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Abstract

The individual's susceptibility to misinformation or "bullshit" news can have tremendous effects on decision-making in today's social environment. The acceptance of misinformation surrounding COVID-19 is particularly worrisome from a public health perspective. In this thesis, I examined how scientific bullshit receptivity – an individual's tendency to perceive truthfulness in nonsensical statements concerning science – affects behaviors related to the COVID-19 vaccine. Research showed that bullshit receptivity played no role in mediating the relationship between risks, expected benefits, and the outcome variables explored: vaccination intentions, satisfaction, and regret. Contrary to predictions, research revealed a surprising relationship between bullshit receptivity and risk perception, such that a positive association exists only between bullshit receptivity and expected benefits. This finding parallels with results from Evans et al. (2020) on the relationship between scientific bullshit and literacy. Consistent with prior research, I found a negative association between perceived risks of vaccination and vaccination intentions and satisfaction, as well as a positive relationship between perceived risks and vaccination regret. In addition, correlation analyses displayed a positive association between expected benefits and vaccination intentions and satisfaction, while showing a negative association between expected benefits and vaccination regret. Exploratory analyses were also conducted, which led to interesting findings involving political orientation and its role in moderating the relationship between risks and vaccination satisfaction and regret. The results of this study offer significant contributions to ongoing research concerning COVID-19 vaccination behaviors in today's politically polarized environment.

Keywords: bullshit receptivity, COVID-19, risk perception, vaccination behaviors

Examining the Role of Bullshit Receptivity on COVID-19 Vaccination Behaviors

Have you ever written a book report for a novel you never read? Maybe you forgot you have a meeting scheduled today to update your boss on the project you have not started yet. Typically, these situations warrant what is defined as "bullshitting:" talk of nonsense to someone, usually to be misleading or deceptive (Čavojová et al., 2020). Bullshitters often overuse uncommon or pretentious vocabulary and grammar devices to project a sense of confidence and higher intelligence unto the speaker or writer to reach the common goal of acceptance. Today, the acceptance of bullshit circulating through the mass volumes of information available to us daily can have monumental effects on decision-making for the individual and society. Misinformation surrounding the COVID-19 vaccine, for example, can affect the public's intention to be vaccinated. This is particularly concerning because nearly 30% of U.S. adults do not intend to receive the COVID-19 vaccine, citing concerns of side effects and the sense that it was developed and put into action prematurely (Funk & Tyson, 2021).

One factor that may undermine the public acceptance of COVID-19 vaccines is the prevalence of pseudo-profound bullshit in the media. Pseudo-profound bullshit characterizes statements related to talk of supernatural forces or the theoretical nature of the universe (Evans et al., 2020). A considerable amount of research has been done on the individual's proclivity to accept "pseudo-profound bullshit," which has been coined as the concept of bullshit receptivity. Fake news stories are most often used in experiments examining individual differences in bullshit receptivity, due to the significant spike in fake news circulation over recent years (Pennycook & Rand, 2019).

Considering the prevalence of bullshit in popular media (e.g., fake news) and the alarmingly high rate of resistance against COVID-19 vaccination, there exists a need for

examining the potential link between bullshit receptivity and vaccination intentions specific to COVID-19. Drawing from the risk-return framework (Weber & Milliman, 1997), I aim to bridge the gap between scientific bullshit receptivity and vaccination behaviors by utilizing risk perception (perceived risks and benefits) as an explanatory mechanism. I expect that individuals with higher receptivity to perceive the vaccination as riskier and less beneficial, which in turn, will reduce their intentions to be vaccinated against COVID-19. I predict the same pattern to occur in vaccinated individuals, where higher receptivity correlates to higher risk, reducing satisfaction and increasing feelings of regret towards being vaccinated against COVID-19.

Background

The spiritual, transcendental nature of pseudo-profound bullshit shows no concern for the actual truth, as its real intentions lie within other motives. This observation supports the original definition of bullshit, where the bullshitter has no regard for whether the information is true or false and only aims to persuade his or her target audience in a certain direction (Frankfurt, 2005). Specifically, the said "profoundness" of pseudo-profound bullshit has set its roots in persuading and engaging rather than educating and informing (Pennycook et al., 2015). Bullshit, in the sense of fake news, is more concerned with media attention and engagement for goals such as social or political gain. Receptivity to bullshit, therefore, reflects the individual differences in people's proclivity to accept bullshit statements. Research has found, for example, a significant relationship between pseudo-profound bullshit and fake news reception, where individuals rating bullshit as highly profound are more likely to find accuracy in fake news stories (Pennycook & Rand, 2019). This evidence furthers the idea that bullshit receptivity is an important determining factor in the reception and detection of fake news.

In addition, those more accepting of pseudo-profound bullshit are also adamant in their support of other transcendental domains, like paranormal activity and conspiracy theories. This leaves in question whether the same could be said about bullshit pertaining to other topics. Pennycook and Rand's (2019) utilization of the Bullshit Receptivity Scale (BSR) to gauge acceptance of pseudo-profound bullshit consisted of ratings for profoundness, likeability, and truthfulness. To investigate the validity of this scale as it applies to general bullshit, Čavojová et al. (2020) designed a General Bullshit Receptivity Scale (GBRS) in the same fashion catering to a diverse range of topics, such as healthcare, politics, and relationships. The study found a significant relationship between the two categories, in which individuals rating general bullshit statements as profound, likeable, and accurate also supported epistemically suspect beliefs related to conspiracies and the supernatural.

Evans et al. (2020) extended upon these findings by developing a scale to measure scientific bullshit receptivity and investigating its correlation to pseudo-profound bullshit. Scientific bullshit was strongly correlated with pseudo-profound bullshit receptivity, upholding the results of Čavojová et al. (2020). However, in measuring individual differences in receptivity, they found that scientific bullshit receptivity was positively correlated with belief in science and negatively correlated with conservative political beliefs. Despite the existence of a general proclivity to accept bullshit statements, these findings suggest that individual correlations of scientific bullshit receptivity are not consistent across domains.

Based on the trend of receptivity correlations found, this suggests that scientific bullshit or bullshit concerning healthcare will produce similar results, so that individuals highly receptive to pseudo-scientific claims are more likely to find accuracy in conspiracy theories and misinformation about COVID-19 and vaccinations.

Previous evidence from Čavojová et al. (2020) has shown that higher receptivity to life-related bullshit directly translates into the belief of other types of misinformation. This finding appeals largely to the present environment of the pandemic, as individual differences in bullshit receptivity can directly affect participation in certain health-promoting behaviors (e.g., social distancing, mask wearing). Research shows a significant relationship between one's susceptibility to misinformation and health behaviors relevant to the pandemic. Rozenbeek et al. (2020) conducted a study over five different countries amid the pandemic (US, Spain, Mexico, UK, & Ireland), finding that high susceptibility to COVID-19 misinformation resulted in low levels of intent to vaccinate and reduced compliance with health measures to combat the virus. However, there lacks an explanatory factor for how exactly this (mis)information is assessed in order for an individual to decide to comply or not comply with encouraged health behaviors, such as vaccination against COVID-19.

As a prime example of a humanitarian crisis, the fear and uncertainty created by the continuing COVID-19 pandemic has served as a breeding ground for the proliferation of fake news on all media platforms, labeling it as a new category of misinformation (Allcott & Gentzkow, 2016). Due to the inability of verified sources, such as the CDC, to distribute confirmed information in a short period of time, unverified news and information is consumed by the public through social media and other platforms to comfort themselves with explanations. A study by Tran et al. (2020) studied the consequences of misinformation on individual risk assessments of well-known humanitarian crises (e.g., Boston Marathon). Crisis-handling professionals rated the likelihood and impact of harms that result from the circulation of misinformation (e.g., reputation, safety, privacy, decision, etc.) Results showed that the harm misinformation causes on decision-making was rated with high likelihood and high impact in all

described crises. It can be inferred from these results that individuals with higher reception to misinformation will assess the risks associated with being vaccinated against COVID-19 more seriously than the benefits associated. Therefore, today's prevalence of misinformation associated with COVID-19 vaccinations, due to its fast-paced development and distribution, will prompt individuals with higher receptivity to bullshit to outweigh risks over the return of benefits associated with this action.

In the context of being vaccinated, along with many other behaviors, there are obvious perceived risks (e.g., side effects) and benefits (e.g., protection against the virus) to receiving a COVID-19 vaccine. The risk-return model incorporates the "return" or benefits involved with engaging in risky behaviors, as well as the "riskiness of the gamble," and predict that risky decisions (e.g., decision to be vaccinated) can be explained by the trade-off between perceived risks and benefits. (Weber & Milliman, 1997). The use of risk perception in decision-making has been shown to impact both prosocial and health behaviors, specifically behaviors involving vaccination against infectious diseases (Brewer et al., 2007). Considerable research has shown risk perception to be directly linked to health-promoting behaviors. Brewer et al.'s (2007) metanalysis investigated the relationship between risk perception and influenza vaccination intentions by dividing risk into three dimensions: perceived likelihood, susceptibility, and severity. Perceived severity refers to the extent of harm an individual could cause to oneself or others if they contract the virus without being vaccinated. Likelihood is the probability that the individual will be harmed by the hazard after being vaccinated, while susceptibility is one's biological vulnerability to the hazard still after receiving the vaccine. Results from this study showed strong associations between all three risk conditions and vaccine intent; for example, individuals reporting high perceived risk of susceptibility to influenza after being vaccinated

resulted in reporting lower levels of intent to be vaccinated. This finding validates perceived risk as a predictor of vaccination behaviors, specifically the negative relationship that exists between the two variables.

An even more recent study (Zampetakis & Melas, 2021) used these same dimensions to predict COVID-19 vaccination intentions, where interactions between the risk conditions themselves were explored. It was found that when perceived benefits of receiving the vaccination were high, the effect of severity on intent was stronger for individuals who reported low susceptibility to the virus. In general, a positive overall association resulted between perceived benefits and intent. With higher return valued over risk, the results from this study coincide with the principles outlined in the risk-return model (Weber & Milliman, 1997). So that, the individual's decision to receive a vaccination depended on both the risk and value of engaging in this behavior. Overall, both studies work together to strengthen the idea that perceived risks and benefits for receiving a COVID-19 vaccine weigh heavily on one's intention to be vaccinated, as well as the lasting effects of satisfaction or regret for individuals who have received the vaccine.

Hypothesis 1a. Bullshit receptivity will be positively associated with perceived risks.

Hypothesis 1b. Bullshit receptivity will be negatively associated with expected benefits.

Hypothesis 2a. Perceived risks of vaccination will be negatively associated with vaccination intentions.

Hypothesis 2b. Expected benefits of vaccination will be positively associated with intentions to receive the vaccine.

Hypothesis 3a. Perceived risks of vaccination will be negatively associated with feelings of satisfaction for vaccinated individuals.

Hypothesis 3b. Expected benefits of vaccination will be positively associated with feelings of satisfaction for vaccinated individuals.

Hypothesis 3c. Perceived risks of vaccination will be positively associated with feelings of regret for vaccinated individuals.

Hypothesis 3d. Expected benefits of vaccination will be negatively associated with feelings of regret for vaccinated individuals.

Hypothesis 4. Perceived risks (a) and expected benefits (b) will mediate the relationship between bullshit receptivity and vaccination intentions, satisfaction, and regret.

Methods

Participants and Procedure

The participants for this study were adults (N = 262; 57.6% women; mean age = 32.1 years, SD = 17.3) recruited through a variety of social media sources including: Facebook, Instagram, Twitter, Snapchat, and Reddit. Survey respondents can also be attributed to word of mouth from friends, family, classmates, and co-workers.

The survey was administered using Qualtrics. Participants provided basic demographic information before being presented with the bullshit receptivity and risk perception scales. Based on the answer reported for current vaccination status, the participant was then guided to either the vaccination intent or satisfaction scales.

Measures

Scientific bullshit receptivity. The 10-item *Scientific Bullshit Receptivity Scale* (SBRS) created by Evans et al. (2020) was used to measure individuals' receptivity to science-related bullshit statements. Ten real scientific definitions were modified to include irrelevant scientific jargon, and participants rate each item based on truthfulness on a 7-point Likert scale with values

ranging from 1 (not truthful at all) to 7 (very truthful). A high score reflects a higher inclination to believe bullshit statements. To increase efficiency on mobile devices and minimize survey fatigue, only a listed five out of the full 10 items were utilized in this study. The list of items displayed in the survey is included in Appendix A.

Perceived risks and benefits. The following question was asked to measure participants' perceived risk in being vaccinated: "How risky do you think receiving a COVID-19 vaccine is." Responses were recorded using a 7-point Likert scale with values ranging from 1 (not at all risky) to 7 (extremely risky). Expected benefits in being vaccinated were measured by the following question: "How beneficial do you think receiving a COVID-19 vaccine is." The same scale was used for participants' responses with values from 1 (not at all beneficial) to 7 (extremely beneficial).

Vaccination intentions. Intent to be vaccinated against COVID-19 was assessed through a two-item survey adapted from the pre-vaccine development scale for COVID-19 (Huynh & Senger, 2021). The items were: 1) "How likely is it that you will get a Coronavirus (COVID-19) shot now that they are widely available?"; and 2) "If you were faced with the decision to get a Coronavirus (COVID-19) shot today, how likely is it that you would do so?" Participants indicated their intentions using a 7-point Likert scale from 1 (not at all likely) to 7 (extremely likely). These questions directly followed the risk perception portion.

Vaccination satisfaction and regret. Participants who reported already receiving a COVID-19 vaccination were not presented with the vaccination intent survey items; instead, the same scale was utilized to gauge how satisfied or dissatisfied participants were with their decision to become vaccinated against COVID-19 in a two-item survey. Participants were asked to rate the following items: 1) "To what degree are you satisfied with your decision to get

vaccinated?"; and 2) "To what degree do you regret getting vaccinated?" Satisfaction was scored on a five-item scale ranging from 1 (not at all satisfied) to 5 (very satisfied), and regret responses were recorded from 1 (not at all) to 5 (a great deal).

Coronavirus diagnosis and vaccination. Participants were asked to report their current COVID-19 vaccination status at the time of survey completion (73.5% reported to be fully vaccinated). It is important to note that data collection occurred between October and December 2021, and COVID-19 vaccines had become available for anyone 18 and older as of April 2021. Any confirmed medical diagnosis of COVID-19 was also asked to be reported, and if answered yes, participants were to state whether this was before or after receiving at least one dose of a COVID-19 vaccine. 32.7% of participants reported a COVID-19 diagnosis, with 55.4% of this sample testing positive before receiving at least one dose of a vaccine.

Political orientation. The participants also reported general left-right political placement ("Please describe your current political ideology.") on a 7-point Likert scale ranging from 1 (left/liberal) to 7 (right/conservative). The average of self-placement was close to the midpoint; ($M = 3.61$, $SD = 1.97$).

Results

Table 1 contains the correlation matrix of the study variables. I found that perceived risk was positively correlated with political orientation such that righter leaning or conservative individuals found the vaccine to be riskier than left-leaning or liberal subjects. I also found that perceived benefits were negatively correlated with political orientation such that further left-leaning individuals found the vaccine to be more beneficial than right-leaning individuals. Political orientation was also correlated with both satisfaction and regret of being vaccinated, where left-leaning individuals scored themselves as more satisfied with being vaccinated, and

right-leaning participants scored themselves as more regretful for receiving the COVID-19 vaccine. For participants that were not yet vaccinated, there exists a negative correlation between political orientation and vaccination intention such that right-leaning individuals had lower intentions of becoming vaccinated than left-leaning individuals.

I also examined age and gender differences in risk perceptions, as well as vaccination intentions and decision outcomes (e.g., regret and satisfaction). I found that males had a higher mean risk perception towards COVID-19 vaccination than females, in addition to higher scores of regret towards their decision to become vaccinated. When examining the data of unvaccinated participants, it was found that males scored lower than females based on intent to become vaccinated. A significant correlation between age and political orientation, risk perception, and vaccine satisfaction was also found. These results suggest that older participants are more right-leaning or conservative, while finding the vaccine to be less beneficial and being less satisfied with their decision to become vaccinated against COVID-19.

Hypothesis Testing

Inspection of Table 1 found no significant correlation between bullshit receptivity and perceived risks of receiving the vaccine. I found a significant correlation between bullshit receptivity and expected benefits, such that a positive relationship exists between the two variables ($r = 0.13$, $p<.05$). Contrary to hypothesis 1b, a higher inclination to believe bullshit statements resulted in higher scores of expected benefits for becoming vaccinated against COVID-19.

I also found a significant relationship in the correlation between perceived risks and vaccination intentions of individuals who have not yet received a dose of a COVID-19 vaccine. Research showed a negative correlation between the two variables, such that higher risk

perceptions of the vaccine resulted in lower intentions to become vaccinated ($r = -0.30$, $p<.05$). In addition, I also found significance in a positive relationship between expected benefits and vaccination intentions ($r = 0.60$, $p<.001$), so that a higher return of benefit over risk resulted in higher scores of intent to become vaccinated. Thus, hypotheses (2a-2b) were supported.

The correlation matrix in Table 1 was also utilized to examine relationships between perceived risks and benefits and feelings of regret or satisfaction. For participants who had received at least one dose of a COVID-19 vaccine at the time of the survey, satisfaction and regret in response to being vaccinated were scored to parallel levels of intent in unvaccinated participants. Consistent with hypothesis 3a, I found a negative association between perceived risks and satisfaction ($r = - 0.35$, $p<.001$), such that high risk perceptions resulted in low vaccination satisfaction. In turn, a positive association between expected benefits and satisfaction exists ($r =0.71$, $p<.001$), where higher scores of benefits regarding the vaccine resulted in higher levels of satisfaction for vaccinated participants, thus also supporting hypothesis 3b.

Further inspection of Table 1 found a significant positive association between perceived risks and regret ($r = 0.44$, $p<.001$), such that high risk perception resulted in higher scores of regret in response to being vaccinated. I also found significance between expected benefits and regret, where a negative relationship between the variables reflects that high scores of benefit resulted in low feelings of regret in being vaccinated against COVID-19 ($r = -0.46$, $p<.001$). The trends between these variables support hypotheses 3c and 3d.

I conducted mediation analyses, displayed in Tables 2-4, to explore the potential role of risk perception as an explanatory factor between the relationships of bullshit receptivity and vaccination intent, satisfaction, and regret. A visual representation of these intended relationships is displayed in a mediation model labeled as Figure 1.

To estimate the indirect effect of risk on the outcome of intent, mediation analysis was conducted with the bootstrapping method with bias-corrected confidence estimates. The 95% confidence interval was obtained with 1,000 bootstrap resamples (ß = 0.09, 95% CI = -0.09 to 0.39). Estimating the indirect effect of benefits on intent, the same method and confidence interval was used (ß = -0.01, 95% CI = -0.57 to 0.30). I found no significant data in either analysis, which reflects that risk perception does not mediate the relationship between bullshit receptivity and vaccination intent.

To estimate the indirect effect of risk on the outcome variable of vaccination satisfaction, the 95% confidence interval was obtained with 1,000 bootstrap resamples (ß = -0.001, 95% CI = -0.01 to 0.01). The results for the indirect effect of benefits on satisfaction were obtained utilizing the same model (ß = 0.13, 95% CI = -0.01 to 0.26). I found no significance within either mediator for the outcome variable, thus suggesting that risk perception does not mediate the relationship between bullshit receptivity and vaccination satisfaction.

To estimate the indirect effect of risk on the outcome variable of vaccination regret, the mediation analysis model was repeated like previously (ß = -0.05, 95% CI = -0.13 to 0.03). The indirect effect of benefits on vaccination regret was found under the same conditions (ß = -0.08, 95% CI = -0.18 to 0.01). I found no significant results within either mediator for the dependent variable of vaccination regret, stating that risk perception does not mediate the relationship between bullshit receptivity and vaccination regret. In sum, hypotheses 4a and 4b were not supported, such that neither risks nor benefits can be named as an explanatory factor to bridge an association between bullshit receptivity and COVID-19 vaccination behaviors.

Exploratory Analyses

I also examined political orientation as a moderator of risks and benefits towards vaccination intentions, regret, and satisfaction. So that, political orientation may significantly affect the direction and strength of the relationship between risk perception, expected benefits, and the listed outcome variables. Through linear regression analysis, interactions between risk and politics, along with benefits and politics, were assessed utilizing each outcome variable independently.

Inspection of Table 5 first found a significant interaction between risk and political orientation in Model 2 for vaccination regret (ß = 0.07, p< .01). Regarding the overall sample, I found a positive association between risk and vaccination regret. However, the moderation analysis illustrates how conservative participants were the strengthening factor for this otherwise weak association. This interaction is displayed in Figure 2. In turn, results showed another significant interaction between risk and political orientation in Model 3 for vaccination satisfaction (ß= -0.05, p<.01). Overall, I found that a negative association exists between risk and vaccination satisfaction. However, the moderation analysis shows a positive association between risk and vaccination satisfaction for liberal participants, such that higher scores of risk resulted in high levels of satisfaction. Therefore, liberalism moderated the relationship between risk and satisfaction by weakening its negative association. The significance of this interaction is displayed in Figure 3. As it pertains to vaccination intentions, I found no significant interactions between risk and political orientation. For all outcome variables, results showed no significant interactions between expected benefits and political orientation.

Lastly, political orientation as a moderator of bullshit receptivity towards risk perception of the COVID-19 vaccine was explored. Inspection of Table 6 found no significant interactions

between the two covariates for either outcome (risks and benefits), suggesting that political orientation did not play a role in affecting the strength or direction of the relationship between bullshit receptivity and risk perception.

Discussion

Misinformation surrounding the COVID-19 pandemic has only strengthened with the development of vaccines against the virus. Decision-making in all aspects, but specifically concerning healthcare, involves the utilization of risk perception, or weighing the risks and benefits of participating in a certain behavior against one another. In today's age of technology and political polarization, there existed a need to explain and operationalize the potential effects of fake news reception on critical vaccination behaviors towards COVID-19.

I attempted to bridge this gap by linking the concept of scientific bullshit receptivity to vaccination behaviors with the individual's process of risk perception. First, I examined the correlation between scientific bullshit receptivity and perceived risks and benefits towards the COVID-19 vaccines. Before gathering data for this project, I expected higher (lower) bullshit receptivity to equate with higher perceived risks (benefits) concerning vaccination. Contrary to expectations and past research, analysis displayed a positive correlation between bullshit receptivity and perceived benefits regarding the COVID-19 vaccines. This finding is interesting, as it reigns in support for the idea that individual correlates of receptivity to scientific bullshit are not consistent across domains. Such that, high belief in science and scientific literacy correlates with low receptivity to pseudo-scientific bullshit but high receptivity to scientific bullshit (Evans et al., 2020).

Second, I explored the associations between risks and benefits concerning vaccination intentions, satisfaction, and regret. Research showed a negative correlation between perceived

risk and vaccination intentions, and perceived benefits were positively correlated with intent to become vaccinated. These findings uphold recent research on the interaction between risk perception and vaccination behaviors (Zampetakis & Melas, 2021). As most participants were already vaccinated against COVID-19, I projected to see the same relationship unfold between perceived risks and benefits and measured feelings of satisfaction and regret towards having received the vaccine. As expected, perceived risk was negatively associated with feelings of vaccination satisfaction and positively associated with feelings of regret. Perceived benefits of the vaccine were positively associated with satisfaction and negatively associated with feelings of regret. This is an important finding, as previous studies have been validated beyond the scope of prediction and in real-time of COVID-19 vaccination distribution.

Lastly, I intended to measure risk perception as an explanatory factor for the relationship between scientific bullshit receptivity and vaccination behaviors. Predicting perceived risks and benefits as valid mediators between the variables, analyses showed no significant connections for any of the outcome behaviors. The lack of findings to validate or disprove the final hypothesis raises even more questions about these phenomena. Perhaps the contradictory linkage found between scientific bullshit receptivity and expected benefits of the vaccine prevented significant results of any capacity for the following mediation analyses.

As the concepts of bullshit receptivity and vaccination behaviors are guarded by individual differences (e.g., age, ethnicity, political orientation), I conducted additional exploratory analyses to offer alternate explanations in the event of failed mediation, which occurred. Conservatism was found to interact with perceived risk and vaccination regret, such that a positive association existed between the two variables in right-leaning participants. A positive association was also found between risk and vaccination satisfaction, but with liberal or

left-leaning individuals. These findings add dimension to what was established previously in this study; for example, a negative association was found between perceived risks and vaccination satisfaction, as it pertained to the overall sample.

The discrepancies made evident from these exploratory analyses, along with the disproven or nonsignificant hypotheses proposed in this study, allow for consideration of potential limitations and mitigating factors involved in the project. Most importantly, a limitation noted in Evans et al. (2020) pertaining to the SBRS could have also been perpetuated in this study. Some participants may have lacked the expertise to properly evaluate the scientific statements included in the scale, therefore failing to identify any elements of either truth or nonsense. This explanation could be supported by the lack of concrete findings between the first set of hypotheses, as confusion could have led to randomized answers. Additionally, the scale items gathered from the SBRS (Evans et al., 2020) focused only on physical science, rather than specific or diverse science-related topics. If a specific set of scale items was developed concerning scientific but controversial issues (e.g., vaccines, global warming), the results may have been significantly impacted.

Ultimately, this study made proactive strides in highlighting the concept of scientific bullshit receptivity and raising awareness on the multiple aspects to consider in decision-making, especially in today's social and political climate.

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Table 1

The correlations between bullshit receptivity, risk perception, satisfaction, intent, age, and political orientation.

	Political Orientation	Risks	Benefits	Vaccination Satisfaction	Vaccination Regret	Bullshit Receptivity	Age	Vaccination Intentions
Political Orientation	-							
Risks	0.36***	-						
Benefits	-0.44***	-0.51***	-					
Vaccination Satisfaction	-0.35***	-0.35***	0.71***	-				
Vaccination Regret	0.31***	0.44***	-0.46***	-0.63***	-			
Bullshit Receptivity	0.04	-0.12	0.13*	0.10	-0.02	-		
Age	0.25***	0.02	-0.19**	-0.19*	0.02	-0.17*	-	
Vaccination Intentions	-0.28*	-0.30*	0.60***			0.05	0.24	-

Note: *** = p<.001, ** = p<.01, * = p<.05

Table 2

Results of vaccination intent mediation analysis.

Type	Effect	Estimate	SE	Lower	Upper	ß	z	p
Indirect	Bullshit receptivity → Risk→ Vaccination Intent	0.09	0.13	-0.10	0.39	0.03	0.74	0.46
	Bullshit receptivity → Benefits→ Vaccination Intent	-0.01	0.21	-0.57	0.30	-0.005	-0.06	0.95
Component	Bullshit receptivity → Risk	-0.36	0.42	-1.25	0.42	-0.13	-0.87	0.382
	Risk→ Vaccination Intent	-0.26	0.10	-0.49	-0.10	-0.27	-2.52	0.01
	Bullshit receptivity → Benefits	-0.02	0.33	-0.82	0.46	-0.01	-0.06	0.95
	Benefits→ Vaccination Intent	0.64	0.15	0.30	0.86	0.61	4.42	<.001
Direct	Bullshit receptivity → Vaccination Intent	0.05	0.29	-0.56	0.57	0.02	0.17	0.87
Total	Bullshit receptivity → Vaccination Intent	0.13	0.37	-0.59	0.85	0.05	0.35	0.73

Table 3

Results of vaccination satisfaction mediation analysis.

Type	Effect	Estimate	SE	Lower	Upper	ß	z	p
Indirect	Bullshit receptivity → Risk→ Vaccination Satisfaction	-0.001	0.007	-0.01	0.01	-9.23e-4	-0.19	0.85
	Bullshit receptivity → Benefits→ Vaccination Satisfaction	0.13	0.07	-0.01	0.26	0.09	1.80	0.07
Component	Bullshit receptivity → Risk	-0.20	0.16	-0.52	0.11	-0.09	-1.27	0.20
	Risk→ Vaccination Satisfaction	0.006	0.03	-0.06	0.07	0.01	0.19	0.85
	Bullshit receptivity → Benefits	0.32	0.18	-0.02	0.67	0.13	1.82	0.07
	Benefits→ Vaccination Satisfaction	0.39	0.03	0.33	0.44	0.70	13.60	<.001
Direct	Bullshit receptivity → Vaccination Satisfaction	0.007	0.07	-0.13	0.15	0.005	0.10	0.92
Total	Bullshit receptivity → Vaccination Satisfaction	0.13	0.09	-0.06	0.32	0.10	1.34	0.18

Table 4

Results of vaccination regret mediation analysis.

Type	Effect	Estimate	SE	Lower	Upper	ß	z	p
Indirect	Bullshit receptivity → Risk→ Vaccination Regret	-0.05	0.04	-0.13	0.03	-0.03	-1.21	0.23
	Bullshit receptivity → Benefits→ Vaccination Regret	-0.08	0.05	-0.18	0.01	-0.05	-1.74	0.08
Component	Bullshit receptivity → Risk	-0.20	0.16	-0.51	0.11	-0.09	-1.26	0.21
	Risk→ Vaccination Regret	0.25	0.05	0.14	0.35	0.29	4.49	<.001
	Bullshit receptivity → Benefits	0.33	0.18	-0.02	0.67	0.13	1.83	0.07
	Benefits→ Vaccination Regret	-0.26	0.05	-0.32	-0.16	-0.34	-5.24	<.001
Direct	Bullshit receptivity → Vaccination Regret	0.09	0.12	-0.15	0.33	0.05	0.77	0.44
Total	Bullshit receptivity → Vaccination Regret	-0.04	0.14	-0.32	0.24	-0.02	-0.28	0.78

Table 5

Results of exploratory moderation analyses for political orientation on outcome variables.

Vaccination Intentions												
	Model 1				Model 2				Model 3			
	Estimate	SE	t	p	Estimate	SE	t	p	Estimate	SE	t	p
Intercept	1.98	0.90	2.19	0.03	1.77	1.77	1.00	0.32	0.72	2.06	0.35	0.73
Risks	-0.25	0.10	-2.39	0.02	-0.20	0.38	-0.53	0.60	-0.13	0.38	-0.35	0.73
Benefits	0.59	0.12	5.09	<.001	0.59	0.12	5.04	<.001	0.93	0.36	2.57	0.01
Political Orientation	-0.02	0.13	-0.15	0.89	0.02	0.35	0.07	0.95	0.26	0.42	0.63	0.53
Risks * Political Orientation					-0.01	0.07	-0.13	0.89	-0.02	0.08	-0.32	0.75
Benefits * Political Orientation									-0.09	0.09	-1.00	0.32
Vaccination Satisfaction												
	Model 1				Model 2				Model 3			
	Estimate	SE	t	p	Estimate	SE	t	p	Estimate	SE	t	p
Intercept	9.45	0.27	34.5	<.001	9.09	0.29	31.4	<.001	9.29	0.49	18.9	<.001
Risks	0.01	0.04	0.15	0.88	0.19	0.07	2.82	0.01	0.17	0.07	2.39	0.02
Benefits	0.36	0.03	10.6	<.001	0.35	0.03	10.9	<.001	0.32	0.06	5.01	<.001
Political Orientation	-0.07	0.03	-2.50	0.01	0.05	0.05	1.07	0.29	-0.003	0.12	-0.03	0.98
Risks * Political Orientation					-0.05	0.02	-3.24	0.001	-0.05	0.02	-2.65	0.01
Benefits * Political Orientation									0.01	0.02	0.51	0.61
Vaccination Regret												
	Model 1				Model 2				Model 3			
	Estimate	SE	t	p	Estimate	SE	t	p	Estimate	SE	t	p
Intercept	2.16	0.47	4.56	<.001	2.70	0.51	5.33	<.001	1.74	0.85	2.03	0.04
Risks	0.21	0.06	3.31	0.001	-0.06	0.12	-0.50	0.62	0.01	0.13	0.08	0.94
Benefits	-0.24	0.06	-4.16	<.001	-0.23	0.06	-4.10	<.001	-0.01	0.12	-0.86	0.39
Political Orientation	0.11	0.05	2.14	0.03	-0.07	0.08	-0.89	0.37	0.19	0.20	0.91	0.36
Risks * Political Orientation					0.07	0.03	2.74	0.01	0.06	0.03	1.81	0.07
Benefits * Political Orientation									-0.04	0.03	-1.40	0.16

Table 6

Results of exploratory moderation analysis for political orientation on risk perception.

Risks								
	Model 1				Model 2			
	Estimate	SE	t	p	Estimate	SE	t	p
Intercept	2.74	0.49	5.58	<.001	2.07	0.85	2.44	0.02
Bullshit Receptivity	-0.35	0.15	-2.34	0.02	-0.11	0.29	-0.39	0.70
Political Orientation	0.34	0.06	6.00	<.001	0.52	0.20	2.67	0.01
Bullshit Receptivity*Political Orientation					-0.06	0.07	-0.97	0.33
Benefits								
	Model 1				Model 2			
	Estimate	SE	t	p	Estimate	SE	t	p
Intercept	5.65	0.56	10.1	<.001	5.58	0.97	5.75	<.001
Bullshit Receptivity	-0.49	0.06	-7.60	<.001	-0.47	0.22	-2.11	0.04
Political Orientation	0.37	0.17	2.14	0.03	0.39	0.33	1.18	0.24
Bullshit Receptivity*Political Orientation					-0.01	0.08	-0.08	0.94

Figure 1

Mediation model for indirect effect of risk perception on the relationships between bullshit receptivity and vaccination intentions, regret, and satisfaction.

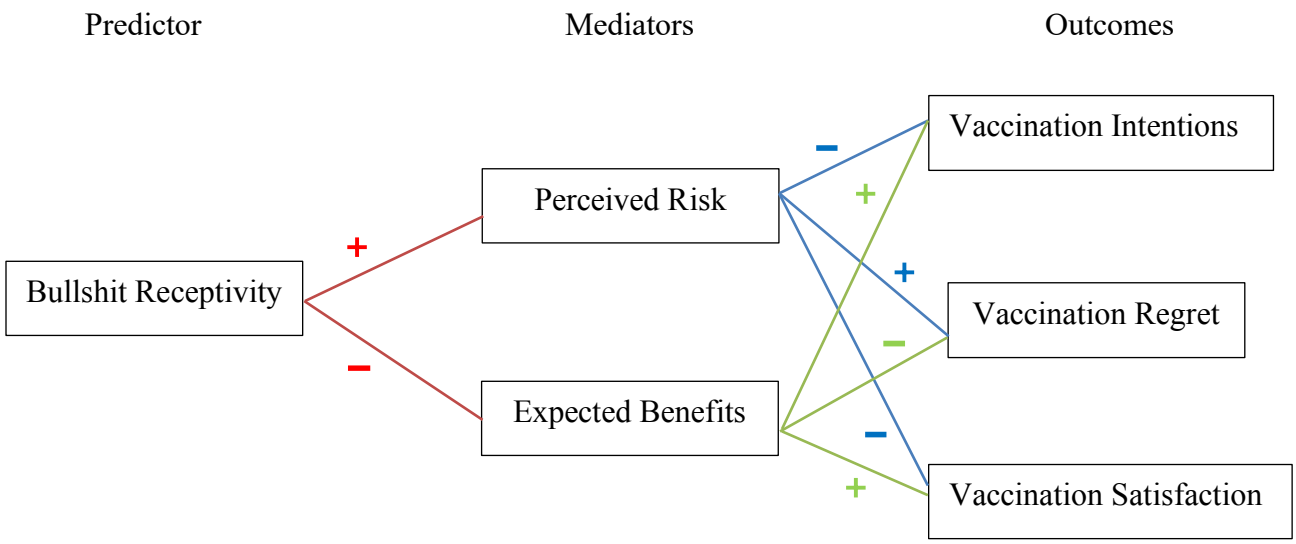


Figure 2

The relationship between risk and vaccination regret moderated by political orientation.

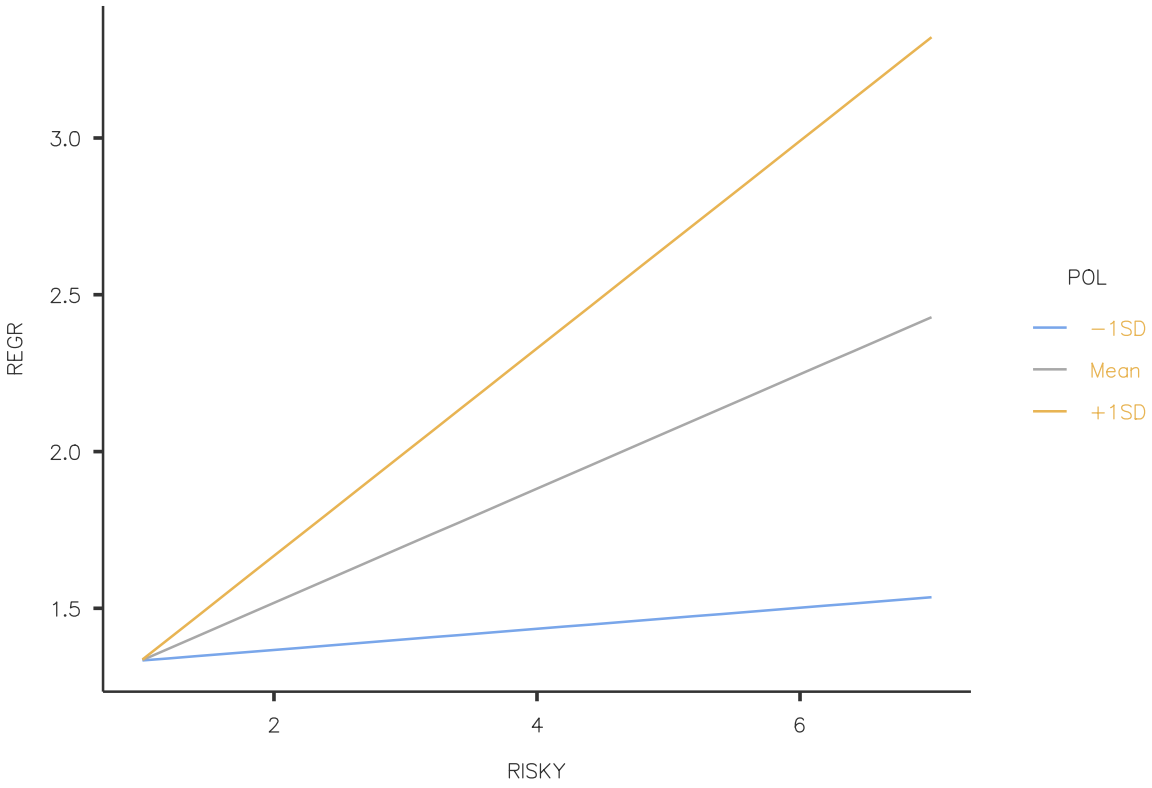
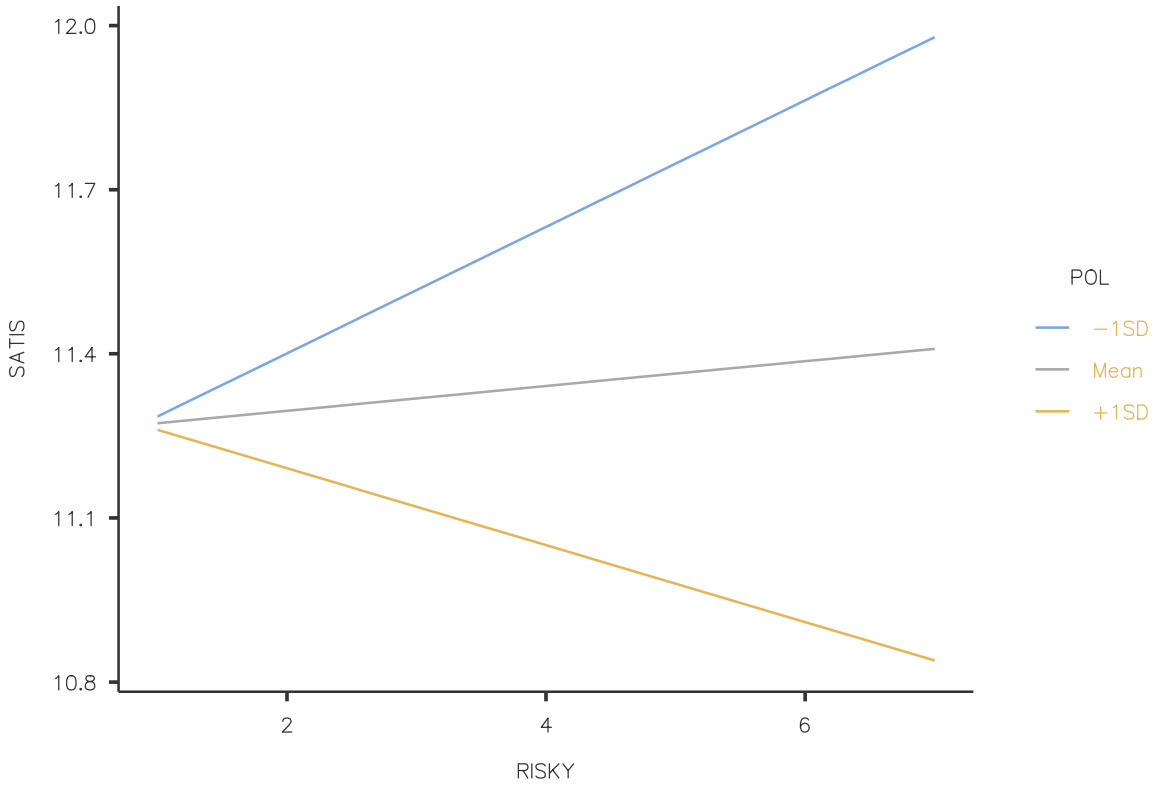


Figure 3

The relationship between risk and vaccination satisfaction moderated by political orientation.



Appendix A

Scientific Bullshit Receptivity Scale (SBRS) (Evans et al., 2020)

Please read each statement and take a moment to think about what it might mean. Then please rate how "truthful" you think it is.

Truthfulness is defined as 'the property (of a statement) of being in accord with fact or reality'.

(1) Not at all truthful (2) (3) (4) (5) (6) (7) Very Truthful

1 In all thermal equilibria, if no surface tension is applied nor any refraction imposed upon the object, the capacity of that atomic structure disperses throughout the object.

2 There are no transverse waves when the total magnetic sublimation through a stiff photon is equal to its scattered matrix.

3 The thermal conduction capacity is approximately equal to the total internal reflection of a set of linear actuators.

4 The sum of the derivative differences encountered in an alternating current during any destructive interference is zero.

5 For a dispersed force induced on a shortwave radiation, the acceleration produced is proportional to the amplitude of its separation from particle charge.

Appendix B

Perceived Risks and Benefits Survey Items

Perceived Risks

1. How risky do you think receiving a COVID-19 vaccine is?

(1) Not at all risky (2) (3) (4) (5) (6) (7) Extremely risky

Perceived Benefits

1. How beneficial do you think receiving a COVID-19 vaccine is?

(1) Not at all beneficial (2) (3) (4) (5) (6) (7) Extremely beneficial

Appendix C

Vaccine Intent/Satisfaction Survey Items

Vaccine Intent

1. How likely is it that you will get a Coronavirus (COVID-19) shot now that they are widely available?
2. If you were faced with the decision to get a Coronavirus (COVID-19) shot today, how likely is it that you would do so?

(1) Not at all likely (2) (3) (4) (5) (6) (7) Extremely likely

Vaccine Satisfaction

1. To what degree are you satisfied with your decision to get vaccinated?

(1) Not at all satisfied (2) Not satisfied (3) Neutral (4) Satisfied (5) Very satisfied

2. To what degree do you regret getting vaccinated?

(1) Not at all (2) A little (3) Neutral (4) A moderate amount (5) A great deal