Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

The Effect of Perceived Spokesperson Masculinity on HPV Vaccination Intention among College Students

Chaeyeon Yim

chaeyeon.yim@uconn.edu

University of Connecticut

Carolyn Lin

University of Connecticut

Research Article

Keywords: human papillomavirus, vaccination intention, spokesperson masculinity, source credibility, protection motivation theory

Posted Date: November 4th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10924446/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

The human papillomavirus (HPV) vaccine is a highly effective preventive measure against cervical cancer, genital warts, and other infectious diseases that affect both men and women. Because the vaccine was initially recommended for girls/women, a gap in vaccine uptake between women and men persists. Guided by the model of source credibility and protection motivation theory, this study examined whether perceived spokesperson masculinity may potentially "defeminize" the perceived HPV stigma and increase college students' HPV vaccination intention. The study adopted a 2×2 between-subjects design ($N = 267$) comparing unvaccinated U.S. college students' responses to a more muscular vs. less muscular fictional male physician with an older- vs. a younger appearance. Findings showed that participants perceived the physician who appeared more muscular and older-looking as more agentic-masculine, which, in turn, increased their perceived credibility. This credibility perception led to higher vaccination intention, but it did not directly influence beliefs about the HPV threats and the vaccine's efficacy. Two mediation paths were statistically significant: from physician's agentic masculinity via physician credibility and coping efficacy, respectively, to vaccination intention. Both threat and coping efficacy perception were also found to be positively related to vaccination intention. This study extends our understanding of how perceived credibility of spokespersons in vaccine communication may facilitate beneficial HPV-threat evaluation and increase protective action intention.

Introduction

The human papillomavirus (HPV) is one of the most common sexually transmitted infections (STIs) (Plotzker et al., 2023). It can cause various types of cancers (e.g., cervix, penis, anus, and throat) and genital warts in both women and men (CDC, 2025a, 2025b). Despite HPV posing health threats to both genders, HPV vaccine uptake among young adults aged between 19–26 in the U.S.—57.2% in females and 37.4% in males (Sonawane et al., 2024)—significantly falls short of the U.S. federal government's goal of 80% coverage for adolescents (Healthy People 2030, 2024).

As early promotion of HPV vaccine targeted only the female audience, unvaccinated adults—both women and men— often perceive HPV as primarily a female-only disease, distrust the safety of the vaccine, or do not see a necessity for immunization if they are sexually inactive (Daley et al., 2017; Joshi & Kilinsky, 2025). This suggests that risk perceptions associated with the vaccines could influence vaccination behaviors. Importantly, the cognitive process-to-protection action pathway described here is similar to the assertions of protection motivation theory (Rogers, 1975), which proposes that an individual's risk evaluations will motivate their self-protection motivation and behavior.

Research also suggests that a credible information source can increase vaccine acceptance (Charron et al., 2020; Frietze et al., 2023; Qiao et al., 2024). Credible health information sources can include government, medical experts, and figures who share similar values or ideologies with vaccine recipients (e.g., religion, gender ideology) (Chu et al., 2021; Himmelstein & Sanchez, 2016; Martinez et al., 2025; Peterson et al., 2022; Pink et al., 2021). In the current study context, our understanding of what

information-source characteristics can leverage perceived credibility in promoting HPV vaccination is largely lacking.

The current study aims to help fill this literature gap by gaining a better understanding of how individuals may evaluate their personal health risks and vaccine efficacy after being exposed to vaccine spokespersons with different persona cues. Guided by the model of source credibility (Ohanian, 1990) and protection motivation theory (Rogers, 1975), an online experiment was conducted with college students to explore their evaluations of perceived agentic masculinity and credibility of vaccine spokespersons, HPV risks, vaccine efficacy, and vaccination intention.

Literature Review

Protection Motivation Theory

Protection Motivation Theory (PMT; Rogers, 1975) asserts that when faced with a health risk, individuals will engage in cognitive appraisal to evaluate their vulnerability to and the severity of the risk, while also assessing their own ability to perform the recommended health behaviors (i.e., self-efficacy) and the effectiveness of their resources to do the same (i.e., response efficacy). These two cognitive processes, namely threat and coping appraisal, influence their intentions to accept the protection measures.

In the context of vaccine communication, research has shown that threat and coping appraisals are tied to attitudes toward vaccination intentions (Griffin et al., 2022; Huang et al., 2021; Zou et al., 2023). For example, Yang et al.'s (2024) study among female students in six Chinese medical colleges found that those who had a greater threat perception, self-efficacy, and response efficacy showed more willingness to take the HPV vaccine. Similarly, Balcezak et al.'s systematic review (2022) revealed a significant association between threat appraisal, as well as perceived benefits, and HPV vaccine acceptance among U.S. male college students.

Spokesperson and Vaccine Acceptance

Research has demonstrated the effect of spokesperson credibility on threat and coping appraisal. For example, De Meulenaer et al. (2018) tested how individuals evaluated the fictional infections and the efficacy of health recommendations. They found that a credible spokesperson (i.e., doctors) had a direct positive influence on the study participants' acceptance of the protection measures against hypothetical mosquito infections as compared to a non-credible one (i.e., patients), as well as its indirect effect through threat and efficacy perceptions.

Mccullock and Perrault (2020) also found that a high-expertise spokesperson had a direct positive association with U.S. college students' intention to receive STI screening, in addition to a mediating effect of efficacy perception between spokesperson credibility and screening intention. Past research has also shown that trust in health professionals or spokespersons leads to higher HPV vaccine acceptance (Bahena et al., 2019; Frietze et al., 2023; Nan et al., 2014).

Model of Source Credibility

Ohanian's (1990) Model of source credibility provides a conceptual foundation for further understanding of what may determine credibility perceptions. Ohanian (1990) proposed that perceived expertise, trustworthiness, and attractiveness can influence one's credibility perception of an information spokesperson. Perceived expertise refers to the perceived competence or authority of a spokesperson in providing accurate and reliable information, while perceived trustworthiness reflects the audience's perceived degree of confidence in a spokesperson. On the other hand, perceived attractiveness is the evaluation of a spokesperson's aesthetic appeal, social desirability, or physical signals of status and competence.

While the persuasiveness of expertise and trustworthiness perceptions in vaccine acceptance is well established in many previous studies (Baumgaertner et al., 2018; Eng et al., 2026; Weerakoon et al., 2022; Yuen, 2023; Zarzeczna et al., 2024), the attractiveness component of credibility has received much less attention in health communication (Hocevar et al., 2017). Limited research has focused on verbal and institutional credibility cues (König & Jucks, 2020; Sbaffi & Rowley, 2017), leaving visual attractiveness cues understudied as a potential factor that can help explain spokesperson effectiveness in the context of health communication.

Nonetheless, limited empirical research has found that visual cues (e.g., attire, gender, facial characteristics) of spokespersons had a unique role in contributing to spokesperson credibility (Bigham et al., 2019; Hong et al., 2019; Jones et al., 2023). For example, Gutiérrez-García et al. (2019) found a significant correlation between attractiveness and trustworthiness perception across the seven varying facial expressions of models (i.e., neutral, happy, angry, disgusted, sad, fearful, and surprised), with attractiveness being judged prior to trustworthiness.

Masculinity as a Heuristic Cue

Perceived masculinity of a spokesperson has been defined as the message recipient's belief that the spokesperson possesses a set of traits culturally considered appropriate for boys and men, including dominance, leadership, or competence (Connor et al., 2021; Koenig et al., 2011; Whitehead & Barrett, 2001). While masculinity may be demonstrated through observed behaviors (Merdassa, 2024; Wong & Wang, 2022), empirical research suggests that visual cues, such as biological sex, facial characteristics, or attire, can influence such evaluation (Barry, 2018; Dong et al., 2023; Korenman et al., 2019; Lippa, 2016). In marketing research, perceived masculinity is linked to spokesperson credibility and attitudes toward endorsed products by enhancing perceived expertise (Knoll & Matthes, 2017) and trustworthiness (Rostovtseva et al., 2023) or by shaping more positive brand evaluations (Deska et al., 2022).

Extant literature on source credibility in relation to health communication has not examined the influence of social attributes such as masculinity of spokespersons as a heuristic cue. In the current study, we

particularly focused on the evaluation of spokespersons' agentic masculinity due to its implication of confidence, competence, and authoritativeness that it communicates to message recipients (Abele et al., 2016; Connell & Messerschmidt, 2005). We define masculine traits as agentic masculinity to reflect a desirable characteristic of a spokesperson among authoritative leaders to frame HPV vaccination as an appropriate and safe behavior.

Spokesperson Muscularity and Age

Lukaszewski et al.'s (2016) study revealed that males' physical strength (muscularity) was a visual cue for powerful leadership and competence, as formidable males are perceived as equipped to provide group-beneficial services, particularly in managing conflicts and collective action problems. On the contrary, Su et al.'s study (2021) showed that male influencers displaying obvious muscularity were perceived as less trustworthy among females as compared to those displaying subtle muscularity (*ß*= — 1.23), which, in turn, influenced participants' intention to buy the endorsed products.

Still another study focusing on male undergraduate students' intention to engage in physical activity found that muscular models in fitness magazines evoked more behavioral intentions to increase their current level of physical activity in the future among those who were dissatisfied with their bodies (Ang & Leng, 2025). Taken together, these findings suggest muscularity's influence on credibility perception may depend on audience gender and degree of muscularity displayed, rather than operating as a consistent signal.

In addition to muscularity, age cues can also signal agency and leadership capacity that contribute to perceptions of credibility (Daldrop et al., 2025; Thrasher et al., 2023). The age-competence heuristic (Montepare & Zebrowitz, 1998) suggests that a spokesperson's ability can be judged based on their age cues that trigger message recipients' age-based stereotypes. For instance, older newscasters were perceived as more credible than their younger counterparts, particularly when the newscaster was male, with older White male newscasters perceived as especially authoritative (Weibel et al., 2008). Hence, age can be linked to credibility in the messaging context when it concerns current facts and information accuracy.

This trend also holds in the recent context of online communication: older-looking host pictures were more trusted in Airbnb, an online marketplace for homestays (Ert & Fleischer, 2020). This perception is likely due to the perceived association of an older spokesperson with greater experience and reliability, which enhances their perceived degree of expertise (Tifferet et al., 2019). Furthermore, a study on college students' investment decisions in trust games found that participants were more likely to invest more money with their in-game partners when the partners appeared to be older, suggesting that older-looking individuals could evoke a greater sense of trustworthiness among young adults (Li et al., 2022).

The Present Study

The present study sought to extend on past research by examining how agentic masculinity of spokespersons influences the perception of credibility in HPV vaccine advertising. The scholarly evidence reviewed above highlights how message recipients use visual cues—including muscularity and age—to infer essential qualities such as trustworthiness and domain expertise of spokespersons. As discussed above, muscularity and age serve as heuristic cues to trigger competence- and identity-schematic information processing in the current study setting (Petty & Cacioppo, 1986; Telaak et al., 2023).

For these reasons, we conceptualize both muscularity and age as factors that can influence the perceived credibility of the spokesperson, which, in turn, is expected to relate to credibility.

H1. A more muscular spokesperson will be more strongly related to the agentic masculinity perception than a less muscular spokesperson.

H2. An older-looking spokesperson will be more strongly related to the agentic masculinity perception than a younger-looking spokesperson.

H3. Perceived agentic masculinity of the spokesperson will be positively related to perceived spokesperson credibility.

The empirical evidence discussed above shows that a spokesperson may influence individuals' cognitive appraisal of a health threat and protection measures. Additionally, as grounded in PMT, the empirical evidence elaborated above shows cognitive appraisal can contribute to a more positive attitude toward vaccination. Hence, we hypothesized:

H4a-b. Perceived credibility of spokesperson will be positively related to **(a)** threat perception of HPV infection and **(b)** coping efficacy perception via HPV vaccine.

H5a-b. Perceived (a) threat of HPV infection and (b) coping efficacy via HPV vaccine will be positively related to vaccination intention.

Method

Design and Participants

A cross-sectional study of college students was conducted in November 2024 at a large northeastern university in the U.S., with prior approval of the university's institutional human-subject research review board (IRB). The data collection yielded 479 responses for the larger study. The current study focused only on those who did not receive HPV vaccination. After data cleaning (to remove incomplete responses and ones that failed the attention check), the study yielded 267 valid cases, which exceeded the minimum sample size requirement of 210 generated through a power analysis (α = .05 and 1-ß=.95). The study adopted a 2 (spokesperson muscularity: high versus low) × 2 (spokesperson age: older versus younger) factorial between-subject experimental design with random assignment (see **Appendix 1**).

The majority of the participants were female (52.8%). Race breakdown was as follows: White or Caucasian (61.42%), followed by Asian (15.36%), Hispanic or Latino (11.99%), Black or African American (5.60%), and Others (5.62%). Their average age was 19.19 (*SD* = 0.94), and median household income was between $100,000 and $149,999.

Procedures

After logging in to the study webpage, participants were asked to review the informed consent form before proceeding with the study. The consented participants were first asked to answer a questionnaire assessing their HPV knowledge. Following this, they were randomly assigned to one of the four study conditions. The study conditions involved viewing an advertisement containing a visual image of a physician with two different levels of muscularity (high vs. low) and age (older vs. younger).

Afterward, participants proceeded to complete questionnaire items that included attention checks, as well as measures of spokesperson credibility, threat and coping appraisal, and HPV vaccination intention. An attention check consisted of a single multiple-choice question asking the number of persons/spokespersons in the ad that the participant had viewed, with options of zero, one, and two.

Measures

All constructs were measured on a 7-point Likert-type scale, except HPV knowledge. A complete list of constructs, item wordings, and reliability is reported in Table 1.

Table 1

Variables, Measurements, and Reliability

Latent Variable	**Item**	**CA**
Agentic masculinity perception	has leadership abilities.	0.89
	appears to be assertive.	
	is willing to take a stand.	
	is confident.	
	acts like a leader.	
Spokesperson credibility perception	phony/genuine	0.96
	unreliable/reliable	
	unconvincing/convincing	
	not credible/credible	
	unreasonable/reasonable	
	questionable/unquestionable	
	indecisive/decisive	
	not authentic/authentic	
Threat appraisal		0.81
(1) Vulnerability	I believe that my chances of being infected with HPV are great.	0.86
	My physical health makes it more likely that I will be infected with HPV.	
	I thought I could have HPV.	
	I feel that my chances of being infected with HPV in the future are great.	
(2) Severity	I believe that the HPV is extremely harmful.	0.80
	The thought of being infected with HPV scares me.	
	HPV is a serious disease that can kill me.	
	If I had been infected with HPV, my career/life/study would be affected.	
Coping appraisal		0.90
(1) self-efficacy	I’m confident that vaccination is a good way to protect myself.	0.84

Latent Variable	Item	CA
	I'm not afraid of receiving a vaccine to avoid getting the disease.	
	I'm not concerned with have the low probability of adverse reactions after a vaccination.	
	I can deal with the side effects of the HPV vaccine with the help of doctors.	
(2) Response-efficacy	I can rely on scientists to learn about the disease.	0.88
	I can trust my doctors to give me the advice I need.	
	I can have my health insurance cover the vaccination cost.	
	I can easily find a clinic to receive a vaccination.	
Vaccination Intent	I will consider consulting a health professional about receiving a vaccine in the next 3 months.	0.98
	I will consider receiving a vaccine in the next 3 months.	
	I will consider scheduling a vaccination appointment within the next 3 months.	
	I intend to consult a health professional about receiving a vaccine in the next 3 months.	
	I intend to receive a vaccine in the next 3 months.	
	I intend to schedule a vaccination appointment within the next 3 months.	
HPV knowledge	People with certain HPV types always develop health problems. [False]	-
	Women can get HPV. [True]	
	Condoms effectively protect against HPV infection. [False]	
	HPV may spread from person to person by sexual intercourse. [True]	
	Males may be infected with HPV and not know it. [True]	
	HPV infection can be cured with antibiotics. [False]	
	Men can get HPV. [True]	
	If you get HPV, you will have HPV for life. [False]	
	Females may be infected with HPV and not know it. [True]	
	A person can get HPV by having sex. [True]	
	HPV infection among women is rare. [False]	

Latent Variable	Item	CA
	Vaccination always protect you from HPV. [True]	
	HPV may be spread from person to person through oral sex. [True]	
	HPV infection among men is rare. [False]	

Note: CA=Cronbach's alpha.

Agentic masculinity perception was measured to gauge the extent to which the spokesperson is perceived as having agentic traits, including leadership, assertiveness, and confidence. 5 items were adopted from the agency subscale of the Bem Sex-Role Inventory (BSRI) (Bem, 2011) (α = .89). **Spokesperson credibility perception** was assessed to capture the extent to which the spokesperson is perceived as reliable and trustworthy by participants. 8 semantic differential items were adapted from Wu and Lin (2017) (α = .96). For **threat appraisal**, an 8-item scale was adapted from Xu et al. (2021) to gauge the two subdimensions—severity and vulnerability— of the constructs (α = .81). Similarly, an 8-item scale was created to measure the two components—self-efficacy and response efficacy— of **coping appraisal** (α = .90). Additionally, a 6-item scale was created to assess participants' **intentions** to receive the HPV vaccine in the next 3 months (α = .98). **HPV knowledge**, a covariate, was measured using a set of 14-item true/false questions adapted from Katz et al. (2011). One of the original measures ("Condoms always protect you from HPV. [False]") was replaced with "Vaccination can help protect you from HPV. [True]."

Results

Descriptive Analysis and Correlations

Table 2 provides the descriptive statistics for and zero-order correlations between all theoretical constructs. Coping efficacy showed the highest mean value (M = 5.32, SD = 0.89), while threat perception showed the lowest (M = 3.62, SD = 0.98). Agentic masculinity and credibility perception had the highest correlation (r=.55), followed by agentic masculinity-coping efficacy (r=.39) and coping efficacy-vaccination intention (r=.38). On the other hand, threat perception did not show a statistically significant correlation with agentic masculinity (r=.03, n.s.), credibility perception (r=.01, n.s.), and coping efficacy (r = − .02, n.s.)

Table 2
Bivariate Correlations and Descriptive Statistics

Variable	*M*	*SD*	1	2	3	4	5
1. Agentic masculinity	5.30	0.90	–				
2. Credibility	5.38	1.17	0.55***				
3. Threat perception	3.62	0.98	0.026	0.014			
4. Coping efficacy	5.32	0.89	0.388***	0.243***	−0.015		
5. Vaccination intention	4.25	1.46	0.224***	0.292***	0.212***	0.383***	–

Note: *p<0.05 level (2-tailed); **p<0.01 level (2-tailed); ***p<0.001 level (2-tailed).

Manipulation Check

Prior to the hypothesis testing, a 2×2 between-subjects Analysis of Covariance (ANCOVA) was performed to examine whether participants correctly perceived the intended level of agentic masculinity of the spokesperson to which they were exposed, controlling for HPV knowledge. The covariate was associated with agentic masculinity perception, $F(1, 262) = 7.364$, $p=.007$, $\eta^2 = .026$.

After adjusting for the covariate, results confirmed the main effect of muscularity and age, as statistically significant differences were found in the agentic masculinity perception among participants, muscularity (H1): $F(1, 262) = 4.523$, $p=.034$, $\eta^2 = .016$; age (H2): $F(1,262) = 5.214$, $p=.023$, $\eta^2 = .019$. Specifically, the more muscular ($M_{adj}=5.430$, $SE = 0.078$) and older-looking ($M_{adj}=5.438$, $SE = 0.077$) spokesperson were perceived as more masculine than less muscular ($M_{adj}=5.199$, $SE = 0.074$) and younger-looking ($M_{adj}=5.191$, $SE = 0.075$) spokesperson, respectively. Therefore, H1 and H2 were supported. There was no statistically significant interaction effect between muscularity and age, $F(1, 262) = 0.068$, $p=.795$, $\eta^2 = .0002$. After confirming no interaction of the two experimental conditions, they were treated as independent predictors in the subsequent analyses.

To examine whether participant gender moderated the effects of the two study conditions on agentic masculinity perception, Hayes' (2022) PROCESS macro Model 1 was conducted for each condition. While the moderation models were statistically significant (muscularity: $F(4, 262) = 3.795$, $p=.005$, $R^2=.055$, age: $F(4, 262) = 4.400$, $p=.002$, $R^2=.063$), the interaction between spokesperson muscularity levels and participants' gender did not show a statistically significant difference ($b = -.146$, $SE = 0.219$, $t = -0.666$, $p=.506$). Similarly, spokesperson age cues did not interact with participants' gender ($b=.247$, $SE = 0.217$, $t = 1.135$, $p=.257$). Therefore, female and male participants did not differ in their agentic masculinity perceptions in response to spokesperson muscularity and age levels.

Additionally, a one-way Multivariate Analysis of Covariance (MANCOVA) was conducted to determine whether there is a statistically significant difference in the effect of muscularity and age on all four dependent variables, including credibility perception, threat perception, coping efficacy, and vaccination

intention. The main effects of muscularity (Wilk's Λ = .971, p=.100, η^2_p = .029) and age (Wilk's Λ = .983, p=.363, η^2_p = .017) were not significant. The covariate was a statistically significant predictor of the dependent variables, Wilk's Λ = .940, p=.003, η^2_p = .060.

Hayes' (2022) PROCESS macro Model 81 was used to evaluate H3, H4a-b, and H5a-b, which included perceived agentic masculinity as the predictor variable, credibility perception, threat perception, and coping efficacy as mediators, and vaccination intention as the outcome variable. 5,000 bootstrap samples with 95% bias-corrected confidence intervals (BC CI) were employed. The model accounted for 22.25% of the variance in vaccination intention (adjusted R^2=.22, F(5,261) = 16.22, p<.001). The total effect of agentic masculinity perception on vaccination intention was significant, b=.356, SE=.099, 95% BC CI=[0.162, 0.550], p<.001. However, the direct path was not significant, b = − .060, SE=.111, 95% BC CI=[− 0.289, 0.159], p=.591, indicating a complete mediation effect through the hypothesized variables (Table 3).

Table 3

Mediation analysis: Direct and indirect effects

Direct path	***b***	***SE***	***t***	***p***	**95% CI [LL, UL]**	**Supported**
Agentic masculinity ⟶ Credibility **(H3)**	0.722	0.068	10.68	< .001	[0.589, 0.855]	Yes
Agentic masculinity ⟶ Threat	0.021	0.081	0.256	0.798	[− 0.139,0.180]	-
Agentic masculinity ⟶ Coping	0.323	0.067	4.850	< .001	[0.192, 0.454]	-
Credibility ⟶ Threat **(H4a)**	0.001	0.062	0.020	0.984	[− 0.120, 0.123]	No
Credibility ⟶ Coping **(H4b)**	0.039	0.051	0.776	0.439	[− 0.061, 0.139]	No
Credibility ⟶ Intent	0.282	0.081	3.477	< .001	[0.122, 0.442]	-
Threat ⟶ Intent **(H5a)**	0.323	0.081	3.990	< .001	[0.164, 0.483]	Yes
Coping ⟶ Intent **(H5b)**	0.585	0.099	5.929	< .001	[0.391, 0.779]	Yes
Agentic masculinity ⟶ Intent	−0.060	0.111	−0.538	0.591	[− 0.279, 0.159]	-
Indirect path	**Boot b**	**Boot SE**	**Boot 95% CI**			**Sig.**
Agentic masculinity ⟶ Credibility ⟶ Intent	0.204	0.063	[0.082, 0.329]			Yes
Agentic masculinity ⟶ Threat ⟶ Intent	0.007	0.029	[− 0.052, 0.064]			No
Agentic masculinity ⟶ Coping ⟶ Intent	0.189	0.052	[0.097, 0.297]			Yes
Agentic masculinity ⟶ Credibility ⟶ Threat ⟶	0.0003	0.015	[− 0.029, 0.032]			No

Direct path	*b*	*SE*	*t*	*p*	95% CI [LL, UL]	Supported
Intent						
Agentic masculinity ⟶ Credibility ⟶ Coping ⟶ Intent	0.017	0.023	[− 0.029, 0.063]			No
Total indirect effect	0.416	0.078	[0.261, 0.570]			Yes

Note: Boot=bootstrapped; CI=confidence interval; Indirect effects based on 5,000 bootstrap samples with bias-corrected 95% confidence intervals; Sig.=significant (when CI excludes zero).

Examination of the direct paths revealed that agentic masculinity had a statistically significant relationship with credibility, *b*=.722, SE=.068, 95% BC CI=[0.589, 0.855], *p*<.001, supporting H3. Credibility was not associated with threat (*b*=.001, SE=.062, 95% BC CI=[− 0.120, 0.123], *p*<.984) and coping efficacy (*b*=.039, SE=.051, 95% BC CI=[− 0.061, 0.139], *p*<.439). Hence, H4a-b were not supported. On the other hand, both threat (*b*=.323, SE=.081, 95% BC CI=[0.164, 0.483], *p*<.001) and coping efficacy were (*b*=.585, SE=.099, 95% BC CI=[0.391, 0.779], *p*<.001) directly related to vaccination intention. Thus, H5a-b were supported.

Additionally, the bootstrap mediation analyses revealed that two of the five indirect paths were statistically significant, as zero was not within the 95% BC CIs. Specifically, agentic masculinity perception was positively associated with intent through credibility perception and coping efficacy perception, respectively (Table 3).

Discussion

With persistent HPV stigma and declining trust in science, efforts to raise HPV vaccine uptake among young adults have been less successful than anticipated (Healthy People 2030, 2024). This research identifies a spokesperson's agentic masculinity as a contributor to vaccination intention. Our findings showed that spokespersons who were perceived as more agentic-masculine increased intention to vaccinate by increasing coping efficacy perception. Drawing on Protection Motivation Theory (PMT) and Ohanian's Model of source credibility, this study is among the first to examine the influence of the physical muscularity and age of a spokesperson on public health interventions.

Both spokesperson muscularity and age had a significant effect on the participants' evaluations of spokesperson agentic masculinity. More muscular and older-looking spokespersons were perceived as more agentically masculine. This is consistent with past findings indicating that physical competence and age cues are translated into subjective evaluations of their social skills, such as competence, leadership, and trustworthiness (Park et al., 2022; Sinha et al., 2024; Weibel et al., 2008; Yu & Ying, 2021).

Mature and physically competent endorsers are often associated with fluent experience and reliability (Eisend, 2022), extending the “halo effect” in which physically attractive individuals are perceived as holding more socially desirable traits, beyond marketing into vaccine advertising. As the persuasiveness of the spokesperson's muscularity and age in health messaging remains understudied, our findings need to be further validated in future studies.

Agentic masculinity evaluations increased perceived spokesperson credibility, consistent with health and organizational literature showing that confidence and leadership cues elicit greater audience trust (Demeshko et al., 2022; Kim, 2022; Smith & Weishaar, 2018). This suggests that social traits of a spokesperson, such as competence and leadership, may serve as a determinant of the spokesperson’s persuasive strength. Interestingly, this effect did not differ by participant gender, though past literature suggests gender may moderate spokesperson effects in health messaging (Baxter et al., 2022; Park et al., 2022). Future research could further examine gender moderation in the context of vaccine advertising.

Contrary to expectations, spokesperson credibility did not directly influence either threat perception or coping efficacy. For threat perception, it is possible that perceived vulnerability and severity are more driven by message content (i.e., fear appeals and threat framing) than by message sources (Chen et al., 2021; Liu et al., 2021). For coping efficacy, agentic masculinity instead of credibility facilitated the transfer of trust to the endorsed vaccine. This suggests that individuals might have been influenced by the perceived agentic traits of the spokesperson who represents a physician and is capable of being a leader in dispensing medical advice such as HPV vaccination.

Consistent with PMT’s cognitive appraisal framework, both threat and coping efficacy perception were associated with greater vaccination intention, replicating the empirical evidence observed in past health communication research (Lu et al., 2023; Zou et al., 2023). Notably, coping efficacy served as the mediator between agentic masculinity perceptions and intention. This is consistent with high value-alignment or product-endorser fit between a spokesperson and an endorsed measure.

Taken together, our study reveals that when individuals evaluate a vaccine spokesperson as having more socially desirable physical and leadership traits, this judgment can translate into stronger beliefs about the vaccine’s efficacy and greater vaccination intentions. The observed role of agentic masculinity offers new evidence for how physique and persona cues may help shape the cognitive pathway to health behavior, particularly for college students. Our study can thus help inform tailored messaging design for future vaccine communication, through developing advertising strategies that can defeminize HPV perceptions and reduce the gender gap in vaccine uptake.

Several limitations should be noted. First, only a static image with a narrative was utilized as a study stimulus. Future studies could replicate this study using videos to further validate the findings. Second, the sample was drawn from a large university in the northeastern region of the United States, which limits the external generalization of this study. Future research should consider including a national sample with a diverse representation of young adults. Third, we tested only White male physicians as the

spokesperson in the stimuli. The effect of different spokesperson race and gender could be explored to examine whether the spokesperson's social identity may influence participant perception of spokesperson credibility and coping efficacy. Fourth, the cross-sectional design limits the generalizability of study findings. Future research using a longitudinal design could further validate the current study findings by examining participant responses over time.

Given the longstanding discussion regarding the effect of endorsers' physical traits in persuasive communication (Chaiken, 1986; Kang et al., 2019; Volkmer & Meißner, 2025), the present study highlights the need for further research on the role of masculinity in persuasive health communication. Our study also highlights a cognitive pathway indicating how the perceived physical persona traits of a spokesperson may subsequently influence an individual's motivation to get vaccinated. As HPV vaccine uptake remains significantly low in many countries and vaccine hesitancy has increased since the COVID-19 pandemic (Han et al., 2025; Hoang et al., 2025), designing more persuasive communication that defeminizes the vaccine would likely help improve uptake. Replicating the current study measures can also help inform healthcare providers and policymakers in developing more nuanced communication strategies to promote HPV vaccination among those who avoid or distrust the vaccine.

Declarations

Author Contribution

Conceptualization and study design were performed by Y. C. Material preparation was performed by all authors, and the data analysis was performed by Y. C. The first draft of the manuscript was written by Y. C. and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Acknowledgement

The authors would like to thank the students for their participation.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

1. Abele, A. E., Hauke, N., Peters, K., Louvet, E., Szymkow, A., & Duan, Y. (2016). Facets of the Fundamental Content Dimensions: Agency with Competence and Assertiveness—Communion with Warmth and Morality. *Frontiers in Psychology*, *7*, 1810. https://doi.org/10.3389/fpsyg.2016.01810

2. Ang, D., & Leng, H. K. (2025). Effect of Muscular Models in Men's Fitness Magazines on Visual Attention and Behaviour. *Australasian Marketing Journal*, *33*(4), 380–388. https://doi.org/10.1177/14413582241312931
3. Bahena, M., Carvajal-Suarez, M., Soliman, A. S., Luo, J., & De Alba, A. (2019). The influence of medical providers on HPV vaccination among children of Mexican mothers: A comparison between Mexico and the Midwest region of the United States. *Bmc Public Health*, *19*(1), 515. https://doi.org/10.1186/s12889-019-6718-0
4. Balcezak, H. C., Olusanya, O. A., Tomar, A., Foster, M., & Wigfall, L. T. (2022). A 10-year systematic review of theory-driven approaches to increasing catch-up HPV vaccination rates among young adult males in colleges/university settings. *Journal of American College Health*, *70*(8), 2535–2547. https://doi.org/10.1080/07448481.2021.1873350
5. Barry, B. (2018). Re)Fashioning Masculinity: Social Identity and Context in Men's Hybrid Masculinities through Dress. *Gender & Society*, *32*(5), 638–662. https://doi.org/10.1177/0891243218774495
6. Baumgaertner, B., Carlisle, J. E., & Justwan, F. (2018). The influence of political ideology and trust on willingness to vaccinate. *Plos One*, *13*(1), e0191728. https://doi.org/10.1371/journal.pone.0191728
7. Baxter, K., Czarnecka, B., Schivinski, B., & Massaro, M. R. (2022). Masculine men do not like feminine wording: The effectiveness of gendered wording in health promotion leaflets in the UK. *PLOS ONE*, *17*(10), e0273927. https://doi.org/10.1371/journal.pone.0273927
8. Bem, S. L. (2011). *Bem Sex Role Inventory* [Dataset]. https://doi.org/10.1037/t00748-000
9. Bigham, A., Meyers, C., Li, N., & Irlbeck, E. (2019). The Effect of Emphasizing Credibility Elements and the Role of Source Gender on Perceptions of Source Credibility. *Journal of Applied Communications*, *103*(2). https://doi.org/10.4148/1051-0834.2270
10. Bjornsdottir, R. T., Connor, P., & Rule, N. O. (2024). Social judgments from faces and bodies. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/pspa0000397
11. CDC (2025a). *About Genital HPV Infection*. Sexually Transmitted Infections (STIs). https://www.cdc.gov/sti/about/about-genital-hpv-infection.html
12. CDC (2025b). *Cancers Caused by HPV*. Human Papillomavirus (HPV). https://www.cdc.gov/hpv/about/cancers-caused-by-hpv.html
13. Chaiken, S. (1986). Physical Appearance and Social Influence. In C. P. Herman, M. P. Zanna, & E. T. Higgins (Eds.), *Physical appearance, stigma, and social behavior*. Routledge.
14. Charron, J., Gautier, A., & Jestin, C. (2020). Influence of information sources on vaccine hesitancy and practices. *Médecine et Maladies Infectieuses*, *50*(8), 727–733. https://doi.org/10.1016/j.medmal.2020.01.010
15. Chen, L., Yang, X., & Huang, X. (2021). Promoting HPV vaccination on social media: Interactive effects of threat, efficacy and social cues. *Human Vaccines & Immunotherapeutics*, *17*(11), 4442–4456. https://doi.org/10.1080/21645515.2021.1975449

16. Chu, J., Pink, S. L., & Willer, R. (2021). Religious identity cues increase vaccination intentions and trust in medical experts among American Christians. *Proceedings of the National Academy of Sciences*, *118*(49), e2106481118. https://doi.org/10.1073/pnas.2106481118
17. Connell, R. W., & Messerschmidt, J. W. (2005). Hegemonic Masculinity: Rethinking the Concept. *Gender & Society*, *19*(6), 829–859. https://doi.org/10.1177/0891243205278639
18. Connor, S., Edvardsson, K., Fisher, C., & Spelten, E. (2021). Perceptions and Interpretation of Contemporary Masculinities in Western Culture: A Systematic Review. *American Journal of Men's Health*, *15*(6), 15579883211061009. https://doi.org/10.1177/15579883211061009
19. Daldrop, C., Homan, A. C., & Buengeler, C. (2025). Too young to lead? Role incongruity explains age bias against young leaders. *The Leadership Quarterly*, *36*(4), 101878. https://doi.org/10.1016/j.leaqua.2025.101878
20. Daley, E. M., Vamos, C. A., Thompson, E. L., Zimet, G. D., Rosberger, Z., Merrell, L., & Kline, N. S. (2017). The feminization of HPV: How science, politics, economics and gender norms shaped U.S. HPV vaccine implementation. *Papillomavirus Research*, *3*, 142–148. https://doi.org/10.1016/j.pvr.2017.04.004
21. De Meulenaer, S., De Pelsmacker, P., & Dens, N. (2018). Power Distance, Uncertainty Avoidance, and the Effects of Source Credibility on Health Risk Message Compliance. *Health Communication*, *33*(3), 291–298. https://doi.org/10.1080/10410236.2016.1266573
22. Demeshko, A., Buckley, L., Morphett, K., Adams, J., Meany, R., & Cullerton, K. (2022). Characterising trusted spokespeople in noncommunicable disease prevention: A systematic scoping review. *Preventive Medicine Reports*, *29*, 101934. https://doi.org/10.1016/j.pmedr.2022.101934
23. Deska, J. C., Hingston, S. T., DelVecchio, D., Stenstrom, E. P., Walker, R. J., & Hugenberg, K. (2022). The face of the brand: Spokesperson facial width-to-height ratio predicts brand personality judgments. *Psychology & Marketing*, *39*(8), 1487–1503. https://doi.org/10.1002/mar.21666
24. Dong, J., Leger, K., Shiramizu, V. K. M., Marcinkowska, U. M., Lee, A. J., & Jones, B. C. (2023). The importance of face-shape masculinity for perceptions of male dominance depends on study design. *Scientific Reports*, *13*(1), 12620. https://doi.org/10.1038/s41598-023-39912-x
25. Eisend, M. (2022). Older People in Advertising. *Journal of Advertising*, *51*(3), 308–322. https://doi.org/10.1080/00913367.2022.2027300
26. Eng, N., Reed, O., Goke, M., Chen, J., Kurniasari, T., & Bortree, D. (2026). Health Influencers: Effects of Influencer Type and Expertise on Credibility, Trust, and Behavioral Intentions. *International Journal of Strategic Communication*, 1–26. https://doi.org/10.1080/1553118X.2026.2671837
27. Ert, E., & Fleischer, A. (2020). What do Airbnb hosts reveal by posting photographs online and how does it affect their perceived trustworthiness? *Psychology & Marketing*, *37*(5), 630–640. https://doi.org/10.1002/mar.21297
28. Frietze, G., Padilla, M., Cordero, J., Gosselink, K., & Moya, E. (2023). Human Papillomavirus Vaccine Acceptance (HPV-VA) and Vaccine Uptake (HPV-VU): Assessing the impact of theory, culture, and

trusted sources of information in a Hispanic community. *Bmc Public Health*, *23*(1), 1781. https://doi.org/10.1186/s12889-023-16628-1

29. Griffin, B., Conner, M., & Norman, P. (2022). Applying an extended protection motivation theory to predict Covid-19 vaccination intentions and uptake in 50–64 year olds in the UK. *Social Science & Medicine*, *298*, 114819. https://doi.org/10.1016/j.socscimed.2022.114819
30. Gutiérrez-García, A., Beltrán, D., & Calvo, M. G. (2019). Facial attractiveness impressions precede trustworthiness inferences: Lower detection thresholds and faster decision latencies. *Cognition and Emotion*, *33*(2), 378–385. https://doi.org/10.1080/02699931.2018.1444583
31. Han, J., Zhang, L., Chen, Y., Zhang, Y., Wang, L., Cai, R., Li, M., Dai, Y., Dang, L., Chen, H., & Zhu, L. (2025). Global HPV vaccination programs and coverage rates: A systematic review. *eClinicalMedicine*, *84*. https://doi.org/10.1016/j.eclinm.2025.103290
32. Hayes, A. F. (2022). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach* (Vol. 3). The Guilford Press.
33. Healthy People (2030). (2024). *Increase the proportion of adolescents who get recommended doses of the HPV vaccine—IID–08—Healthy People 2030 | odphp.health.gov*. https://odphp.health.gov/healthypeople/objectives-and-data/browse-objectives/vaccination/increase-proportion-adolescents-who-get-recommended-doses-hpv-vaccine-iid-08
34. Himmelstein, M. S., & Sanchez, D. T. (2016). Masculinity in the doctor's office: Masculinity, gendered doctor preference and doctor–patient communication. *Preventive Medicine*, *84*, 34–40. https://doi.org/10.1016/j.ypmed.2015.12.008
35. Hoang, T. N., Agana-Norman, D. F. G., Rizvi, A. S., Hsu, C. D., Guo, F., Adekanmbi, V., & Berenson, A. B. (2025). Provider perspectives on HPV vaccine hesitancy in the post-COVID-19 era. *Human Vaccines & Immunotherapeutics*, *21*(1), 2550054. https://doi.org/10.1080/21645515.2025.2550054
36. Hocevar, K. P., Metzger, M., & Flanagin, A. J. (2017). Source Credibility, Expertise, and Trust in Health and Risk Messaging. In K. P. Hocevar, M. Metzger, & A. J. Flanagin (Eds.), *Oxford Research Encyclopedia of Communication*. Oxford University Press. https://doi.org/10.1093/acrefore/9780190228613.013.287
37. Hong, S., Lee, H., & Johnson, E. K. (2019). The face tells all: Testing the impact of physical attractiveness and social media information of spokesperson on message effectiveness during a crisis. *Journal of Contingencies and Crisis Management*, *27*(3), 257–264. https://doi.org/10.1111/1468-5973.12250
38. Huang, R., Wang, Z., Yuan, T., Nadarzynski, T., Qian, H. Z., Li, P., Meng, X., Wang, G., Zhou, Y., Luo, D., Wang, Y., Cai, Y., & Zou, H. (2021). Using protection motivation theory to explain the intention to initiate human papillomavirus vaccination among men who have sex with men in China. *Tumour Virus Research*, *12*, 200222. https://doi.org/10.1016/j.tvr.2021.200222
39. Jones, A. C. T., Repke, A., Batastini, A. B., Sacco, D., Dahlen, E. R., & Mohn, R. S. (2023). The power of presentation: How attire, cosmetics, and posture impact the source credibility of women expert

witnesses. *Journal of Forensic Sciences*, *68*(3), 962–971. https://doi.org/10.1111/1556-4029.15253

40. Joshi, R., & Kilinsky, A. (2025). HPV vaccine hesitancy in the United States. *Current Opinion in Pediatrics*, *37*(2), 198–204. https://doi.org/10.1097/MOP.0000000000001441
41. Kamins, M. A., & Gupta, K. (1994). Congruence between spokesperson and product type: A matchup hypothesis perspective. *Psychology & Marketing*, *11*(6), 569–586. https://doi.org/10.1002/mar.4220110605
42. Kang, J. A., Hubbard, G. T., & Hong, S. (2019). Gender and credibility in branded storytelling. *Gender in Management: An International Journal*, *34*(8), 702–714. https://doi.org/10.1108/GM-02-2019-0015
43. Katz, M. L., Krieger, J. L., & Roberto, A. J. (2011). Human papillomavirus (HPV): college male's knowledge, perceived risk, sources of information, vaccine barriers and communication. *J of Men's Health, 8*(3), 175–184. https://doi.org/10.1016/j.jomh.2011.04.*002*.
44. Kim, M. (2022). Think Leader, Think Deep Voice? CEO Voice Pitch and Gender. Academy of Management Proceedings, *2022*(1). https://journals.aom.org/doi/abs/10.5465/AMBPP.2022.17778abstract
45. Knoll, J., & Matthes, J. (2017). The effectiveness of celebrity endorsements: A meta-analysis. *Journal of the Academy of Marketing Science*, *45*(1), 55–75. https://doi.org/10.1007/s11747-016-0503-8
46. Koenig, A. M., Eagly, A. H., Mitchell, A. A., & Ristikari, T. (2011). Are leader stereotypes masculine? A meta-analysis of three research paradigms. *Psychological Bulletin*, *137*(4), 616–642. https://doi.org/10.1037/a0023557
47. König, L., & Jucks, R. (2020). Effects of Positive Language and Profession on Trustworthiness and Credibility in Online Health Advice: Experimental Study. *Journal of Medical Internet Research*, *22*(3), e16685. https://doi.org/10.2196/16685
48. Korenman, L. M., Wetzler, E. L., Carroll, M. H., & Velilla, E. V. (2019). Is it in your face? Exploring the effects of sexual dimorphism on perception of leadership potential. *Military Psychology*, *31*(2), 107–116. https://doi.org/10.1080/08995605.2018.1556555
49. Li, Y., Chen, Z., Liu, X., & Qi, Y. (2022). Perceiving the facial trustworthiness: Facial age, emotional expression, and attractiveness. *Quarterly Journal of Experimental Psychology*, *75*(5), 818–829. https://doi.org/10.1177/17470218211047176
50. Lippa, R. A. (2016). Biological influences on masculinity. In *APA handbook of men and masculinities* (pp. 187–209). American Psychological Association. https://doi.org/10.1037/14594-009
51. Liu, S., Yang, J. Z., & Chu, H. (2021). When we increase fear, do we dampen hope? Using narrative persuasion to promote human papillomavirus vaccination in China. *Journal of Health Psychology*, *26*(11), 1999–2009. https://doi.org/10.1177/1359105319894626
52. Lu, L., Liu, J., Kim, S. J., Tao, R., Shah, D. V., & McLeod, D. M. (2023). The Effects of Vaccine Efficacy Information on Vaccination Intentions Through Perceived Response Efficacy and Hope. *Journal of Health Communication*, *28*(2), 121–129. https://doi.org/10.1080/10810730.2023.2186545

53. Lukaszewski, A. W., Simmons, Z. L., Anderson, C., & Roney, J. R. (2016). The role of physical formidability in human social status allocation. *Journal of Personality and Social Psychology*, *110*(3), 385–406. https://doi.org/10.1037/pspi0000042

54. Martinez, A. A., Shastri, S. S., & Frietze, G. A. (2025). Trusted Voices: Assessing Trusted Sources of Human Papillomavirus Vaccine Information Among a Sample of Hispanic Parents. *Vaccines*, *13*(9), 917. https://doi.org/10.3390/vaccines13090917

55. Mccullock, S. P., & Perrault, E. K. (2020). Exploring the Effects of Source Credibility and Message Framing on STI Screening Intentions: An Application of Prospect and Protection Motivation Theory. *Journal of Health Communication*, *25*(1), 1–11. https://doi.org/10.1080/10810730.2019.1692262

56. Merdassa, A. B. (2024). Traditional masculinity, peer pressure, and sensation seeking as correlates of risky behaviours. *International Journal of Adolescence and Youth*, *29*(1), 2298087. https://doi.org/10.1080/02673843.2023.2298087

57. Montepare, J. M., & Zebrowitz, L. A. (1998). Person Perception Comes of Age: The Salience and Significance of Age in Social Judgments. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 30, pp. 93–161). Academic Press. https://doi.org/10.1016/S0065-2601(08)60383-4

58. Nan, X., Zhao, X., & Briones, R. (2014). Parental Cancer Beliefs and Trust in Health Information From Medical Authorities as Predictors of HPV Vaccine Acceptability. *Journal of Health Communication*, *19*(1), 100–114. https://doi.org/10.1080/10810730.2013.811319

59. Ohanian, R. (1990). Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness. *Journal of Advertising*, *19*(3), 39–52. https://doi.org/10.1080/00913367.1990.10673191

60. Okada, H., Okuhara, T., Goto, E., & Kiuchi, T. (2023). Association between trust in COVID-19 information sources and engaging in infection prevention behaviors in Japan: A longitudinal study. *Patient Education and Counseling*, *111*, 107686. https://doi.org/10.1016/j.pec.2023.107686

61. Park, S., Lee, S., & Lee, H. W. (2022). Competence inference from muscle: How and when trainers' muscle mass impacts service purchase of personal fitness training. *International Journal of Sports Marketing and Sponsorship*, *23*(4), 804–822. https://doi.org/10.1108/IJSMS-08-2021-0162

62. Peterson, L. M., Orr, J. A., Rogelberg, S. D., & Olsen, N. (2022). Social–contextual factors interact with masculinity to influence college men's HPV vaccination intentions: The role of descriptive norms, prototypes, and physician gender. *Journal of Behavioral Medicine*, *45*(6), 825–840. https://doi.org/10.1007/s10865-022-00350-1

63. Petty, R. E., & Cacioppo, J. T. (1986). The Elaboration Likelihood Model of Persuasion. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 19, pp. 123–205). Academic Press. https://doi.org/10.1016/S0065-2601(08)60214-2

64. Pink, S. L., Chu, J., Druckman, J. N., Rand, D. G., & Willer, R. (2021). Elite party cues increase vaccination intentions among Republicans. *Proceedings of the National Academy of Sciences*, *118*(32), e2106559118. https://doi.org/10.1073/pnas.2106559118

65. Plotzker, R. E., Vaidya, A., Pokharel, U., & Stier, E. A. (2023). Sexually Transmitted Human Papillomavirus. *Infectious Disease Clinics of North America*, *37*(2), 289–310. https://doi.org/10.1016/j.idc.2023.02.008
66. Qiao, S., Friedman, D. B., Tam, C. C., Zeng, C., & Li, X. (2024). COVID-19 vaccine acceptance among college students in South Carolina: Do information sources and trust in information matter? *Journal of American College Health: J of ACH*, *72*(3), 859–868. https://doi.org/10.1080/07448481.2022.2059375
67. Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change1. *The Journal of Psychology*, *91*(1), 93–114. https://doi.org/10.1080/00223980.1975.9915803
68. Rostovtseva, V. V., Butovskaya, M. L., Mezentseva, A. A., & Weissing, F. J. (2023). Effects of sex and sex-related facial traits on trust and trustworthiness: An experimental study. *Frontiers in Psychology*, *13*, 925601. https://doi.org/10.3389/fpsyg.2022.925601
69. Sbaffi, L., & Rowley, J. (2017). Trust and Credibility in Web-Based Health Information: A Review and Agenda for Future Research. *Journal of Medical Internet Research*, *19*(6), e7579. https://doi.org/10.2196/jmir.7579
70. Schouten, A. P., Janssen, L., & Verspaget, M. (2020). Celebrity vs. Influencer endorsements in advertising: The role of identification, credibility, and Product-Endorser fit. *International Journal of Advertising*, *39*(2), 258–281. https://doi.org/10.1080/02650487.2019.1634898
71. Sinha, M., Misra, M., & Mishra, S. (2024). Gender Selection Dilemma in Fast Moving Consumer Goods (FMCG) Advertising: Insights from Eye-Tracking Research. *Journal of Eye Movement Research*, *17*(2), 1–27. https://doi.org/10.16910/jemr.17.2.6
72. Smith, K. E., & Weishaar, H. (2018). Networks, advocacy and evidence in public health policymaking: Insights from case studies of European Union smoke-free and English health inequalities policy debates. *Evidence & Policy*, *14*(3), 403–430. https://doi.org/10.1332/174426418X15299596208647
73. Sonawane, K., Garg, A., Meissner, E. G., Damgacioglu, H., Hill, E., Nyitray, A. G., & Deshmukh, A. A. (2024). Human Papillomavirus Vaccination Among Young Adults Before and During the COVID-19 Pandemic. *JAMA Network Open*, *7*(2), e2356875. https://doi.org/10.1001/jamanetworkopen.2023.56875
74. Su, Y., Kunkel, T., & Ye, N. (2021). When abs do not sell: The impact of male influencers conspicuously displaying a muscular body on female followers. *Psychology & Marketing*, *38*(2), 286–297. https://doi.org/10.1002/mar.21322
75. Telaak, S. H., Howe, L. C., & Persky, S. (2023). Physician weight influences responses to a public health message about the genetics of obesity. *Patient Education and Counseling*, *115*, 107853. https://doi.org/10.1016/j.pec.2023.107853
76. Thrasher, G. R., Rudolph, C. W., & Hammond, M. M. (2023). The Intersectional Role-(In) Congruity Effects of Age and Gender on Leadership Evaluations. *Group & Organization Management*, *51*(1), 214–256. https://doi.org/10.1177/10596011231212243

77. Tifferet, S., Dror, S., & David, S. (2019). Age preferences for advertisement models differ by their gender / Las preferencias de edad de los modelos publicitarios varían en función del sexo del modelo. *Revista de Psicología Social*, *35*, 1–32. https://doi.org/10.1080/02134748.2019.1682293
78. Trivedi, N., Krakow, M., Hawkins, H., Peterson, K., E. B., & Chou, W. Y. S. (2020). Well, the Message Is From the Institute of Something: Exploring Source Trust of Cancer-Related Messages on Simulated Facebook Posts. *Frontiers in Communication*, *5*, 12. https://doi.org/10.3389/fcomm.2020.00012
79. Volkmer, S. A., & Meißner, M. (2025). Delight my brain and my eyes: Credibility and aesthetic judgments of endorsers. *Journal of Retailing and Consumer Services*, *84*, 104217. https://doi.org/10.1016/j.jretconser.2024.104217
80. Weerakoon, S. M., Henson-Garcia, M., Valerio-Shewmaker, M. A., Messiah, S. E., & Knell, G. (2022). Contributions of Trustworthiness, Health Literacy, and Self-Efficacy in Communicating With COVID-19 Vaccine–Hesitant Audiences: Web-Based Survey Study. *JMIR Formative Research*, *6*(8), e38076. https://doi.org/10.2196/38076
81. Weibel, D., Wissmath, B., & Groner, R. (2008). How Gender and Age Affect Newscasters' Credibility—An Investigation in Switzerland. *Journal of Broadcasting & Electronic Media*, *52*(3), 466–484. https://doi.org/10.1080/08838150802205801
82. Whitehead, S. M., & Barrett, F. J. (2001). The sociology of masculinity. In S. M. Whitehead, & F. Barrett (Eds.), *The masculinities reader* (pp. 1–26). Polity.
83. Wong, Y. J., & Wang, S. Y. (2022). Toward an integrative psychology of masculinities. *Psychology of Men & Masculinities*, *23*(3), 285–298. https://doi.org/10.1037/men0000387
84. Wu, T. Y., & Lin, C. A. (2017). Predicting the effects of eWOM and online brand messaging: Source trust, bandwagon effect and innovation adoption factors. *Telematics and Informatics*, *34*(2), 470–480. https://doi.org/10.1016/j.tele.2016.08.001
85. Xu, X., Li, H., & Shan, S. (2021). Understanding the health behavior decision-making process with situational theory of problem solving in online health communities: The effects of health beliefs, message credibility, and communication behaviors on health behavioral intention. *International Journal of Environmental Research and Public Health*, *18*(9), 4488. https://doi.org/10.3390/ijerph18094488
86. Yang, H., Yangyuen, S., & Sombateyotha, K. (2024). Human papillomavirus vaccination intention and its associated factors among female medical college students in Hubei, China: A cross-sectional study. *Journal of Education and Health Promotion*, *13*(1). https://doi.org/10.4103/jehp.jehp_1350_23
87. Yu, J. M., & Ying, H. (2021). A general serial dependence among various facial traits: Evidence from Markov Chain and derivative of Gaussian. *Journal of Vision*, *21*(13), 4. https://doi.org/10.1167/jov.21.13.4
88. Yuen, V. W. H. (2023). The efficacy of health experts' communication in inducing support for COVID-19 measures and effect on trustworthiness: A survey in Hong Kong. *Social Science & Medicine*, *317*, 115602. https://doi.org/10.1016/j.socscimed.2022.115602

89. Zarzeczna, N., Hanel, P. H. P., Rutjens, B. T., Bono, S. A., Chen, Y. H., & Haddock, G. (2024). Scientists, speak up! Source impacts trust in health advice across five countries. *Journal of Experimental Psychology Applied*, *30*(3), 430–441. https://doi.org/10.1037/xap0000500
90. Zou, X., Chen, Q., Zhang, Y., & Evans, R. (2023). Predicting COVID-19 vaccination intentions: The roles of threat appraisal, coping appraisal, subjective norms, and negative affect. *Bmc Public Health*, *23*(1), 230. https://doi.org/10.1186/s12889-023-15169-x

Appendix

Appendix 1. Study Stimuli

The stimulus was presented in a 2 x 2 factorial design. Condition 1 contained an ad image of a lean-looking physician in his 30s, Dr. John, accompanied by an overhead—"Stay Strong. Stay Protected" on top of the main headline "HPV vaccine"—which is complemented by an underline "How Dangerous is HPV" and a narrative. Below the physician image and the ad copy described above, three pieces of vaccination information were presented, including the benefits of vaccination, when to get vaccinated, and where to get vaccinated. Condition 2 showed the same Dr. John (in his 30s) with a muscular-looking and the same health promotion message. Conditions 3 and 4, respectively, presented a lean-looking Dr. John in his 60s and a muscular-looking Dr. John of the same age, accompanied by the same health message described for Conditions 1 and 2.

Figures

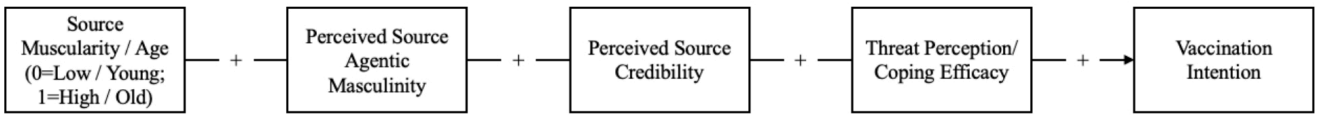


Figure 1

Hypothesized Conceptual Model

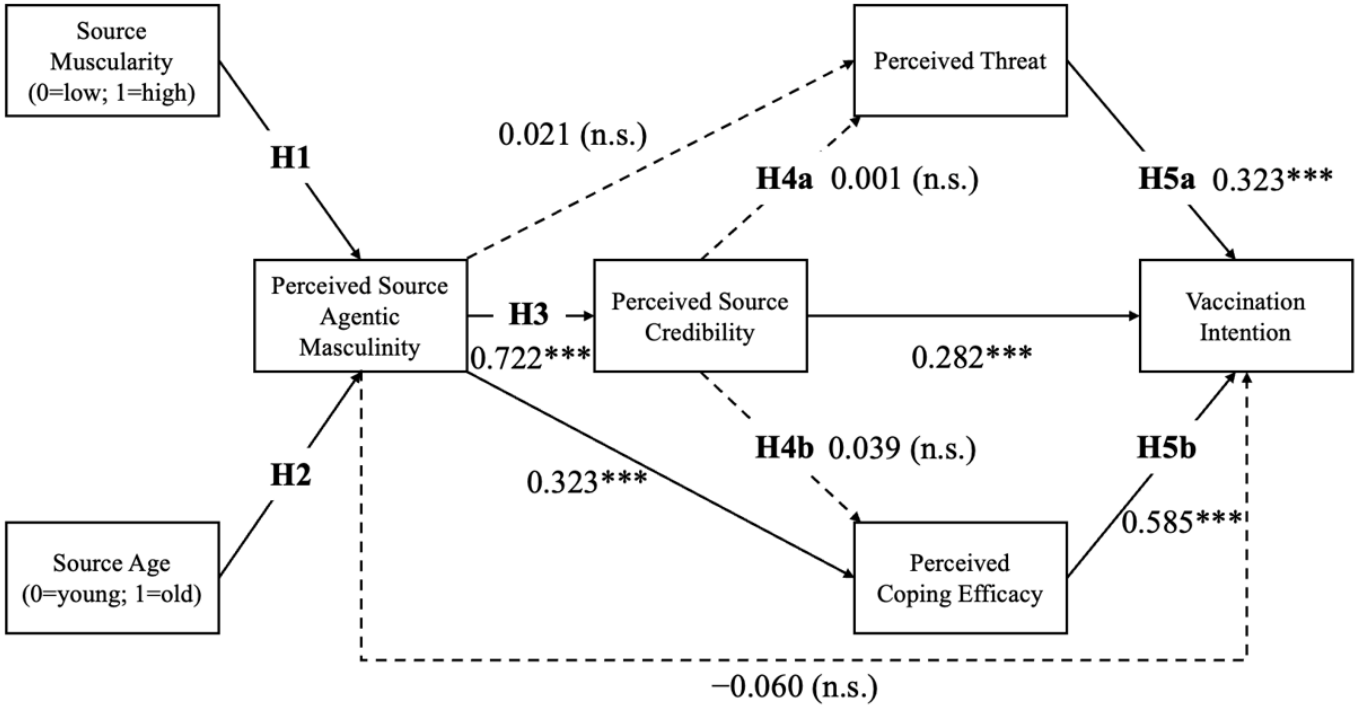


Figure 2

Hypotheses Testing Results (unstandardized b)

Note. *p<0.05; **p<0.01; ***p<0.001.