Predictors of the intention to receive a SARS-CoV-2 vaccine

Brian P. Meier[1], Amanda J. Dillard[2], Courtney M. Lappas[3]

[1]Department of Psychology, Gettysburg College, Gettysburg, PA 17325, USA
[2]Department of Psychology, Grand Valley State University, Allendale, MI 49401, USA
[3]Department of Biology, Lebanon Valley College, Annville, PA 17003, USA
Address correspondence to Brian P. Meier, E-mail: bmeier@gettysburg.edu.

ABSTRACT

Background It is imperative to understand the predictors of vaccine hesitancy for current and future pandemics.

Methods A representative sample (age, race & gender) of 1054 US adults was collected in October 2020 to examine the predictors of vaccine hesitancy. Participants were asked several questions including their intention to receive a vaccine for the novel coronavirus.

Results Predictors significantly associated with a greater intention to receive a COVID-19 vaccine included greater perceived feelings of vulnerability to COVID-19, having received a flu vaccination at the time the question was asked, more liberal political orientation, non-Black race, male gender, and a lower naturalness bias.

Conclusions Vaccines are essential for mitigating current and future pandemics. Multiple strategies are important in encouraging people to be vaccinated and the predictors highlighted here and elsewhere are likely to be useful targets.

Introduction

The novel coronavirus (SARS-CoV-2) that causes COVID-19 created a pandemic that researchers hope will be mitigated by the deployment of safe and effective vaccines[1]. However, vaccine hesitancy might diminish the impact of this protective measure[2] especially considering that approximately 70% of a population needs to have natural or vaccine-generated immunity in order to combat a pandemic[3]. It is imperative to understand the predictors of the intention to receive a SARS-CoV-2 vaccine in order to help us understand vaccine hesitancy in this pandemic and in future pandemics. We examined potential predictors in a sample of adults that was representative of the US population.

Methods

The study was approved by the first-author's IRB and informed consent was obtained. Data were collected on 28–30 October 2020 from a convenience sample using Prolific.co. The sample was representative of the US population based upon age, gender and race. Data were collected from 1072 participants (18 participants who failed an attention check/did not complete questions were removed.) Demographic data included the following categories for gender: 514 males, 540 females, and race: 793 White, 139 Black, 71 Asian, 27 Mixed, 24 other. Participants' average age was 45.36 (SD = 16.21) years (Table 1).

Participants were asked about their intention to receive a vaccine using a 7-point scale (1 = not at all likely to 7 = very likely): 'How likely is it that you will actually get a COVID-19 vaccine when one is available to you?'. The average intention was 5.12 (SD = 1.98) with 30% of the sample (314 of 1054) at or below the scale mid-point.

Participants also answered questions about several factors that could be predictors of vaccine acceptance[1–8]. Two questions examined risk perception: one focused on probability-based perceived risk of contracting COVID-19: 'If you do not get a COVID-19 vaccine, how likely is it that you will contract COVID-19 at some point in the future?' (1 = no chance of happening to 7 = certain chance of happening; $M = 4.40$; $SD = 1.48$); and one focused on feelings-based perceived risk of contracting COVID-19: 'If you do not get a COVID-19 vaccine, how vulnerable will you be to contracting COVID-19 at some point in the future?' (1 = not at all vulnerable to 7 = very vulnerable; $M = 4.83$; $SD = 1.75$).

Additional questions examined political orientation (1 = very conservative/very much a Republican to 9 = very Liberal/very much a Democrat; $M = 6.07$; $SD = 2.40$), the tendency to engage in the naturalness bias when choosing a synthetic or natural drug for a hypothetical medical condition (1 = I

Brian P. Meier, Ph.D

Amanda J. Dillard, Ph.D

Courtney M. Lappas, Ph.D

Table 1 Results of the multiple regression analysis predicting the intention to receive a COVID-19 vaccine[a]

Predictor	β	P	b (95% CI)
Risk perception—feelings of vulnerability	.34	<.001*	.38 (.30, .45)
Risk perception—probability	.06	.06	.08 (−.003 .17)
Political orientation	.13	<.001*	.10 (.06, .15)
Naturalness bias	−.09	.001*	−.09 (−.14, −.03)
Age	−.05	.044	−.01 (−.01, .00)
Flu vaccination (0 = no; 1 = yes)	.28	<.001*	1.09 (.89, 1.29)
Gender (0 = male; 1 = female)	−.10	<.001*	−.38 (−.58, −.19)
Race (0 = non-Black; 1 = Black)	−.13	.004*	−.76 (−1.27, −.25)
Race (0 = non-Asian; 1 = Asian)	−.03	.39	−.25 (−.82, .32)
Race (0 = non-White; 1 = White)	−.02	.67	−.10 (−.55, .35)

$R^2 = .37$

[a]The data were collected as part of a project investigating vaccine messaging in which participants received either no message or one of two messages before completing the measures. Both messages focused on how vaccines stimulate a person's immune response, but one referred to the immune response as 'natural' because we were interested in determining if thinking about vaccines as triggering one's 'natural' immune response would heighten intentions to receive a vaccine. This manipulation did not result in the hypothesized effect and the multiple regression analysis reported here include a message versus no message factor in order to statistically control for this manipulation. However, the results are identical when this factor is not included in the analysis.

Political orientation: higher numbers = a more Liberal orientation

*= significant at the .005 alpha level (we used a conservative Bonferroni correction factor: .05 alpha level/10 predictors = new alpha level of .005 for the analysis.)

strongly prefer the synthetic drug to 9 = I strongly prefer the natural drug; $M = 6.45; SD = 1.95$), and flu vaccination status at the time the question was asked (no = 538; yes = 516). Participants also answered demographic questions and other questions less central to the current focus.

Results

A multiple regression analysis was used to determine which variables were predictors of the intention to receive the vaccine. The results are shown in Table 1. The standardized beta (β) for each predictor reveals the strength of the association and allows one to compare predictors. Predictors significantly associated with a greater intention to receive a COVID-19 vaccine included greater perceived feelings of vulnerability to COVID-19, having received a flu vaccination at the time the question was asked, more liberal political orientation, non-Black race, male gender, and a lower naturalness bias. Risk perception based upon probability, age, Asian race and White race were not significant predictors.

Discussion

Main findings of this study
The data provide useful insight regarding factors that influence intention to receive a vaccination against SARS-CoV-2.

What is already known on this topic
The current data confirm other findings showing that females and Black individuals are less willing to receive the vaccine[8]. These demographic variables along with others found in past work, such as lower education attainment and lower income[8], are important individual characteristics for clinicians to target in the goal of developing immunity in 70% of the population[3].

What this study adds
Perceived vulnerability to COVID-19 was the strongest predictor of the intention to be vaccinated. Yet, perceived probability of getting the virus did not predict intention. This novel finding in this context coincides with work showing that feelings-based versus probability-based risk perception better predicts health behavior intentions[5,7]. Such results suggest that heightening people's perceived vulnerability to or fear of COVID-19 compared to their perceived risk of contracting COVID-19 might better increase intentions to receive the vaccine. Additionally, the novel finding that a greater naturalness bias is negatively related to the intention to receive a COVID-19 vaccine suggests that the synthetic nature of vaccines may contribute to vaccine hesitancy. Messages that combat the negative view of synthetic substances might further enhance vaccine intentions[6]. Both of these findings add to the vaccine

hesitancy literature and would likely be found in future vaccination attempts.

Limitations of this study

A convenience sample was used in the current study, so it is unclear if the findings would be confirmed with a random sample of people in the USA. Yet, some of the significant predictors have been found in other studies, which suggest that the current sample does not appear to differ in a meaningful way from a general sample of people in the USA.

Conclusions

Vaccines are essential for mitigating pandemics. Multiple strategies are important in encouraging people to be vaccinated and the predictors highlighted here and elsewhere are likely to be useful targets to include.

Data Availability

The data underlying this article will be shared on request to the corresponding author.

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