

# The role of trust, hesitancy, and personal autonomy on COVID-19 vaccination behavior



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## Abstract

Since the onset of the COVID-19 pandemic, the successful development and distribution of COVID-19 vaccines has been a primary focus of the United States' pandemic response. However, dissemination has been highly contingent upon public trust and acceptance of the vaccine and of those who promote it. Current public health messaging assumes vaccine hesitancy; however, little is known about if and why hesitancy might occur. Two possibilities are examined in the present research: trust and autonomy. Theoretically, public health messaging can risk undermining personal *autonomy* (Self-Determination Theory), leading to less self-determined motivation and greater distrust. Three forms of motivation for behavioral regulation were considered—identified regulation, introjected regulation, and external regulation. The aims of this study were as follows:

1. Describe the overall levels of vaccine trust and hesitancy within a sample of vaccinated and unvaccinated adults.
2. Evaluate mean differences in vaccine trust and hesitancy, respectively, between vaccinated and unvaccinated groups.
3. Analyze the relationship of autonomous motivation (identified) and other motivation types (external, introjected) with hesitancy and trust, respectively.
4. Evaluate mean differences in autonomous motivation (identified) and other motivation types (external, introjected), respectively, between vaccinated and unvaccinated groups.

The results of this study support concerns that hesitancy and lack of trust are related to poorer vaccination behavior, with the unvaccinated group having significantly higher hesitancy and lower trust than the vaccinated group. Overall, nearly half of all respondents were at least somewhat hesitant towards the COVID-19 vaccine; however, 96% of unvaccinated respondents reported hesitancy, compared to only 37% of vaccinated respondents. Support was also provided for the theoretical conception that more autonomous motivation is related to greater vaccination behavior, as the vaccinated sample reported statistically higher levels of identified and introjected regulation, and slightly lower levels of external regulation than the unvaccinated, underscoring autonomous choice as a relevant component of vaccination decisions. These findings should be utilized to consider how public health messaging can be better crafted to support, rather than undermine, personal autonomy when promoting vaccine uptake.

## Introduction

Since the onset of the COVID-19 pandemic, the successful development and distribution of COVID-19 vaccines has been a primary focus of the United States' pandemic response. However, dissemination has been highly contingent upon public trust and acceptance of the vaccine and of those who promote it. Public health authorities encourage COVID-19 vaccination, deeming low vaccination rates a threat to health security, contributing to an inability to combat community spread. Yet, despite continued public health efforts, as of October of 2021, only 64.88% of Americans had been vaccinated against COVID-19 [1].

## Hesitancy

Public health professionals often assume vaccine hesitancy to be the primary reason for low vaccination rates. Quinn and colleagues summarize vaccine hesitancy as “the full range of attitudes and behaviors surrounding vaccine delay and refusal” [2]. Defined this way, the authors found hesitancy to be a significant, negative predictor of current season flu vaccine and flu vaccination in the past five years ( $b = -0.71$ ). Another study found that for those with vaccine hesitancy, self-reporting they will “definitely not get a vaccine” was significantly weakly and negatively correlated with COVID-19 vaccine uptake rates ( $r = -0.06$ ) [3]. A current challenge facing researchers is the lack of an agreed upon standard for how hesitancy should be measured and whether hesitancy is directly related to vaccine

acceptance [2]. Overall, given the novelty of COVID-19 and the COVID-19 vaccine, there is still much to learn about the relationship of hesitancy and vaccination and why hesitancy might occur. Two possibilities are examined in the present research: trust and autonomy.

### *Trust*

Larson and colleagues define trust as “a relationship that exists between individuals, as well as between individuals and a system, in which one party accepts a vulnerable position, assuming the best interests and competence of the other, in exchange for a reduction in decision complexity” [4]. They go on to illustrate that trust, as it pertains to vaccination, involves several components: trust in the product (the vaccine), trust in the provider (healthcare professionals or staff that are involved in administering vaccination), and trust in the policymaker (the health system, government, vaccine companies, and public health researchers involved in approving and recommending the vaccine) [4]. Recent research has found that concerns regarding these proposed levels of trust and hesitancy have played a role in vaccine uptake. For example, Quinn and colleagues found that self-reported, overall trust in vaccines had a significant, negative correlation with flu vaccine hesitancy ( $r = -0.72$ ), which then predicted vaccination behavior [2]. Additionally, Khairat and colleagues identified that two of the three most reported reasons for vaccine hesitancy involved trust: lack of trust in the COVID-19 vaccine and lack of trust in the government [3].

### *Autonomy*

Another possible explanation of hesitancy is a perceived lack of personal autonomy in the regulation of vaccination behavior. Self-determination theory describes *autonomous motivation* as involving “a sense of choice and volition as a person fully endorses his or her own actions” [5]. The theory posits that autonomy is often more effective at encouraging health behavior change than the use of coercion or extrinsic rewards. However, the perceived level of autonomy that accompanies behaviors where the benefits motivating behavioral regulation are extrinsic to the behavior itself, such as vaccination, varies greatly, and can be undermined by lack of choice, insufficient rationale, use of coercion, and imposition of threats, deadlines, or external rewards [6].

Vaccine messaging can often take a more coercive or threatening tone, fail to recognize personal beliefs or

values, neglect sufficient rationale, and limit or rebuke personal choice in decision making. Theoretically, such health messaging aimed at vaccine uptake can risk undermining personal autonomy, leading to less self-determined motivation to regulate vaccination behavior, greater hesitancy surrounding vaccine compliance, and greater distrust in entities attempting to motivate vaccine behavior in this manner [5, 6].

At the time of this study (October 2021 – January 2022), COVID-19 vaccine options had been available to the public in the United States for nearly a year. The first case of the COVID-19 Omicron Variant (B.1.1.529) was detected in the United States in November 2021 and subsequently became widespread [7]. As a result, there was a continued push for greater vaccination rates from public health agencies, yet mixed messaging was being delivered to the public. Over time, mistrust of public health authorities and their recommendations grew. Anecdotally, through the process of public health and extension education on vaccination, the authors observed a common occurrence of community members expressing their concern with the coercive nature of COVID-19 vaccination messaging. Community members felt the messaging suggested an undermining of their personal autonomy, questioning messenger intentions, and felt the need to counter such messaging to maintain autonomy. Thus, it is possible that perceived level of autonomy is related to hesitancy, trust, and vaccination behavior. However, limited research has attempted to expand upon these theoretical conceptions. Therefore, the aims of this study were as follows:

1. Describe the overall levels of vaccine trust and hesitancy within a sample of vaccinated and unvaccinated adults.
2. Evaluate mean differences in vaccine trust and hesitancy, respectively, between vaccinated and unvaccinated groups.
3. Analyze the relationship of autonomous motivation (identified) and other motivation types (external, introjected) with hesitancy and trust, respectively.
4. Evaluate mean differences in autonomous motivation (identified) and other motivation types (external, introjected), respectively, between vaccinated and unvaccinated groups.

**Methods**

*Design/Procedures*

This was a cross-sectional survey study conducted using Qualtrics management software. Participants were invited to complete a brief, anonymous survey, and informed consent was obtained. Participation was voluntary. Data was collected over a year after the COVID-19 pandemic’s onset from October 2021 – January 2022 during the rise of the Omicron variant. Participants were recruited via social media, email, and word of mouth. There were no exclusion criteria other than age ( $\geq 18$  years of age).

*Participants*

The data set included 144 adult participants ( $\geq 18$  years of age), all of whom were Texas state residents. 81% of respondents were self-reported to be vaccinated against COVID-19. The majority of respondents were white (86.1%), female (72.2%), and of a Christian faith (82.6%). Additional descriptive data are provided in Table 1. Thirty-two participants were excluded due to incomplete data. For specific analyses, two subgroups were created based on current vaccination status: those who had been vaccinated with at least a single dose (VAX,  $n = 117$ ) and those who had not (NOVAX,  $n = 27$ ).

**Table 1.** Participant characteristics

Variable	Overall (N=144)
Age (years)	40.04 ± 16.67
Sex (%)	
Male	27.3
Female	72.2
Ethnicity (%)	
Hispanic	22.9
Race (%)	
White	86.1
Black/African American	7.6
Asian	6.3
Other	1.5
BMI (kg/m <sup>2</sup> )	26.39 ± 5.95
Are you a Christian (% , Yes)	82.6
Religious Denomination (%)	
Protestant	29.2
Catholic/Orthodox	29.2
Non-denominational	24.3
Other	17.4
Prior Positive COVID Test? (%)	
Yes	25.7
No	74.3
Prior COVID Infection (%)	
Yes	17.8
No	82.2
Chronic Disease Risk Factors (%)	
Hypertension	17.5
High Blood Cholesterol	15.5
Obesity	12.8
Arthritis	11.3
Skin Cancer	5.6
Diabetes	4.3
Other types of cancer	4.3
Coronary Heart Disease	3.5
Kidney disease	1.4
Stroke	0.7

## Measures

### *Personal Descriptives & Health Status*

Participants were first asked to provide their age, assessed in years, as well as their sex, race, ethnicity, and religious affiliation. Height and weight, recorded in feet/inches and pounds (lbs), respectively, were self-reported and utilized to configure BMI during statistical analysis. Participants were also asked to self-report their health status on a five-point scale (poor to excellent), and if they had ever been informed by a health professional that they have one or more of the following risk factors for COVID-19: hypertension, high blood cholesterol, coronary heart disease, stroke, diabetes (type 2), skin cancer, other types of cancer, arthritis, kidney disease, and obesity. Finally, participants were asked if they had ever tested positive for COVID-19 (yes/no), believed to have been previously infected by the coronavirus that causes COVID-19 (SARS-CoV-2) (yes/no), and if they had received one or more doses of a COVID-19 vaccine (yes/no).

### *Hesitancy & Trust*

For the measurements of hesitancy and trust, we adapted questions from a 2019 flu vaccination study (Quinn et al, 2021), tailoring the language to apply to COVID-19 vaccination [2]. The adapted questions are listed as follows. For hesitancy, participants were asked, *Overall, how hesitant were you about getting the COVID-19 vaccine*, which was measured on a four-point scale ranging from (1) *not at all hesitant* to (4) *very hesitant*. Trust was measured on a five-point scale, ranging from *not at all to completely*, and included: *Do you trust the COVID-19 vaccine; Do you trust the recommendations of public health officials regarding the COVID-19 vaccine; Do you think getting the COVID-19 vaccine is necessary; Do you think getting the COVID-19 vaccine is safe; and Do you think getting the COVID-19 vaccine is effective?*

### *Motivation*

This study analyzes three forms of motivation for behavioral regulation: identified regulation, introjected regulation, and external regulation. *Identified regulation*, the most autonomous of the three, describes regulating a behavior that has been integrated into one's sense of self and/or aligns with personal values [5]. Those exhibiting identified regulation perceive freedom of choice in their behavior (e.g., to get vaccinated) because the behavior aligns with their personal values and beliefs, rather than external pressures to behave or choose in a particular way.

*Introjected regulation* describes behavior that is driven by contingencies of self-esteem, feeling proud when behaving in accordance with a certain behavior, or guilt and shame when failing to do so [5]. *External regulation*, the least autonomous of the three, describes behavior motivated by external reward, pressure, disapproval, or punishment [5].

To assess motivation, questions from a 2021 flu vaccination study (Moon et al, 2021) were modified for COVID-19 vaccination, using a five-point scale ranging from *strongly disagree* to *strongly agree* [8]. Adapted questions for *identified regulation* included: *I fully support the decision to get vaccinated; I find getting vaccinated personally meaningful; and Getting vaccinated aligns with my personal values* ( $\alpha = 0.81$ ). Adapted *introjected regulation* questions included: *I would have felt bad about myself if I did not get the COVID-19 vaccine; I would feel guilty if I did not get the COVID-19 vaccine; and Others would disapprove of me if I did not get the COVID-19 vaccine* ( $\alpha = 0.70$ ). Finally, adapted *external regulation* questions included: *I felt pressure to get vaccinated; I felt obligated to get vaccinated; and I would be criticized if I did not get vaccinated* ( $\alpha = 0.73$ ).

## Statistical Analysis

For Aim 1, mean, standard deviations (SD), and response frequency percentages were used to describe the overall levels of trust and hesitancy. For Aim 2, independent sample t-tests were conducted to determine any statistically significant mean differences in trust and hesitancy, respectively, between VAX and NOVAX groups. Cohen's *d* was used as a measure of effect size. Small, medium, and large effect sizes were interpreted as  $d = 0.20, 0.50, 0.80$ , respectively. For Aim 3, Pearson correlations were used to examine linear relationships of trust and hesitancy with motivation types. For Aim 4, independent sample t-tests were conducted to determine any statistically significant mean differences in motivation type between VAX and NOVAX groups. The alpha criterion was set at  $\alpha = 0.05$  for all analyses.

## Results

### *Hesitancy, Trust, & Vaccination Status*

Overall, 51.4% of respondents self-reported that they were 'not at all hesitant' about getting the COVID-19 vaccine,

having mean and SD of approximately ‘somewhat hesitant’ ( $1.93 \pm 1.14$ )—see Table 2. There was a statistically significant difference in mean hesitancy between VAX and NOVAX ( $p < 0.01$ ;  $t = -9.95$ ; & large effect size,  $d = -2.13$ ), with NOVAX self-reporting higher hesitancy than VAX ( $3.44 \pm 0.89$  versus  $1.58 \pm 0.87$ , respectively). Group-based means and frequencies are shown in Table 2.

When asked to describe their level of trust in the COVID-19 vaccine, overall, respondents self-reported that they trust the COVID-19 vaccine between ‘moderately’ and ‘considerably’ ( $3.66 \pm 1.45$ )—see Table 2. There was a statistically significant difference in mean trust of the vaccine between VAX and NOVAX ( $p < 0.01$ ;  $t = 13.04$ ; & large effect size,  $d = 2.79$ ), with NOVAX self-reporting lower trust than VAX ( $1.44 \pm 0.85$  versus  $4.17 \pm 1.01$ , respectively). Group-based means and frequencies are shown in Table 2.

When asked, *Do you trust the recommendations of public health officials regarding the COVID-19 vaccine*, respondents reported that they trust public health recommendations between ‘moderately’ and ‘considerably’ ( $3.50 \pm 1.40$ )—see Table 2. There was a statistically significant difference in mean trust of the public health recommendations between VAX and NOVAX ( $p < 0.01$ ;  $t = 6.06$ ; & large effect size,  $d = 1.30$ ), with NOVAX self-reporting lower trust than VAX ( $2.19 \pm 1.33$  versus  $3.81 \pm 1.24$ , respectively). The effect was not as strong as the difference in trust of the vaccine and with more variability of within-group responses. Group-based means and frequencies are shown in Table 2.

### *Hesitancy, Trust, & Autonomy*

Pearson correlations were examined between hesitancy, trust, (in the vaccine and in public health officials) and the three types of self-determined motivation—see Table 3. To highlight, overall hesitancy was significantly, negatively correlated ( $p \leq 0.01$ ) with both trust of the vaccine ( $r = -0.86$ ) and trust of public health officials ( $r = -0.75$ ). The more hesitant respondents were, the less likely they were to self-report more autonomous forms of motivation ( $p \leq 0.01$ ), both identified regulation ( $r = -0.65$ ) and introjected regulation ( $r = -0.52$ ), and more likely to self-report more external regulation ( $r = 0.22$ ), the least autonomous form of motivation.

### *Autonomy & Vaccination*

Overall, the means for the various types of motivational regulation were neutral on the 1 (strongly disagree) to 5 (strongly agree) scale—specifically, identified regulation of vaccination was  $3.73 \pm 1.36$ , introjected regulation was  $3.04 \pm 1.10$ , and external regulation was  $2.91 \pm 1.06$ . As shown in Table 4, the VAX group experienced statistically significantly higher mean levels of more autonomous forms of motivation than the NOVAX group ( $p < 0.01$ ), including identified ( $p < 0.01$ ;  $t = 7.78$ ; & large effect size,  $d = 1.66$ ) and introjected ( $p < 0.01$ ;  $t = -0.77$ ; & small effect size,  $d = -0.17$ ), and lower external regulation ( $p < 0.01$ ;  $t = 5.71$ ; & large effect size,  $d = 1.22$ ).

## **Discussion**

### *Trust, Hesitancy, & Vaccination Status*

Aims 1 and 2 were to examine vaccine trust and hesitancy and to determine if there were differences between those who had been vaccinated (VAX) and those who had not (NOVAX). For hesitancy, the results show that, on average, participants were ‘somewhat hesitant’ to get vaccinated, with the majority (71.4%) either ‘not at all hesitant’ or ‘somewhat hesitant’, leaving 27.8% as being either ‘hesitant’ or ‘very hesitant’. However, upon group analysis, the NOVAX (who were approximately 25% of the sample) had significantly higher hesitancy (between ‘hesitant’ and ‘very hesitant’) than VAX (‘not at all’ to ‘somewhat hesitant’)—see Table 2. It should also be noted that nearly 40% of vaccinated respondents still reported some level of hesitancy, contradicting the assumption that only those who are unvaccinated against COVID-19 are experiencing vaccine hesitancy. These results support concerns that hesitancy is related to vaccination behavior, similar to findings of previous research [2, 3]. However, additional research is warranted to further understand this link and how public health efforts can be improved as a result.

Those who were not vaccinated reported significantly lower trust than the vaccinated group—see Table 2. The same was seen with the means for trust in the vaccine and trust in public health officials; the vaccinated sample was statistically significantly more trusting than the non-vaccinated. On average, the vaccinated sample fell between *considerably* to *completely* trusting, and the non-vaccinated sample fell between *not at all* to *slightly*

**Table 2.** Overall and group comparisons of hesitancy and trust between vaccinated (VAX) and unvaccinated (NOVAX) groups

	Not At All	Somewhat	Hesitant	Very Hesitant	Mean ± SD	Mean Difference <sup>a</sup>			
						<i>t</i>	<i>p</i>	<i>d</i>	
Hesitancy (%)	51.4	20.8	11.1	16.7	1.93 ± 1.14	-9.95	<0.01	-2.13	
VAX ( <i>n</i> = 117)	62.4	22.2	10.3	5.1	1.58 ± 0.87				
NO VAX ( <i>n</i> = 27)	3.7	14.8	14.8	66.7	3.44 ± 0.89				
	Not At All	Slightly	Moderately	Considerably	Completely	Mean ± SD	<i>t</i>	<i>p</i>	<i>d</i>
Trust Vaccine (%)	16.2	6.3	11.9	27.3	38.5	3.66 ± 1.45	13.04	<0.01	2.79
VAX	2.6	5.2	12.1	32.8	47.4	4.17 ± 1.01			
NO VAX	74.1	11.1	11.1	3.7	0.0	1.44 ± 0.85			
Trust Public Health (%)	15.4	9.1	15.4	30.1	30.1	3.50 ± 1.40	6.06	<0.01	1.30
VAX	6.9	10.3	14.7	31.0	37.1	3.81 ± 1.24			
NO VAX	51.9	3.7	18.5	25.9	0.0	2.19 ± 1.33			

VAX = Vaccinated group; NOVAX = Unvaccinated group; SD = standard deviation

<sup>a</sup>Mean differences assessed between VAX and NOVAX groups

trusting. However, 2.6% of the vaccinated sample reported that they were *not at all* trusting of the COVID-19 vaccine, suggesting that public health messaging aimed at vaccine uptake should focus more on improving trust than attempting to completely overcome hesitancy. While an individual who experiences hesitancy may still get vaccinated, it is unlikely that an entirely non-trusting individual would proceed with vaccination. Future research should consider how increased trust may improve hesitancy and what underlying factors may contribute to trust and hesitancy.

The results of this study also confirm a strong relationship between hesitancy and trust, for both trust of the vaccine and public health officials. Those who were more trusting of the COVID-19 vaccine were less hesitant, and vice versa. These findings are consistent with previous research that has shown a relationship between hesitancy and vaccination trust (Khairat et al, 2022) [3]. The correlations were strong enough to consider that interventions that can effectively improve trust in the vaccine and/or public

health officials would be able to reduce vaccine hesitancy. Such a hypothesis is speculative based on the cross-sectional nature of the present data but could be fruitful for future research. Additionally, such a hypothesis might assume trust precedes hesitancy, but it could be possible that hesitancy alters perception of trust, and that other moderating factors could be involved. For example, if one is hesitant to get a vaccination due to a personal health concern, then trust in that vaccine could be reduced because of the risk the vaccine could pose in worsening the health issue.

### *Hesitancy, Trust, & Autonomy*

Aims 3 and 4 were directed at furthering an understanding of the relationship of personal autonomy to hesitancy, trust, and vaccination behavior. Overall, those who experienced more autonomous forms of motivation regarding their vaccination decision were less hesitant and more trusting of the COVID-19 vaccine (Table 3). The most autonomous motivation type, identified regulation,

**Table 3.** *Linear correlations of hesitancy, trust, and self-determined motivation variables*

Variables	1	2	3	4	5	6
1. Hesitancy	1.00					
2. Trust Vaccination	-0.86**	1.00				
3. Trust Public Health	-0.75**	0.78**	1.00			
4. Identified Regulation	-0.65**	0.70**	0.59**	1.00		
5. External Regulation	0.22**	-0.19*	-0.21*	-0.07	1.00	
6. Introjected Regulation	-0.52**	0.62**	0.57**	0.48**	0.29**	1.00

\* $p \leq 0.05$ ; \*\* $p \leq 0.01$

was the strongest, negative correlate to hesitancy and positive correlate to trust. These findings confirm our hypothesis that for those who believe vaccination is integrated into one’s sense of self and/or aligns with personal values, the less hesitant with and more trusting of vaccination they would be. These findings may also suggest that health messaging and interventions that promote more autonomous forms of motivation will more effectively reduce hesitancy and build trust than messaging and interventions that do not do so—or worse, interventions that undermine personal autonomy and enhance external regulation.

Accordingly, external regulation (i.e., motivated by external reward, pressure, disapproval, or punishment) was positively correlated with vaccine hesitancy. Although not often examined in public health, this finding supports suggestions from previous research that emphasizes the benefits of employing autonomous forms of motivation rather than imposing behavioral change through external demands or coercion [5]. This perspective is important to note when considering what communication methods might best encourage health behavior changes, such as vaccination, in a way that supports personal autonomy. The importance of autonomy support is prominently expressed in related health behavior research around topics such as medication adherence, weight loss and maintenance, and hospital readmissions, which find that the more the individual believes their autonomy is being supported, the greater more positive forms of autonomous types of motivation, the greater behavior change and outcomes [10-12].

*Autonomy & Vaccination Status*

Finally, aim 4 was to evaluate mean differences in motivation types, respectively, between VAX and

NOVAX groups. As shown in Table 4, the VAX sample reported statistically higher levels of identified and introjected regulation and slightly lower levels of external regulation than NOVAX. The strongest effect was with identified regulation, of which VAX had nearly double the mean rating than NOVAX, supporting the theoretical conception that autonomous choice is a relevant component of vaccination decisions. Previous studies have also found violation of choice to be a barrier to vaccination, further emphasizing the role of autonomy in vaccination behavior [9]. Additionally, autonomy can be enhanced by choice, explanation/rationale, and acknowledgment of feelings, and undermined by tangible rewards, threats, deadlines, and imposed goals and control [6]. These characteristics are important when considering how public health messaging can be tailored to enhance autonomy in vaccination decisions. Future research should examine if health messaging can effectively build autonomy and if increased autonomy translates into increased vaccination rates.

**Limitations**

Several limitations should be noted. First, the small sample size and the racial, ethnic, and gender distribution impact the generalizability of the study findings. Additionally, the VAX and NOVAX groups were not equally distributed, as the majority of respondents were vaccinated, although the distribution was somewhat similar to public vaccination rates at the time of the study. A larger unvaccinated sample would aid conceptions that were suggested with the present findings. Finally, the time frame in which this study was conducted—over a year into the pandemic, nine months after vaccine options were made readily available in the United States, and during the rise of the new Omicron variant—might have been influential upon

**Table 4.** Overall and group comparisons of self-determined motivation variables between vaccinated (VAX) and unvaccinated (NOVAX) groups

	Mean ± SD	Mean Difference <sup>a</sup>		
		<i>t</i>	<i>p</i>	<i>d</i>
Identified Regulation	3.73 ± 1.36	7.78	< 0.01	1.66
VAX	4.09 ± 1.19			
NO VAX	2.20 ± 0.88			
Introjected Regulation	3.04 ± 1.10	-0.77	< 0.01	-0.17
VAX	3.26 ± 1.02			
NO VAX	2.05 ± 0.87			
External Regulation	2.91 ± 1.06	5.71	< 0.01	1.22
VAX	2.87 ± 1.05			
NO VAX	3.05 ± 1.12			

<sup>a</sup>Mean differences assessed between VAX and NOVAX groups

participants. As such, the unique period of data collection should be taken into account when extrapolating these results. Future research should include a larger, more diverse sample, perhaps accounting for trust, hesitancy, and autonomy over time, and allow for subgroup analyses.

### Conclusion

The primary goal of the present cross-sectional research study was to assess hesitancy and trust in relation to COVID-19 vaccination and further explore the relationship of varying degrees of autonomous motivation types within vaccinated and unvaccinated groups in the United States. The results of this study support concerns that hesitancy and lack of trust are related to poorer vaccination behavior, with the unvaccinated having significantly higher hesitancy and lower trust than the vaccinated. In addition, support was provided for the theoretical conception that more autonomous motivation is related to greater vaccination behavior. With concerns of the coercive nature of public health messaging and questioning of messenger intentions, future research should consider how public health messaging can be developed and tested to support, rather than undermine, personal autonomy when promoting vaccine uptake.

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