Received: 5 October 2023 | Revised: 15 May 2024 | Accepted: 26 May 2024

DOI: 10.1002/acp.4216

RESEARCH ARTICLE

WILEY

Prejudice is epistemically unwarranted belief

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Abstract

In two preregistered online studies with U.S. adults, we provide evidence of a common psychological profile characterizing belief in prejudicial and non-prejudicial epistemically unwarranted claims. We solicited self-report ratings of beliefs in prejudicial and non-prejudicial pseudoscientific, conspiratorial, and paranormal claims, as well as individual difference measures related to cognitive style, social dominance orientation (SDO), and trust in science. We found moderate to strong positive correlations between endorsing prejudicial and non-prejudicial unwarranted claims, and robustly replicable associations between endorsement of all the assessed varieties of epistemically unwarranted beliefs, SDO, and perceptions of the credibility of science. Our findings suggest that individuals who endorse epistemically unwarranted beliefs are not only characterized by a rejection of epistemic authority (e.g., science), but also by preferences for a rigid, inequitably stratified society. This suggests that successfully challenging epistemically unwarranted beliefs may benefit by incorporating explicit challenges to social dominance motivations.

KEYWORDS

conspiracy theory, epistemically unwarranted beliefs, prejudice, pseudoscience, social dominance orientation

1 | INTRODUCTION

Collectively, pseudoscience, conspiracy theories, and paranormal beliefs have been termed *epistemically unwarranted beliefs* (Lobato et al., 2014), reflecting the common feature across these beliefs that they lack epistemic warrant, which refers to the "totality of evidence and knowledge that is available to human knowledge-seekers at the time in question" (p. 239, Hansson, 2009). Referencing these beliefs collectively also acknowledges the intermingling of pseudoscientific, conspiratorial, and paranormal components common within such claims. For example, paranormal claims about extraterrestrial visitations are frequently intermixed with conspiracy allegations of government cover-ups, Area 51, and "men in black." Despite the discrete labels "pseudoscience," "conspiracy theory," and "paranormal," there appears to be considerable overlap in the ways such claims are understood, embraced, and socially deployed. Here, we integrate the psychology of epistemically unwarranted beliefs with the psychology of social prejudices. The co-occurrence of prejudicial beliefs with other epistemically unwarranted beliefs has not received much explicit attention, even though socially prejudicial empirical claims frequently resemble and deploy rhetoric akin to other epistemically unwarranted beliefs. For example, the Great Replacement is a longstanding antisemitic allegation that a secret cabal of Jews—sometimes called the New World Order—is working toward world domination by replacing white populations with non-white populations (Joyce, 2021). In addition to being prejudicial, the claim is a conspiracy theory and contains pseudoscientific elements, specifically essentialist claims about race that run counter to consensus views in genetics (cf. ASGH, 2018). Insofar as prejudicial beliefs manifest themselves as empirical claims that are alleged to be scientific, assert the existence of conspiratorial

plots, or entertain the existence of paranormal phenomena, we posit that prejudicial beliefs are epistemically unwarranted beliefs rather than something distinct. In this paper, we will present evidence across two studies of common socio-cognitive variables associated with level of endorsement of both prejudicial and non-prejudicial epistemically unwarranted beliefs, and we will argue based on the presented evidence that a more explicit integration of research on prejudice with research on epistemically unwarranted beliefs can benefit efforts to develop strategies intended to mitigate the endorsement and diffusion of epistemically unwarranted beliefs. The variety of negative individual, social, and environmental outcomes associated with believing epistemically unwarranted beliefs—ranging from individuals abstaining from evidence-based medicine in favor of alternative medical pseudoscientific claims (Hermes, 2018) to incidents of mass shootings motivated partly by racist pseudoscience and conspiracy theories (Wedow et al., 2022)—necessitates research such as this, building a more comprehensive understanding of epistemically unwarranted belief in service of efforts intended to inoculate and dissuade people from endorsing such nonsensical claims.

The relevance of prejudice to the study of epistemically unwarranted beliefs has gone largely unrecognized in prior research. Studies of belief in unwarranted pseudoscientific, conspiratorial, or paranormal claims rarely consider examples that intersect with social prejudices (e.g., Čavojová et al., 2020; Dyer & Hall, 2019; Lewandowsky et al., 2013; Rizeq et al., 2021). In the rare instances where researchers have included items measuring some prejudicial belief, these have typically accounted for but a few items in the ad hoc questionnaires deployed, without comment concerning their prejudicial nature (e.g., Fasce & Picó, 2019; Lobato et al., 2014; McLaughlin & McGill, 2017).

Despite a lack of research broadly examining prejudice in the context of epistemically unwarranted beliefs, there are a few studies that have more narrowly related specific epistemically unwarranted beliefs to specific prejudices. Swami (2012) found that endorsement of antisemitic conspiracy theories was correlated both with a general conspiracist ideation and with a measure of anti-Chinese racism. Similarly, Kofta et al. (2020) reported that inducing a sense of political uncontrollability resulted in an increase in endorsement of antisemitic conspiracy beliefs and stereotypes about Jewish people, and that belief in antisemitic conspiracies predicted belief in other conspiracy theories as well as a general tendency toward conspiracist ideation. Jolley et al. (2020) as well reported a study finding that exposure to antisemitic conspiracy theories not only increased antisemitic sentiments, but increased prejudicial sentiments to unrelated outgroups. In fact, the most studied intersection of prejudice with epistemically unwarranted beliefs is the specific intersection of conspiracy beliefs and antisemitism (for review, see Biddlestone et al., 2020). Beyond that particular line of research, Dambrun (2004) reported two studies examining astrology beliefs and prejudice toward marginalized groups in France, finding small-to-modest positive relationships with prejudicial views about Arab people, women, overweight people, and poor people. Most recently, there is evidence of a link between racist and homophobic attitudes and the rejection of biological evolutionary theory, partially mediated by speciesist attitudes categorizing human beings as intrinsically distinct from and superior to non-human animals (Syropoulos et al., 2022). Syropoulos and colleagues found that this link between rejection of evolutionary theory and endorsement of prejudicial views included increased endorsement of militaristic and conflict-oriented views toward outgroups. The latter association with conflictual intergroup attitudes suggests a possible role for social dominance orientation (SDO; Ho et al., 2015; Kugler et al., 2010) in the endorsement of epistemically unwarranted beliefs. SDO refers to "an individual's preference for group-based hierarchy and inequality" (p. 584, Ho et al., 2015). Though SDO is associated with broad socio-cognitive constructs such as political orientation (i.e., higher SDO is associated with stronger political conservatism), the emphasis on the naturalness and desirability of a socially stratified and unequal society makes the construct of SDO an ideal socio-cognitive variable for exploring the potential relationship between epistemically unwarranted beliefs that are overtly prejudicial and those that are not overtly prejudicial. There is a robust association between a SDO and various intergroup prejudices (Ho et al., 2015), and SDO has also been found to predict both belief in and willingness to spread COVID-19 pandemic conspiracy theories (Lobato et al., 2020; Zubielevitch et al., 2024) as well as climate change denialism (Jylhä et al., 2016).

Nonetheless, existing work provides a fruitful foundation for understanding the potential shared psychological profile underlying endorsement of prejudice and other non-prejudicial epistemically unwarranted beliefs. For example, there is a robust association between cognitive style and endorsement of epistemically unwarranted beliefs, such that an analytical cognitive style predicts low endorsement of epistemically unwarranted beliefs and an intuitive cognitive style predicts greater endorsement (e.g., Lindeman, 2011; Lindeman & Aarnio, 2007; Lobato et al., 2014; Lobato & Zimmerman, 2019; Pennycook et al., 2015; Swami et al., 2014). These findings parallel research linking cognitive style and racist attitudes (Epstein et al., 1996; Hogan & Mallott, 2005) and preferences for social inequality (Kugler et al., 2010). This suggests a possible association between a person's cognitive style and their inclination to endorse prejudicial epistemically unwarranted beliefs alongside non-prejudicial unwarranted beliefs.

When considered together, the foregoing results are consistent with the premise that prejudicial and non-prejudicial unwarranted beliefs are rooted in common socio-cognitive mechanisms. We investigated this putative relationship by testing two broadly related predictions: (1) there are significant positive correlations between peoples' beliefs in prejudicial and non-prejudicial epistemically unwarranted beliefs, and (2) there is a shared socio-cognitive profile predicting (dis)belief in both prejudicial and non-prejudicial epistemically unwarranted beliefs. We collected a number of candidate variables which might plausibly make up part of this putative socio-cognitive profile, specifically cognitive style, SDO, and perceptions of the credibility of science. We predicted that: (2a) analytical, reflective thinking would negatively correlate with both prejudicial and non-prejudicial epistemically unwarranted beliefs, (2b) intuitive, experiential thinking would positively correlate with endorsement of both prejudicial and

non-prejudicial epistemically unwarranted beliefs, (2c) SDO would positively correlate with endorsement of both prejudicial and non-prejudicial epistemically unwarranted beliefs, and (2d) perceptions of science as credible would negatively correlate with endorsement of both prejudicial and non-prejudicial epistemically unwarranted beliefs.

1.1 | Open practices statement

Preregistered design and analysis plans, as well as full data and stimuli for these studies are uploaded to OSF and can be reviewed at https://osf.io/75ema/. Of note, the present studies represent the first phase of a larger, multi-phase project examining epistemically unwarranted beliefs. Some measures administered during the studies reported below are not described in this manuscript as they were not analyzed at this phase of the project, though they are included in the OSF website for this study.

2 | STUDY 1

2.1 | Method

2.1.1 | Participants

We recruited a convenience sample of 411 adult U.S. online participants via Prolific, in exchange for $2 in compensation. After removing participant response sets with incomplete data, our final sample size was 401 (age: $M = 36.5$ years, $SD = 12.8$ years; Male = 189, Female = 195, Other/Non-binary = 15; Prefer not to say = 2).

2.1.2 | Materials and procedure

We used Qualtrics to design and administer our survey, comprised of several questionnaires. The first questionnaire was an ad hoc Epistemically Unwarranted Beliefs Questionnaire (see Table 1) developed for this study and based on prior literature examining endorsement of various epistemically unwarranted beliefs (e.g., Fasce & Picó, 2019; Lewandowsky et al., 2013; Lobato et al., 2014; McLaughlin & McGill, 2017; Swami, 2012). Participants were asked to rate their level of agreement on a six-point Likert scale (1 = *Strongly disagree*; 6 = *Strongly agree*) with 18 claims categorized a priori as pseudoscience claims, conspiracy theories, or paranormal claims. Half of the claims are connected to socially prejudicial beliefs and half are not. As such, the questionnaire is intended to tap into six distinct varieties of epistemically unwarranted belief: Non-Prejudicial Pseudoscience, Prejudicial Pseudoscience, Non-Prejudicial Conspiracies, Prejudicial Conspiracies, Non-Prejudicial Paranormal beliefs, and Prejudicial Paranormal beliefs. Each statement was worded such that agreement represents endorsement of an epistemically unwarranted belief on the underlying topic. The questionnaire was presented to participants as a questionnaire assessing their agreement with a variety of cultural, historical, and scientific topics that have been a part of popular culture discussions over the past several decades.

We next administered the following individual difference measures:

The Rational-Experiential Inventory (REI, Norris & Epstein, 2011) is a 42-item measure of participants' dispositions toward Type 1 and Type 2 thinking styles. The questionnaire has four subscales, Rational, Imaginative, Emotional, and Intuitive. The Rational subscale is a coherent measure of an analytical, reflective thinking style. The Imaginative, Emotional, and Intuitive subscales measure different facets of an overall experiential thinking style. Participants are asked to respond on a 5-point Likert scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*) to statements such as "I enjoy problems that require hard thinking" and "I trust my initial feelings about people." For this study, we only preregistered predictions and analyses for the Rational ($\omega_t = 0.93$, 95% CI [0.92, 0.95]) and Intuitive subscales ($\omega_t = 0.81$, 95% CI [0.69, 0.87]), given that we could not find prior relevant research for the Imaginative or Emotional measures for which we could justify predictions.

The SDO_7 scale (Ho et al., 2015) is a 16-item measure of SDO comprised of two subscales, one measuring the Dominance facet of SDO ($\omega_t = 0.91$, 95% CI [0.90, 0.96]) and one measuring the Anti-Egalitarian facet of SDO ($\omega_t = 0.94$, 95% CI [0.94, 0.96]). Participants use a 7-point Likert scale (1 = *Strongly Oppose*, 7 = *Strongly Favor*) to indicate how much they favor or oppose ideas represented in statements such as "Some groups of people are simply inferior to other groups" and "We should work to give all groups an equal chance to succeed."

The Credibility of Science Scale (CoSS, Hartman et al., 2017) is a 6-item questionnaire measuring participants' general attitudes about science ($\omega_t = 0.96$, 95% CI [0.95, 0.97]). Participants are asked to rate their level of agreement with statements about the credibility and influence of the scientific community such as "Sometimes I think we put too much faith in science," using a 7-point Likert scale (1 = *Disagree very strongly*, 7 = *Agree very strongly*).

Finally, participants completed a brief demographics questionnaire.

2.2 | Data analysis plan

In this section, we will describe our pre-registered data analysis strategy and explain where we deviate from our pre-registered plan. To assess the validity of our a priori categorization of the epistemically unwarranted beliefs, we first planned to examine the internal reliability of the items in the ad hoc epistemically unwarranted beliefs scale via Cronbach's alpha. However, upon subsequent readings on psychometric reliability, we deviated from this planned analysis in favor of measuring mean inter-item correlations, which is preferable when there are few indicators being assessed (Clark & Watson, 1995). Following this analysis, we planned to conduct a confirmatory factor analysis (CFA). The initial plan, contingent on acceptable reliability of the six factors, was to examine the validity of a six-factor structure.

TABLE 1 Epistemically Unwarranted Belief Questionnaire items and mean level of agreement.

	Study 1 mean (SD)	Study 2 mean (SD)
Non-prejudicial pseudoscience		
(1) Childhood vaccines have been shown to cause disorders such as autism.	1.77 (1.13)	2.00 (1.29)
(2) Due to well demonstrated biological reasons, negative emotions and unsolved conflicts or traumas increase the probability of having cancer.	2.96 (1.34)	2.94 (1.29)
(3) Most human beings only use approximately 10% of their brain.	2.69 (1.56)	2.73 (1.58)
Prejudicial pseudoscience		
(4) Black people's skin is thicker than white people's.	2.01 (1.19)	2.07 (1.18)
(5) Racial groups vary in their abilities because of biological differences between them.	2.49 (1.50)	2.46 (1.43)
(6) A person chooses to be homosexual, bisexual, or heterosexual.	2.12 (1.50)	2.36 (1.60)
Non-prejudicial conspiracy theories		
(7) The Apollo moon landings never happened and were staged in a Hollywood film studio.	1.54 (1.00)	1.59 (0.98)
(8) The assassination of John F. Kennedy was not committed by the lone gunman, Lee Harvey Oswald, but was rather a detailed, organized conspiracy to kill the President.	2.73 (1.45)	2.84 (1.51)
(9) In the 1980s, the Coca-Cola company intentionally changed to an inferior formula with the intent of driving up demand for their classic product, later reintroducing it for their financial gain.	3.10 (1.39)	2.96 (1.30)
Prejudicial conspiracy theories		
(10) A powerful and secretive group known as the New World Order is planning to eventually rule the world by replacing the white race with easier to control non-white people.	1.67 (1.05)	1.84 (1.26)
(11) COVID-19 was deliberately created in a Chinese virology lab to be released as a bioweapon.	2.24 (1.41)	2.58 (1.58)
(12) World banking is dominated by Jewish families.	2.04 (1.28)	2.29 (1.40)
Non-prejudicial paranormal claims		
(13) It has been scientifically proven that some people have extrasensory abilities (such as telepathy or precognition).	2.37 (1.46)	2.37 (1.43)
(14) After people die, they still interact with the living as ghosts.	2.51 (1.40)	2.40 (1.34)
(15) An ape-like mammal, sometimes called Bigfoot, roams the forests of America.	2.15 (1.35)	2.13 (1.25)
Prejudicial paranormal claims		
(16) Alien visitors to earth taught ancient uncivilized cultures the technology to build pyramids.	2.03 (1.22)	2.06 (1.26)
(17) The Ancient Maya people predicted that the world would end in 2012.	3.02 (1.59)	2.93 (1.57)
(18) An ancient curse placed on the tomb of Egyptian Pharaoh King Tut actually killed people.	2.10 (1.19)	2.05 (1.23)

Note: Study 1 $N = 401$; Study 2 $N = 575$.

Deviating from this plan slightly, and following a recommendation from reviewers, we subsequently conducted a two-factor and three-factor model CFA, allowing us to compare which factor structure we should retain for subsequent analyses.

After examining the psychometric structure of our ad hoc measure of epistemically unwarranted beliefs, we planned to analyze the relationship between epistemically unwarranted belief acceptance and participant scores on the socio-cognitive measures we administered. We planned to conduct a canonical correlation analysis (CCA). This multivariate analytic technique is well-suited for examining relationships between sets of predictor variables and sets of criterion variables, by creating synthetic variates representing linear combinations of the set of predictor or set of criterion variables and then regressing the synthetic criterion variate onto the synthetic predictor variate (Stevens, 2009; Tabachnick & Fidell, 2017; Wang et al., 2020). This analysis strategy is analogous to the more familiar univariate linear multiple regression in several ways. In linear multiple regression, beta weights are applied to the observed scores of the predictor variables and then the sum of these weighted observed variables produces the predicted value of the outcome variable. Then, the predicted outcome value is correlated with the actual outcome value. In CCA, the analogue of the standardized beta weights is called the standardized canonical function coefficients. However, whereas in univariate regression there is only one outcome variable, and thus only requires one linear equation applied to the predictor variables, CCA is a multivariate analysis and a similar linear equation is used on the set of outcome variables, which are similarly weighted by their own canonical function coefficients. Then the synthetic outcome variate is regressed onto the synthetic predictor variate, producing a squared canonical correlation that is the CCA analogue to the R^2 from linear regression. This process repeats, creating orthogonal models attempting to explain residual variance from the earlier-created model(s) until either all variance between the predictor and outcome variables is explained or until the analysis produces a number of models equal to the

number of variables in whichever set of predictors or outcomes is smaller. In addition to the function coefficients, this analysis produces structure coefficients, which are the bivariate Pearson's *r* between the observed variable and the synthetic variate and are used to aid interpreting the nature of the synthetic variate. A high ratio of participants to variables (>20:1) is recommended for reliably interpreting the results of CCA (Stevens, 2009). In study 1, we had a ratio of 44:1; in study 2 we had a ratio of 63:1.

We conducted our analyses in R (version 4.2.1 "Funny-Looking Kid") using RStudio (Build 561 "Mountain Hydrangea"). We used the *lavaan* package (Rosseel, 2012, version 0.6-14) for conducting the CFAs and the *candisc* package (Friendly & Fox, 2021, version 0.8-6) for conducting the CCAs.

2.3 | Results

We first analyzed the a priori factor structure of the epistemically unwarranted beliefs questionnaire. Based on the small number of indicators for each subscale, we calculated the mean inter-item correlation between the three indicators for each subscale: Pseudoscience Non-prejudice items ($r = 0.29$), Pseudoscience Prejudice ($r = 0.41$), Conspiracy Non-prejudice ($r = 0.40$), Conspiracy Prejudice ($r = 0.56$), Paranormal Non-prejudice ($r = 0.58$), Paranormal Prejudice ($r = 0.39$). These values generally suggest the items in each subscale are sufficiently related without indicating problematic redundancy between the items, although the values for Conspiracy Prejudice items and Paranormal Non-Prejudice items were slightly higher than recommended (Clark & Watson, 1995).

We next conducted a CFA with maximum likelihood estimation to assess the validity of the six-factor model structure. Fit indices generally revealed acceptable-to-good model fit with the data, $\chi^2 = 335$, df = 120, $p < .001$, CFI = 0.92, TLI = 0.90, RMSEA = 0.067, and SRMR = 0.052, with only the χ^2 index suggesting less than good model fit. Further, this model was identified, with a factor complexity of 1. For comparison, we assessed the fit of a two-factor (prejudicial, non-prejudicial) and a three-factor (pseudoscience, conspiracy, paranormal) model alternative. For the two-factor model, fit indices were generally poor, $\chi^2 = 743$, df = 134, $p < .001$, CFI = 0.78, TLI = 0.75, RMSEA = 0.107, and SRMR = 0.077, with only the SRMR indicating acceptable model fit. For the three-factor model, fit indices improved but were still generally poorer than the six-factor solution, $\chi^2 = 425$, df = 132, $p < .001$, CFI = 0.90, TLI = 0.88, RMSEA = 0.074, and SRMR = 0.062, with only the CFI and SRMR suggesting acceptable model fit. We therefore retained the six-factor model for subsequent analysis on the predictors of epistemically unwarranted beliefs. Consistent with Prediction 1, there were medium to strong positive correlations (ranging from $r = 0.34$ to $r = 0.70$) between endorsement of prejudicial and non-prejudicial epistemically unwarranted beliefs (see Table 2). A sensitivity analysis conducted with G*Power 3.1 (Faul et al., 2009) revealed that our sample size was sufficient to reliably detect correlations greater than |0.10| at 95% power with $\alpha = 0.05$.

Next, we conducted a CCA where the six factors in the Epistemically Unwarranted Belief questionnaire (Pseudoscience Non-Prejudice, Pseudoscience Prejudice, Conspiracy Non-prejudice, Conspiracy Prejudice, Paranormal Non-prejudice, and Paranormal Prejudice) were entered as criterion variables, and the individual difference measures (REI—Rational and Intuitive subscales, CoSS, and SDO_7 Dominance and Anti-Egalitarian subscales) were entered as predictor variables.

The full model was significant, Wilk's $\lambda = 0.32$, $F(5, 395) = 73.08$, $p < .001$, producing five functions with squared canonical correlations of 0.56, 0.21, 0.05, 0.007, and <0.001, respectively. Only the first three functions were significant with $p < .001$, <.001, and =.021, respectively (see Tables 3 and 4).

The first function explained 79% of the explained variance in the full model, canonical $R^2 = 0.56$, Wilk's $\lambda = 0.33$, $F(30, 1562) = 16.87$, $p < .001$. The criterion variables that substantially contributed to the synthetic criterion variate (i.e., had standardized coefficients greater than |0.30|) were the Pseudoscience Prejudice and Conspiracy Prejudice subscales of the Epistemically Unwarranted Beliefs questionnaire (see Table 3). The predictor variables that substantially contributed to the synthetic predictor variate (i.e., had standardized coefficients greater than |0.30|) were the Credibility of Science Scale and the Dominance subscale of the SDO_7. This function suggests that higher perceptions of science as a credible enterprise and lower dispositions toward social dominance predict lower endorsement of both pseudoscientific and conspiratorial claims of an overtly prejudiced nature.

For the first function, the standardized canonical structure coefficients (see Table 4) reveal substantial correlations between the Intuitive subscale of the REI and the Anti-Egalitarian subscale of the SDO_7 alongside the Credibility of Science Scale and Dominance subscale of the SDO_7 measure with the synthetic predictor variate, and substantial correlations of all the epistemically unwarranted belief subscales with the synthetic criterion variate. These correlations suggest that a latent socio-cognitive profile largely made up of skeptical perceptions of science and a dominance orientation are also strongly associated with an intuitive cognitive style and an anti-egalitarian orientation, and that for individuals with this socio-cognitive profile, all manner of epistemically unwarranted beliefs are treated relatively similarly, regardless of their content containing elements of pseudoscience, conspiracy, paranormality, or prejudice.

The second function explained 17% of the explained variance in the full model, canonical $R^2 = 0.21$, Wilk's $\lambda = 0.74$, $F(20, 1298) = 6.17$, $p < .001$. The criterion variables that substantially contributed to the synthetic criterion variate were the Pseudoscience Non-Prejudice, Pseudoscience Prejudice, Conspiracy Non-Prejudice, and Paranormal Non-Prejudice subscales of the Epistemically Unwarranted Beliefs questionnaire (see Table 3). The predictor variables that substantially contributed to the synthetic predictor variate were the Intuitive subscale of the Rational-Experience Inventory, the Credibility of Science Scale, and the Dominance and Anti-Egalitarian subscales of the SDO_7. This function suggests that individuals with a low disposition toward an intuitive cognitive style, a greater perception of science as credible, and greater dispositions toward social dominance

TABLE 2 Correlation matrix of the Epistemically Unwarranted Beliefs questionnaire subscales and individual difference measures, Study 1. 95% Confidence Intervals in brackets.

	1	2	3	4	5	6	7	8	9	10	11
1. Pseudoscience non-prejudice	-	0.48 [0.40, 0.55]	0.47 [0.39, 0.54]	0.55 [0.47, 0.61]	0.47 [0.39, 0.54]	0.54 [0.47, 0.61]	−0.02 [−0.12, 0.08]	0.30 [0.21, 0.39]	−0.49 [−0.56, −0.41]	0.26 [0.16, 0.35]	0.24 [0.15, 0.33]
2. Pseudoscience prejudice		-	0.45 [0.37, 0.52]	0.66 [0.60, 0.71]	0.34 [0.25, 0.43]	0.43 [0.35, 0.51]	−0.05 [−0.14, 0.05]	0.18 [0.08, 0.27]	−0.53 [−0.60, −0.46]	0.56 [0.49, 0.63]	0.52 [0.45, 0.59]
3. Conspiracy non-prejudice			-	0.61 [0.54, 0.66]	0.46 [0.38, 0.53]	0.51 [0.43, 0.58]	−0.06 [−0.16, 0.04]	0.25 [0.16, 0.34]	−0.50 [−0.57, −0.42]	0.17 [0.07, 0.26]	0.15 [0.06, 0.25]
4. Conspiracy prejudice				-	0.46 [0.38, 0.54]	0.53 [0.46, 0.60]	−0.04 [−0.14, 0.06]	0.23 [0.14, 0.32]	−0.64 [−0.69, −0.57]	0.46 [0.38, 0.54]	0.46 [0.38, 0.54]
5. Paranormal non-prejudice					-	0.70 [0.64, 0.75]	0.01 [−0.09, 0.10]	0.39 [0.31, 0.47]	−0.37 [−0.45., −0.28]	0.13 [0.04, 0.23]	0.09 [−0.01, 0.19]
6. Paranormal prejudice						-	−0.01 [−0.11, 0.08]	0.33 [0.24, 0.42]	−0.44 [−0.51, −0.35]	0.25 [0.15, 0.34]	0.18 [0.09, 0.28]
7. REI Rational							-	0.00 [−0.09, 0.10]	0.09 [0–0.01, 0.19]	−0.01 [−0.11, 0.09]	0.01 [−0.09, 0.11]
8. REI intuitive								-	−0.29 [−0.38, −0.20]	0.10 [0.00, 0.19]	0.00 [−0.09, 0.10]
9. Credibility of science scale									-	−0.35 [−0.43, −0.26]	−0.42 [−0.50, −0.34]
10. SDO_7 dominance										-	0.72 [0.66, 0.76]
11. SDO_7 anti egalitarian											-

Note: $N = 401$. REI = Rational-Experiential Inventory. SDO_7 = Social Dominance Orientation.

and anti-egalitarianism were less likely to endorse the non-prejudicial epistemically unwarranted beliefs yet more likely to endorse pseudoscientific epistemically unwarranted beliefs that were overtly prejudicial.

Finally, the third significant canonical function explained only 3% of explained variance in the full model, canonical $R^2 = 0.05$, Wilk's $\lambda = 0.94$, $F(12, 1037) = 2.00$, $p = .02$. The criterion variables that substantially contributed to the synthetic criterion variate were the Pseudoscientific Prejudice, Conspiracy Non-prejudice, Conspiracy Prejudice, and Paranormal Non-Prejudice subscales of the Epistemically Unwarranted Beliefs questionnaire (see Table 3). The predictor variables that substantially contributed to the synthetic predictor variate were the Intuitive subscale of the Rational-Experience Inventory, the Credibility of Science Scale, and the Dominance subscale of the SDO_7. This function suggests that individuals with a greater disposition toward an intuitive cognitive style, who held greater perceptions of science as credible, and who had higher dispositions toward social dominance were more likely to endorse prejudicial pseudoscience beliefs and non-prejudiced paranormal beliefs, but were less likely to endorse either prejudicial or non-prejudicial conspiracy theories.

2.4 | Discussion

Study 1 provides clear support for our prediction of substantial positive correlations between endorsing prejudicial and non-prejudicial unwarranted claims. Further, the canonical models revealed nuanced relationships between the assessed individual difference variables and endorsement of epistemically unwarranted beliefs. Contrary to our prediction, an analytical disposition was neither a substantial contributor to nor substantially correlated with any of the synthetic predictor variates. Regarding our other predictions, our findings suggest that there are distinct socio-cognitive profiles corresponding to greater or lesser endorsement of different kinds of epistemically unwarranted beliefs as a function of dispositions toward an intuitive style, social dominance, and perceptions of science. However, the nature of CCA is to find the linear combination of variables within a set that maximally explains the variance in a linear combination of variables within another set (Tabachnick & Fidell, 2017; Wang et al., 2020). As such, the resulting models may be an artifact of the sample, necessitating

TABLE 3 Standardized canonical function coefficients for Study 1.

	Function 1	Function 2	Function 3
Individual difference measures			
REI—Rational	0.00	−0.05	0.13
REI—Intuitive	−0.10	**−0.55**	**0.82**
Credibility of science	**0.65**	**0.53**	**0.76**
SDO_7—Dominance	**−0.40**	**0.42**	**0.50**
SDO_7—Anti-egalitarian	−0.15	**0.47**	0.05
Epistemically unwarranted belief subscales			
Pseudoscience non-prejudice	−0.13	**−0.36**	−0.06
Pseudoscience prejudice	**−0.46**	**0.71**	**0.55**
Conspiracy non-prejudice	0.03	**−0.56**	**−0.78**
Conspiracy prejudice	**−0.54**	**0.23**	**−0.56**
Paranormal non-prejudice	0.05	**−0.57**	**0.76**
Paranormal prejudice	−0.08	−0.04	0.29

Note: Bolded items indicate coefficients > |.30|.
Abbreviations: REI, Rational-Experiential Inventory; SDO, Social Dominance Orientation.

TABLE 4 Standardized canonical structure coefficients for Study 1.

	Function 1	Function 2	Function 3
Individual difference measures			
REI—Rational	0.06	−0.01	0.20
REI—Intuitive	**−0.33**	**−0.66**	**0.65**
Credibility of science	**0.88**	**0.34**	**0.34**
SDO_7—Dominance	**−0.74**	**0.51**	**0.35**
SDO_7—Anti-egalitarian	**−0.71**	**0.54**	0.09
Epistemically unwarranted belief subscales			
Pseudoscience non-prejudice	**−0.65**	**−0.44**	0.05
Pseudoscience prejudice	**−0.89**	0.23	0.19
Conspiracy non-prejudice	**−0.59**	**−0.55**	**−0.40**
Conspiracy prejudice	**−0.92**	−0.12	−0.19
Paranormal non-prejudice	**−0.46**	**−0.67**	**0.51**
Paranormal prejudice	**−0.59**	**−0.48**	**0.33**

Note: Bolded items indicate coefficients > |.30|.
Abbreviations: REI, Rational-Experiential Inventory; SDO, Social Dominance Orientation.

replication to confirm the analysis models. We therefore conducted a direct replication of Study 1.

3 | STUDY 2

3.1 | Method

3.1.1 | Participants

We recruited a convenience sample of 600 participants from Prolific, using the same compensation and exclusion criteria in Study 1, additionally excluding participants from the first study. After removing participants with incomplete data, our final sample size was 575 (age: $M = 39.1$ years, $SD = 14.5$ years; Males = 310, Females = 249, Other/Non-binary = 14, Prefer not to say = 2).

3.1.2 | Materials and procedure

The materials and procedure were identical to those in Study 1. Reliability estimates and 95% CIs for the individual difference measures in Study 2 are as follows: REI-R ($\omega_t = 0.94$ [0.92, 0.96]), REI-I ($\omega_t = 0.83$ [0.82, 0.90]), SDO_7 Dominance ($\omega_t = 0.92$ [0.92, 0.97]), SDO_7 Anti-Egalitariansim ($\omega_t = 0.95$ [0.95, 0.97]), and CoSS ($\omega_t = 0.97$ [0.96, 0.98]).

3.2 | Results

As in Study 1, we first calculated inter-item correlations for the three indicator items in each subscale: Pseudoscience Non-prejudice ($r = 0.31$), Pseudoscience Prejudice ($r = 0.46$), Conspiracy Non-prejudice ($r = 0.37$), Conspiracy Prejudice ($r = 0.59$),

Paranormal Non-prejudice ($r = 0.57$), and Paranormal Prejudice ($r = 0.38$). These values were comparable to those found in Study 1.

We next conducted a CFA to assess whether the underlying assumed factor structure of the ad hoc Epistemically Unwarranted Belief Questionnaire would replicate. Fit indices generally revealed acceptable-to-good model fit with the data, $\chi^2 = 447$, df $= 120$, $p < .001$, CFI $= 0.92$, TLI $= 0.90$, RMSEA $= 0.069$, and SRMR $= 0.052$, with only the χ^2 index suggesting less than good model fit. As with Study 1, this model was identified, with a factor complexity of 1. We therefore once again retained this six-factor model for subsequent analysis. Closely replicating the results from Study 1, and again supporting our first prediction, endorsement of prejudicial and non-prejudicial epistemically unwarranted beliefs were positively correlated, with values ranging from $r = 0.33$ to $r = 0.68$ (see Table 5). As with study 1, a sensitivity analysis revealed that our sample was sufficient to reliably detect correlation values greater than |0.08| at 95% power with $\alpha = 0.05$.

We then carried out another CCA, identical in structure to that performed in Study 1. Participants' individual difference measure scores were entered as the set of predictor variables, and responses to the six Epistemically Unwarranted Beliefs Questionnaire subscales were entered as the set of criterion variables. As with Study 1, the full model was significant, Wilk's $\lambda = .40$, $F(5, 569) = 107.2$, $p < .001$, producing five functions with squared canonical correlations of 0.53, 0.09, 0.05, 0.01, and 0.001, respectively. Only the first three functions were significant with $p < .001$ for all three (see Tables 6 and 7).

As in Study 1, the first significant canonical function, which accounted for 87% of the explained variance in the full model (canonical $R^2 = 0.53$, Wilk's $\lambda = 0.40$, $F(30, 2258) = 19.29$, $p < .001$), had a synthetic predictor variate comprised substantially of a linear combination of the Credibility of Science Scale and the Dominance subscale of the SDO_7. Deviating slightly from the findings in Study 1, the contributions to the synthetic predictor variate by the Intuitive subscale of the REI were greater, with a standardized canonical function coefficient of −0.24 (compared to −0.10 in Study 1, compare Tables 3 and

TABLE 5 Correlation of the Epistemically Unwarranted Beliefs questionnaire subscales and individual difference measures, Study 2. 95% confidence intervals in brackets.

	1	2	3	4	5	6	7	8	9	10	11
1. Pseudoscience non-prejudice	-	0.51 [0.45, 0.57]	0.55 [0.49, 0.60]	0.61 [0.55, 0.65]	0.52 [0.45, 0.57]	0.52 [0.45, 0.57]	−0.12 [−0.20, −0.03]	0.28 [0.20, 0.35]	−0.52 [−0.58, −0.46]	0.30 [0.22, 0.37]	0.29 [0.21, 0.36]
2. Pseudoscience prejudice		-	0.45 [0.39, 0.52]	0.66 [0.61, 0.71]	0.33 [0.25, 0.40]	0.43 [0.36, 0.49]	−0.16 [−0.24, −0.08]	0.18 [0.10, 0.26]	−0.52 [−0.57, −0.45]	0.49 [0.43, 0.55]	0.45 [0.38, 0.51]
3. Conspiracy non-prejudice			-	0.65 [0.59, 0.69]	0.51 [0.45, 0.57]	0.50 [0.44, 0.56]	−0.11 [−0.19, −0.03]	0.24 [0.16, 0.31]	−0.50 [−0.56, −0.44]	0.32 [0.25, 0.39]	0.28 [0.20, 0.35]
4. Conspiracy prejudice				-	0.46 [0.39, 0.52]	0.49 [0.42, 0.55]	−0.15 [−0.23, −0.07]	0.25 [0.17, 0.33]	−0.64 [−0.68, −0.59]	0.50 [0.44, 0.56]	0.50 [0.43, 0.56]
5. Paranormal non-prejudice					-	0.68 [0.63, 0.72]	−0.13 [−0.20, −0.04]	0.36 [0.28, 0.43]	−0.34 [−0.41, −0.26]	0.25 [0.17, 0.32]	0.18 [0.10, 0.26]
6. Paranormal prejudice						-	−0.11 [−0.19, −0.03]	0.33 [0.25, 0.40]	−0.39 [−0.46, −0.32]	0.31 [0.24, 0.38]	0.24 [0.16, 0.32]
7. REI rational							-	−0.06 [−0.14, 0.02]	0.23 [0.15, 0.31]	−0.16 [−0.24, −0.08]	−0.11 [−0.19, −0.03]
8. REI intuitive								-	−0.21 [−0.29, −0.13]	0.07 [−0.01 0.15]	0.01 [−0.07, 0.10]
9. Credibility of science scale									-	−0.47 [−0.53, −0.40]	−0.53 [−0.59, −0.47]
10. SDO_7 dominance										-	0.75 [0.71, 0.78]
11. SDO_7 anti-egalitarian											-

Note: $N = 575$.

Abbreviations: REI, Rational-Experiential Inventory; SDO_7, Social Dominance Orientation.

TABLE 6 Standardized canonical function coefficients for Study 2.

	Function 1	Function 2	Function 3
Individual difference measures			
REI—Rational	−0.00	−0.02	**0.31**
REI—Intuitive	−0.24	**0.80**	**−0.41**
Credibility of science	**0.67**	−0.13	**−0.98**
SDO_7—Dominance	**−0.34**	−0.08	**−0.78**
SDO_7—Anti-Egalitarian	−0.07	**−0.58**	−0.14
Epistemically unwarranted belief subscales			
Pseudoscience non-prejudice	−0.14	0.38	**0.84**
Pseudoscience prejudice	−0.26	−0.51	**−0.69**
Conspiracy non-prejudice	−0.09	0.14	**0.62**
Conspiracy prejudice	**−0.57**	**−0.56**	0.06
Paranormal non-prejudice	−0.01	**0.65**	**−0.68**
Paranormal prejudice	−0.12	**0.31**	**−0.28**

Note: Bolded items indicate coefficients > |.30|.
Abbreviations: REI, Rational-Experiential Inventory; SDO, Social Dominance Orientation.

TABLE 7 Standardized canonical structure coefficients for Study 2.

	Function 1	Function 2	Function 3
Individual difference measures			
REI—Rational	0.23	−0.03	0.25
REI—Intuitive	**−0.40**	**0.82**	−0.28
Credibility of science	**0.92**	0.03	**−0.38**
SDO_7—Dominance	**−0.72**	**−0.39**	**−0.51**
SDO_7—Anti-egalitarian	**−0.68**	**−0.55**	−0.25
Epistemically unwarranted belief subscales			
Pseudoscience non-prejudice	**−0.73**	**0.36**	**0.36**
Pseudoscience prejudice	**−0.81**	−0.28	−0.29
Conspiracies non-prejudice	**−0.72**	0.24	**0.31**
Conspiracies prejudice	**−0.95**	−0.12	0.06
Paranormal non-prejudice	**−0.56**	**0.71**	**−0.33**
Paranormal prejudice	**−0.64**	**0.53**	−0.27

Note: Bolded items indicate coefficients > |.30|.
Abbreviations: REI, Rational-Experiential Inventory; SDO, Social Dominance Orientation.

6), only slightly below a typical cutoff of |0.30| to be considered a substantial contributor to the synthetic variate. Also as in Study 1, the synthetic criterion variate in this model was made up of substantial contributions by the Conspiracy Prejudice and the Pseudoscience Prejudice subscales, although the Pseudoscience subscale was now a much smaller contributor, with a standardized canonical function coefficient of −.26 (relative to −0.46 in Study 1, compare Tables 3 and 6). As with the results from Study 1, this function suggests that higher perceptions of science as a credible enterprise and a low disposition toward social dominance predicts a low endorsement of both pseudoscientific and conspiratorial claims of an overtly prejudicial nature. This model also suggests that a low disposition toward an intuitive cognitive style contributes to the latent sociocognitive profile of people who reject prejudicial pseudoscience and conspiracy theories. The pattern of standardized canonical structure coefficients was identical to those found in Study 1 (compare Table 7 to Table 4).

The other two significant canonical functions from Study 1 did not replicate as cleanly. Given that the nature of CCA is to create orthogonal models to explain remaining variance not explained by earlier-created model(s) in the analysis, this is not entirely unexpected (Tabachnick & Fidell, 2017; Wang et al., 2020). The first canonical function explained more variance in the replication than in Study 1, leaving less residual variance for orthogonal models to explain. We describe the second and third canonical function here for the sake of completeness, though due to their substantial differences than the functions found in Study 1, we refrain from interpreting their explanatory value in the General Discussion.

The second function explained 7% of the explained variance in the full model, canonical $R^2 = 0.09$, Wilk's $\lambda = 0.85$, $F(20, 1875)$

= 4.56, $p < .001$. The predictor variables that substantially contributed to the synthetic predictor variate were the Intuitive subscale of the Rational-Experience Inventory and the Anti-Egalitarian subscale of the SDO_7. The criterion variables that substantially contributed to the synthetic criterion variate were the Pseudoscience Non-Prejudice, Pseudoscience Prejudice, Conspiracy Prejudice, and Paranormal Non-Prejudice subscales of the Epistemically Unwarranted Beliefs questionnaire (see Table 7). This function suggests that individuals with a high disposition toward an intuitive cognitive style and a low disposition toward anti-egalitarianism were more likely to endorse the non-prejudicial pseudoscience and both kinds of paranormal claims yet less likely to endorse overly prejudicial pseudoscientific or conspiratorial claims.

Finally, the third significant canonical function explained only 4% of explained variance in the full model, canonical $R^2 = 0.51$, Wilk's $\lambda = 0.93$, $F(12, 1498) = 3.23$, $p < .001$. The Pseudoscience Non-prejudice and Conspiracy Non-prejudice subscales contributed positively to the synthetic criterion variate, while the Pseudoscience Prejudice and Paranormal Non-Prejudice subscales contributed negatively. For the synthetic predictor variate, the Rational subscale of the REI contributed positively, while the Intuitive subscale of the REI, the CoSS, and the Dominance subscale of the SDO_7 contributed negatively. This function suggests individuals who are highly disposed to a reflective thinking style, have a low disposition toward an intuitive thinking style, have low perceptions of science as credible, and are not inclined toward SDO are more likely to endorse non-prejudicial pseudoscience and conspiracy claims, but less likely to endorse prejudicial pseudoscience claims and non-prejudicial paranormal claims.

4 | GENERAL DISCUSSION

We obtained evidence in two pre-registered studies that prejudicial and non-prejudicial epistemically unwarranted beliefs are both substantially positively associated and predicted by a common socio-cognitive profile. This profile appears to be largely characterized by a combination of pessimism regarding the scientific establishment's credibility and high SDO, while also associated with an intuitive thinking style. These patterns replicated in both the initial study and the direct replication to a notably similar extent in the primary canonical functions explaining the great majority of variance for both studies, notwithstanding variation in the second and third canonical functions obtained in each study. Accordingly, the results support our proposed integration of research on epistemically unwarranted beliefs with research on the determinants of prejudicial social attitudes. Research on epistemically unwarranted beliefs should more directly and explicitly attend to prejudice, as our evidence favors viewing prejudicial claims as one manifestation of epistemically unwarranted beliefs.

The term "epistemically unwarranted belief" originated in the empirical literature as a category encompassing a very diverse array of beliefs (Lobato et al., 2014). Prior to that work, much of the empirical psychological literature that examined, for example, determinants and consequences of conspiracy theory endorsement tended to not explicitly address the contributions of science denial and pseudoscience promotion as important for understanding why some people endorsed conspiracy theories (though there were exceptions, e.g., Lewandowsky et al., 2013). Since then, there has been a robust and informative program of research looking at epistemically unwarranted beliefs collectively. For example, the role of ontological confusions or category mistakes, originating from research showing that endorsement of paranormal beliefs increases positively with endorsement of ontological confusions (Lindeman & Aarnio, 2007), has been found to generalize to conspiracy theories and pseudoscience (Lobato et al., 2014; Rizeq et al., 2021). As another example, research has also found evidence of reduced susceptibility to epistemically unwarranted beliefs as a result of taking college courses on critical thinking, including for beliefs not addressed directly by the course (Dyer & Hall, 2019; McLaughlin & McGill, 2017). The purpose of the present research is, partially, as a continuation of the research by Lobato et al. (2014) assessing the degree of shared covariation and predictors for kinds of beliefs that have typically been examined in isolation.

In this instance, as reviewed in the Introduction, the empirical research on epistemically unwarranted beliefs typically has predominantly overlooked the role of prejudice in the formation, maintenance, or revision of epistemically unwarranted beliefs (though there are again some exceptions, e.g., Syropoulos et al., 2022). Our results demonstrate both systematic covariation between the overtly prejudicial unwarranted beliefs and the not-overtly prejudicial unwarranted beliefs and shared socio-cognitive profiles associated with sets of these beliefs. However, as illustrated by the better fitting six-factor CFA model that differentiated between the prejudicial and non-prejudicial forms of the three major categories of epistemically unwarranted beliefs compared to the two- or three-factor models, these kinds of beliefs are not perfectly overlapping and do not represent a unitary dimension. Thus, the results of the CCA revealed not merely a single socio-cognitive profile predicting endorsement of epistemically unwarranted beliefs, but several different socio-cognitive profiles associated with endorsement of different subsets of epistemically unwarranted beliefs. This is not unexpected. Even though fewer items per factor relative to more items per factor can result in lower factor stability when sample sizes are low (Lloret-Segura et al., 2014), our sample size was relatively large and our results align with prior research on the multidimensionality of epistemically unwarranted beliefs (termed "contaminated mindware" in Rizeq et al., 2021). It is our hope that the research we present here can serve to motivate expanding research on epistemically unwarranted beliefs in a promising direction by explicitly attending to the contributions that peoples' beliefs about prejudicial claims make to their beliefs about other epistemically unwarranted claims, whether paranormal claims about extraterrestrial visitations or pseudoscientific claims about vaccine efficacy or some other nonsensical claim. Our treatment of prejudicial epistemically unwarranted beliefs as measured distinctly from non-prejudicial epistemically unwarranted beliefs should not, even considering the results of the CFA, be taken to mean that these different "kinds" of beliefs are truly separate constructs. Rather, just as Lobato et al. (2014) pointed out that "it can be difficult to tease apart when a

pseudoscience or paranormal claim ends and a conspiracy claim begins" (p. 617) as reason for introducing the broad term 'epistemically unwarranted beliefs' in the first place, we are noting that prejudicial empirical claims do in fact frequently contain pseudoscientific, conspiratorial, or even paranormal elements. Thus, factors typically associated with prejudicial beliefs have the potential to have explanatory value for understanding epistemically unwarranted belief more generally. Perhaps prejudicial attitudes that do not contain an epistemic component—such as a personal bias against dating members of a certain racial group—could be considered a separate construct from the prejudicial epistemically unwarranted beliefs of the type we investigated. Future research assessing the degree to which nonepistemic prejudicial beliefs associate with epistemically unwarranted beliefs could help in fleshing out the boundary between prejudice qua prejudice and epistemically unwarranted worldviews.

It is worth noting that we assessed a limited selection of both epistemically unwarranted beliefs and socio-cognitive individual differences. Given the body of research examining the dimensionality of endorsing epistemically unwarranted beliefs (Čavojová et al., 2020; Dyer & Hall, 2019; Fasce & Picó, 2019; Lewandowsky et al., 2013; Lobato et al., 2014; McLaughlin & McGill, 2017; Rizeq et al., 2021; Swami, 2012), there are hundreds of claims that we might have asked about, and should be explored in future work. Further, we did not systemically vary the items in our measure in terms of valence. For example, Pennycook et al. (2022) created an ad hoc measure of endorsement of 21 COVID-19 falsehoods, some of which were optimistic and some of which were pessimistic. For our study, the claims we investigated tended more toward negative valences, with no comparable set of epistemically unwarranted claims that promoted positive or optimistic unwarranted claims (e.g., about crystal healing or benevolent sexism). The generalizability of our findings is thus an open question due to this stimulus sampling problem (Wells & Windschitl, 1999). Likewise, the socio-cognitive variables we measured represent only a subset of socio-cognitive variables that have been assessed in the context of epistemically unwarranted belief acceptance (e.g., performance-based measures of cognitive style or measures of susceptibility to the conjunction fallacy) or prejudice (e.g., measures of authoritarianism or measures of essentialist thinking), which future research should explore. On this last point, authoritarianism is of particular interest to examine for future research, as recent research findings show that although both SDO and right-wing authoritarianism (RWA) are associated with endorsement of anti-LGBTQ+ conspiracy theories, the association of such prejudiced conspiracy theories with RWA is stronger than the association with SDO (Salvati et al., 2024). By contrast, other research shows that SDO is more strongly associated than RWA is with specific COVID-19 conspiracies alleging the disease was lab-created and that the health risks were deliberately exaggerated (Zubielevitch et al., 2024). This suggests that the relationship between epistemically unwarranted beliefs and various components of political orientation or worldview is likely quite nuanced, necessitating that research into unwarranted beliefs avoid viewing political orientation as a unidimensional construct of interest.

Future research efforts exploring the socio-cognitive dimensions associated with epistemically unwarranted beliefs should also examine how replicable prior findings are when considering overtly prejudicial pseudoscience or conspiracy claims. For example, both Lobato et al. (2014) and Rizeq et al. (2021) found that a propensity toward endorsing ontological confusions, or inappropriately ascribing essential features from one core ontological category (physical, biological, or psychological) to another category (e.g., ascribing psychological properties to purely physical phenomena), predicts higher endorsement of pseudoscientific, conspiratorial, and paranormal claims (see also, Lindeman & Aarnio, 2007). Given that many socially prejudicial views include aspects of dehumanization toward out-groups, which can be considered an analogous kind of category mistake, it is reasonable to examine the association of an ontologically confused worldview with the endorsement of explicitly prejudicial epistemically unwarranted beliefs.

Our findings have implications for the development of strategies to combat epistemically unwarranted beliefs. The association between SDO and the endorsement of a broad array of epistemically unwarranted belief types, including prejudicial unwarranted beliefs, suggests that scholarly communities should not focus solely on increasing their perceived credibility with the public. Rather, in addition to efforts to enhance trust in scientific expertise, scholarly communities should leverage science to subvert empirically unwarranted assumptions prerequisite to social dominance motivations.

For example, let us consider race pseudoscience. Race pseudoscience is intrinsically hierarchical, advocates for a rigidly stratified society, and depends on the continued pseudoscientific claim of biological race categories. A unified scientific front rejecting this unfounded proposition may undermine efforts to maintain the veneer of scientific legitimacy that race pseudoscientists pretend to have. Indeed, professional organizations like the American Society of Human Genetics (2018), the American Association for Biological Anthropology (Fuentes et al., 2019), and the American Sociological Association (2003) have released anti-racism statements that explicitly reject the idea that "race" is a biological construct. By contrast, organizations like the Association for Psychological Science or Psychonomic Society do not explicitly reject "race" as a biological construct in their anti-racism statements (e.g., APS, 2020; Association for Psychological Science, 2021; Psychonomic Society, 2020). A recent meta-analysis on consensus messaging about socially controversial science topics such as climate change or genetically modified foods reveals positive effects for public endorsement of scientifically supported beliefs (van Stekelenburg et al., 2022), a pattern which should plausibly generalize to combating prejudicial forms of misinformation. The example of scientific messaging about the nonreality of biological race exemplifies an approach that combines credibility-enhancement—by promoting scientific consensus rather than allowing for the perception of scientific controversy—with a direct challenge of social dominance motivations—by rebuking a foundational claim that is used to advocate for intergroup dominance. Analogous approaches might be taken with respect to other forms of prejudice.

There is precedent for scholarly communities mobilizing at large scales to protect the integrity of science. When legislation requiring

the teaching of creationism in U.S. public schools was pushed during the 1990s and 2000s, scholars from across disciplines and nations rallied in opposition. Scholarly communities should mobilize at similar scales in opposition to prejudice, as combating epistemically unwarranted beliefs may require scholars demonstrating that we are, for example, as vigorously anti-racist as we are anti-creationist.

AUTHOR CONTRIBUTIONS

Emilio Jon Christopher Lobato: Conceptualization; investigation; writing – original draft; methodology; writing – review and editing; formal analysis; data curation; validation; visualization. **Colin Holbrook:** Writing – review and editing; supervision; investigation; project administration; validation; conceptualization.

FUNDING INFORMATION

This research was self-funded.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in OSF at https://osf.io/75ema/.

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How to cite this article: Lobato, E. J. C., & Holbrook, C. (2024). Prejudice is epistemically unwarranted belief. *Applied Cognitive Psychology*, *38*(3), e4216. https://doi.org/10.1002/acp.4216