (1 = Strongly disagree to 5 = Strongly agree; 6 items; α = .81; *M* = 4.24, SD = 0.755).

Prevention behavior—time 2 outcome

Participants reported participation in CDC-advised COVID-19 prevention behaviors using questions that matched intentions such as: "In the past 2 weeks, I have… (1) avoided close contact with all people outside my home, (2) washed my hands a great deal more than normal, (3) worn a face mask or cover every time I've gone outside" (1 = Strongly disagree to 5 = Strongly agree; 6 items; α = .74; *M* = 4.18, SD = 0.737).

Public health behavioral willingness—time 2 outcome

Participants reported their willingness to participate in COVID-19 prevention behaviors that were in development or piloting phases at the time of data collection using 4 willingness scenarios. The public health behavioral scenarios included: in-person and phone-application contact tracing, testing, temperature screening, and future vaccination (1 = Not at all willing/Extremely unlikely to 5 = Completely willing/Extremely likely; 8 items; α = .89; single factor loadings = 0.593-0.838; *M* = 3.96, SD = 0.927).[17]

Covariates

Demographic factors such as race, ethnicity, age, socioeconomic status, and liberal political orientation have been associated with prevention behavior both in past pandemics and early during the COVID-19 pandemic,[20–24] thus we assessed demographic factors to determine putative covariates. Participants reported their race (coded categorically: African American, White, and Other), whether they identified their ethnicity as Hispanic (coded: 0 = No, 1 = Yes), sexual orientation (coded: 0 = Gay, Bisexual, and/or Other, 1 = Heterosexual), social class (the poor [1], the working class [2], the middle class [3], the upper-middle class [4], the upper class [5][25]), highest level of education (coded: 1 = high school GED or less, 2 = associates degree, 3 = college degree, or 4 = more than college), political ideology ("In terms of overall political orientation, how liberal or conservative are you?" 1 = Extremely liberal to 7 = Extremely conservative[26]), and geographic area (eg, Large city, Rural area[27]).

Past behavior and other COVID-19 contextual factors were also relevant to consider as potential covariates. For example, seasonal flu vaccination[28] predicted early COVID-19 prevention behavior, thus participants were asked "Did you get the flu shot this season (between Sept 2019 and now)?" (coded: 0 = No/Not sure, 1 = Yes). At time 1, participants reported their baseline participation in CDC-prevention behaviors assessed identically to the time 2 outcome variable (α = .76).

Additionally, participants reported a series of COVID-contextual questions that assessed whether they belonged to a vulnerable/at-risk group (coded: 0 = No/Not sure, 1 = Yes), their indirect COVID-19 experience (coded: 0 = no experience, 1 = know someone with coronavirus, 2 = know someone who died from coronavirus/coronavirus complications), along with their worker essential/outdoor worker status (coded: 0 = No/Not applicable, not employed, 1 = Yes, job essential/work outside home). Timing of prevention behavior mandates, such as requiring social distancing or mask-wearing, was adopted unevenly across the United States by various authority sources (eg, states, counties, cities, employers[29,30]), and thus, participants reported their experience of prevention behavior regulations experienced across the duration of the study (eg, social distancing/stay-at-home orders, mask-wearing directives; summed, range: 0-3). At the time the study was conducted, severity of the infection was highly divergent across geographic locations, thus participants reported their perceived severity of the virus in their state on a 5-point scale (Not severe [1] to Extremely severe [5]). Additionally, we calculated an objective county infection count per 100 000 person rate for each participant based on their residence at the time of survey completion[31] using the Johns Hopkins Github Dashboard[32]; see Ref. 17 for a full explanation of covariate measurement.

Results

Power analysis and analytic plan

For a multiple regression with 7 predictors, a power analysis conducted in G*Power yielded a sample size of 226 with the following settings: power at 95%, alpha level at .05, and a small to medium effect size (~*f* = 0.10); thus, our study was adequately powered for the maximum number of predictors in our analyses. We first determined putative covariates by examining bivariate relations between the predictor (masculine norms) and either outcome variable (time 2 prevention behavior or public health behavioral willingness). Variables were included as covariates if the variable was significantly associated (*P* < .05) with both masculine norms and the outcome variable. Age, political orientation, and past prevention behaviors at time 1 were covariates for both outcomes (*P*s ≤ .029), essential job/job outside home was an additional covariate for prevention behavior (*P*s < .001); no other variables were covariates and were not included in further analyses (Table 1).

We used PROCESS v4.2 SPSS 29 Model 6[33] to run a model for each outcome variable, assessing whether masculine norms (X, T1) directly or indirectly influenced prevention behaviors or public health willingness (Y, T2) via strength beliefs (M1, T1) or behavioral intentions (M2, T1); regression parameters were set at 5000 bootstrap bias-corrected samples and 95% confidence intervals. To rule out alternative explanations, we ran 4 sensitivity analyses for each hypothesis adjusting the models as follows: (1) dropping baseline prevention behavior as a control variable, (2) switching the mediator order (behavioral intentions M1 and strength beliefs M2), (3) substituting gender role discrepancy for masculine norms, and (4) substituting gender role discrepancy stress for masculine norms.

Hypothesis testing—COVID-19 prevention behavior

First, we explored whether masculine norms at time 1 directly or indirectly predicted time 2 prevention behavior through increases in believing that strength protects against the virus, then relating to lower prevention behavioral intentions. Controlling for putative covariates, the overall model was significant, $F(7, 347) = 87.81$, $P < .00001$, $R^2 = 0.64$. Masculine norms were not directly related to time 2 prevention behavior ($P = .5495$). Masculine norms indirectly associated with lower prevention

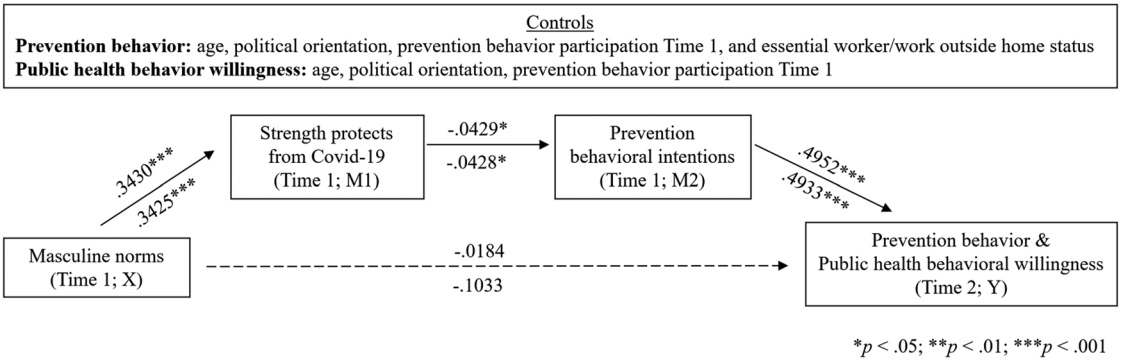

Figure 1 Masculine norm's relation to COVID-19 prevention behaviors and public health behavioral willingness ($N = 355$). Prevention behavior values represented above the lines, public health behavioral willingness values represented below the lines.

behavior ($b = -0.0073$, SE = 0.0043, 95% CI, −0.0172 to −0.0004) via a serial mediation pathway where masculine norms were associated with higher belief that strength protects against the virus ($b = 0.3430$, SE = 0.0715, $t = 4.7997$, $P < .00001$), then higher strength beliefs associated with lower intentions to engage in prevention behavior ($b = -0.0429$, SE = 0.0191, $t = -2.2553$, $P = .0247$), which predicted lower engagement with prevention behavior 2 weeks later ($b = 0.4933$, SE = 0.0628, $t = 7.8491$, $P < .00001$; Figure 1 and Table S1). Of the total effect, 20.67% was mediated by this serial mediation. Neither strength beliefs ($b = -0.0087$, SE = 0.0089, 95% CI, −0.0273 to 0.0080) nor behavioral intentions ($b = -0.0009$, SE = 0.0121, 95% CI, −0.0252 to 0.0235) were significant parallel mediators between masculine norms and prevention behavior (Table S2).

Alternative models

The indirect mediational pathway remained significant when time 1 past prevention behavior was dropped from the controls ($b = -0.0344$, SE = 0.0134, 95% CI, −0.0646 to −0.0117; Table S3). The indirect mediational pathway was not significant when the mediator order was switched (M1: behavioral intentions, M2: strength beliefs; $b = -0.0001$, SE = 0.0004, 95% CI, −0.0012 to 0.0004; Table S4), providing evidence for our hypothesized mediational pathway. Analyses were replicated substituting Gender Role Discrepancy and Gender Role Discrepancy Stress for the Male Role Norms Inventory (the scale for masculine norms) while controlling for putative controls relevant to the new X variable. For both analyses, no direct or indirect effects emerged for alternative masculinity constructs on time 2 prevention behavior, suggesting the distinct role of masculine norms (Tables S5 and S6).

Hypothesis testing—public health behavioral willingness

Next, we explored whether masculine norms directly or indirectly predicted time 2 public health behavioral willingness through increases in believing that strength protects against the virus then relating to lower prevention behavioral intentions. Controlling for putative covariates, the overall model was significant, $F(6, 348) = 24.94$, $P < .00001$, $R^2 = 0.30$. Masculine norms were not directly related to time 2 public health behavioral willingness ($P = .0528$). Masculine norms indirectly associated with lower time 2 public health behavioral willingness ($b = -0.0073$, SE = 0.0046, 95% CI, −0.0180 to −0.0004) via a serial mediation pathway where masculine norms were associated with higher belief that strength protects against the virus ($b = 0.3425$, SE = 0.0705, $t = 4.8568$, $P < .00001$), then higher strength beliefs associated with lower intentions to engage in prevention behavior ($b = -0.0428$, SE = 0.0191, $t = -2.2374$, $P = 0.0259$), which predicted lower public health behavioral willingness 2 weeks later ($b = 0.4952$, SE = 0.1092, $t = 4.5346$, $P < 0.00001$; Figure 1 and Table S7). Of the total effect, 5.39% was mediated by this serial mediation. Neither strength beliefs ($b = -0.0197$, SE = 0.0150, 95% CI, −0.0528 to 0.0076) nor behavioral intentions ($b = -0.0052$, SE = 0.0124, 95% CI, −0.0320 to 0.0175) were significant parallel mediators between masculine norms and public health behavioral willingness (Table S8).

Alternative models

The indirect mediational pathway remained significant when time 1 past prevention behavior was dropped from the controls ($b = -0.0184$, SE = 0.0079, 95% CI, −0.0369 to −0.0063; Table S9). The indirect mediational pathway was not significant when the mediator order was switched (M1: behavioral intentions, M2: strength beliefs; $b = -0.0005$, SE = 0.0009, 95% CI, −0.0030 to 0.0005; Table S10). Analyses were replicated substituting Gender Role Discrepancy and Gender Role Discrepancy Stress for the Male Role Norms Inventory while controlling for putative controls relevant to the new X variable. For both analyses, no direct or indirect effects emerged for alternative masculinity constructs on time 2 public health behavioral willingness (Tables S11 and S12). Paralleling the results for prevention behavior, these results suggest the distinct importance of masculine norms on men's decision pathway for public health behavioral willingness.

Discussion

The present results demonstrate that masculine norm endorsement indirectly predicts lower engagement in CDC-recommended COVID-19 prevention behaviors and lower openness to public health efforts among American men early in the pandemic. Masculine norms were related to stronger beliefs that strength is protective against COVID-19, which in turn related to lower behavioral intentions to engage in COVID-19 prevention behaviors, and subsequent lower participation in COVID-19 prevention behavior and willingness to participate in emerging public health behaviors (eg, vaccination) 2 weeks later. These results held across

demographic, political, past prevention behavior, and COVID-19 contextual factors (eg, frontline worker status) among a sample of adult men reflective of the US population.

The present results add to a knowledge base demonstrating that masculinity is associated with lower COVID-19 prevention decisions and behaviors. These results were robust to age and political ideology controls, 2 demographic covariates which relate to both masculine ideology[34] and COVID-prevention; the influence of masculine norms transcends other potential predictors. Additionally, this is the first study that longitudinally examined the influence of masculinity on COVID-19 prevention behavior. The present findings add to existing knowledge showing masculinity's prospective, indirect influence on future behavior *through* beliefs which shape behavioral intentions while holding baseline COVID-19 prevention behavior constant. Given the lack of a direct effect, these results suggest that cross-sectional findings may overrepresent the possibility of a direct relationship between masculinity and lower participation in COVID-19 prevention.

Interestingly, we did not observe comparable indirect effects for alternative masculinity constructs reflecting gender role discrepancy and discrepancy stress. This divergence suggests that endorsement of prescriptive masculine norms, rather than masculinity-related distress or perceived inadequacy, shaped men's COVID-19 illness beliefs and prevention behavioral intentions in this context. Masculine norms reflect internalized ideological schemas about how men ought to think and behave,[35] which may be particularly influential when men are confronted with novel, ambiguous threats that require interpretation rather than an immediate defensive response. In April 2020, before prevention behaviors were widely politicized or explicitly framed as gendered, men may have relied on normative masculine schemas to assess the relevance of the virus and appropriate behavioral responses. In contrast, gender role discrepancy stress captures a subjective assessment of stress related to being inadequately masculine and is more likely to be activated under conditions of explicit masculinity or manhood threats, social evaluation, or pressure to engage in compensatory behavior.[35] The absence of effects for discrepancy-based constructs therefore suggests that men's early pandemic prevention decisions were guided more by ideological masculine schemas shaping belief formation and subsequent behavioral choices than by distress-driven processes related to maintaining or regaining masculine identity.

The strengths of this study included a robust, data-driven approach to addressing potential covariates, strengthening internal validity, and illustrating the distinct role of masculine norm endorsement in men's COVID-related decisions and behaviors in the United States. In addition, the sample was large and heterogeneous, and the 2-week follow-up afforded participants' recall of prevention behaviors during the preceding 2 weeks. The study also had several limitations. It would have been better to assess serial mediators across time points, and future research would benefit from experimental studies to examine whether priming masculinity causes changes in illness beliefs or lower prevention intentions.[36] An additional limitation concerns the strength belief construct, which was assessed with a single, face-valid item designed to directly capture perceptions of a masculine-coded (strength) trait's relations to COVID-19 vulnerability. Although the item allowed for examination of a theoretically coherent pathway connecting masculine norms to prevention intentions at a time when validated scales were unavailable, the use of a single-item measure limits reliability assessment and construct breadth.[37] Future research should develop and validate multi-item measures that differentiate between related but distinct strength conceptualizations, such as perceived physical fitness, generalized invulnerability, emotional reactions to prevention behaviors, and concerns about masculine image or status. Indeed, prior work suggests that masculinity may influence pandemic-related health behavior through multiple pathways, including emotional responses to mask-wearing[10] or perceived benefits and barriers to mask-wearing.[38] Thus, strength-based beliefs should be understood as one plausible mechanism—but not an exclusive pathway—through which masculine ideology shapes health-related decision-making.

In sum, masculine norm endorsement influenced participation in prevention behaviors advised early in the pandemic and this finding replicated for adjacent behavioral decisions for in-development public health interventions (eg, vaccination). Future research should examine whether these findings replicate for seasonal COVID-19 vaccination boosters and future pandemic vaccines given the paucity of research on masculinity's relation to vaccination.[39] For interventions to promote health behavior for pandemics and infectious disease prevention, men who endorse masculine norms may be more responsive to gender-concordant messengers and normative healthy behavior among peer men.[39] Additionally, the present findings demonstrate that masculine norm endorsement influences prevention behavior through strength beliefs, which may be an opportune target for intervention. For example, encouraging social dynamics among groups of men to reposition infectious disease prevention as an act of strength (eg, strong men get vaccinated).[14,40] In conclusion, during the early phase of the US pandemic, masculine norm endorsement influenced men's COVID-beliefs and decisions in ways that put their lives at risk.

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Author contributions

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Supplementary material

Supplementary material is available at *Annals of Behavioral Medicine* online.

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Conflicts of interest

We have no conflicts of interest to disclose.

Data availability

The data, code, and materials are available from the corresponding author on reasonable request.

Author note

- Research has been published off the parent dataset from these data;[17,41,42] the present study is unique in that it specifically examines masculine norms in the male subsample, which has not been previously reported.
- This study was approved by the Institutional Review Board of Dickinson College.
- The study was preregistered (OSF, Hypothesis 9 https://osf.io/ufb2v; examining male subsample only).
- Clinical trial number: not applicable.

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