The Messenger Matters: Religious Leaders and Overcoming COVID-19 Vaccine Hesitancy

Supplementary Appendix

Table S1: Descriptive Statistics of All Variables

Variable	Mean	Std. Dev.	Min	Max
Interest in Vaccination	1.99	1.34	1	5
Thune Thermometer	47.30	30.35	0	100
SDSMA Thermometer	56.49	23.59	0	100
ELCA Thermometer	41.46	29.02	0	100
3-Point Party ID	2.48	0.69	1	3
Age	42.43	15.71	19	88
Male	0.54	0.50	0	1
Education	3.99	1.36	1	6
Evangelical Identity	0.35	0.48	0	1
Trust in Government	2.03	0.78	1	4
Know someone who died of COVID-19	0.32	0.47	0	1

We utilized entropy balancing to weight the data by gender, age, region within South Dakota, vaccination status, and political party affiliation.

Table S2: Effect of Messenger on Interest in Vaccination 1= "Not at all interested"— 5= "Very interested")

	Interest in Vaccination
Control Group	1.859 (1.606, 2.112)
Religious Messenger	2.321* (1.936, 2.705)
Political Messenger	1.769 (1.532, 2.006)
Medical Messenger	1.972 (1.746, 2.198)

Note: 95% confidence intervals in parentheses. ∗ p<0.05 two-tailed test. N= 596

Table S3: OLS Regression on Interest in Getting a COVID-19 Vaccination

	Vaccination Interest
Political Messenger	0.056
	(0.182)
Religious Messenger	0.499**
	(0.161)
Medical Messenger	0.201
	(0.140)
Thune Thermometer	-0.003
	(0.002)
SDSMA Thermometer	0.020***
	(0.003)
ELCA Thermometer	0.011***
	(0.003)
Party ID (3= Republican)	-0.660***
	(0.129)
Age	-0.000
	(0.004)
Male	-0.144
	(0.125)
Know Someone Who Died of COVID	0.358*
	(0.141)
Trust in Government	0.254*
	(0.103)
Education	-0.056
	(0.050)
Evangelical Identity	0.093
	(0.154)
Constant	1.598***
	(0.385)
Observations	337
R-Square	0.468

p|t|<.05 two-tailed *, p|t|<.01 two-tailed **, p|t|<.001 two-tailed ***

Entries are coefficients with robust standard error in parenthesis.

Survey Vignettes

<u>Control Group</u>

The Sioux Falls Stampede is South Dakota's only Tier I junior hockey team. In just 20 seasons they have an impressive record, qualifying for their league's playoffs 15 times and winning the championship three times. Many of their players have landed on professional teams, with 31 players being placed in the NHL. They also hold the league record for attendance in a single season. South Dakotans should be proud of their support for this successful organization.

<u>Political Frame</u>

Please read the following message from John Thune, United States Senator from South Dakota:

All of the Food and Drug Administration authorized coronavirus vaccines help protect people from contracting COVID-19. Being vaccinated will also prevent serious illness, being hospitalized, and dying in the event you are infected with the virus. The vaccine also lowers the risk of spreading the virus to other people. For these reasons, I recommend that South Dakotans get vaccinated. Take responsibility for your health and the health of your community.

<u>Religious Frame</u>

Please read the following message from Constanze Hagmaier, Bishop of the Evangelical Lutheran Church In America South Dakota Synod:

All of the Food and Drug Administration authorized coronavirus vaccines help protect people from contracting COVID-19. Being vaccinated will also prevent serious illness, being hospitalized, and dying in the event you are infected with the virus. The vaccine also lowers the risk of spreading the virus to other people. For these reasons, I recommend that South Dakotans get vaccinated. Take responsibility for your health and the health of your community.

<u>Medical Frame</u>

Please read the following message from Dr. Benjamin C. Aaker, President of The South Dakota State Medical Association:

All of the Food and Drug Administration authorized coronavirus vaccines help protect people from contracting COVID-19. Being vaccinated will also prevent serious illness, being hospitalized, and dying in the event you are infected with the virus. The vaccine also lowers the risk of spreading the virus to other people. For these reasons, I recommend that South Dakotans get vaccinated. Take responsibility for your health and the health of your community.

Table S4: Demographic Questions

What was your age on your last birthday?
What is your gender?   • Male/ Female/ Other
What is the highest level of education you have completed?   • Some high school/ High school graduate/ Some college/ 2-year degree/ 4-year degree/ Post-graduate degree
What is your present religion, if any?   • Christian/ Muslim/ Jewish/ Buddhist/ Indigenous religion/ Agnostic/ Atheist/ Other
[if Christian] Would you describe yourself as "born again" or evangelical Christian, or not?   • Yes/ No

Table S5: COVID-19 Personal and Family History Questions

Do you personally know anyone that has been hospitalized due to COVID-19? (check all that apply)   • No/ Yes, a friend or acquaintance/ Yes, a family member/ Yes, myself
[if knew someone who was hospitalized due to COVID-19] Do you personally know anyone that has died due to COVID-19? (check all that apply)   • No/ Yes, a friend or acquaintance/ Yes, a family member

Table S6: Political Questions

Generally speaking, do you think of yourself as a Democrat, Republican, an Independent, or something else?   • Democrat/ Republican/ Independent/ Something Else   [If Democrat]: Would you call yourself a strong Democrat or not a strong Democrat?   [If Republican]: Would you call yourself a strong Republican or not a strong Republican?   [If Independent or Something Else]: Do you think of yourself as closer to the Democratic Party or the Republican Party?

How often can you trust the government to do what is right?"

- Always/ Most of the time/ About half of the time/ Some of the time/ Never

Please rate the following people or groups on a scale of 0 to 100. Ratings between 51 and 100 mean you feel favorably and warm towards the person or group, ratings between 0 and 49 mean that don't feel favorably towards them. You would rate the person or group 50 if you don't feel warm or cold towards them. If you don't recognize a person or group, please SKIP to the next one. In order to record a score, you must click on the slider; if you wish to skip the person, do not click the slider at all.

- John Thune/ South Dakota State Medical Association/ Evangelical Lutheran Church In America

Table S7: Attention Check Question

Please skip this and move on to the next question. Do not click on the scale labeled from Strongly Disagree to Strongly Agree.

Table S8: Demographic Characteristics — Balance Table

	Control Group	**Political Messenger**	**Religious Messenger**	**Medical Messenger**
Age	49.870	48.922	48.277	48.948
	(47.538, 52.201)	(46.397, 51.447)	(45.783, 50.772)	(46.805, 51.092)
Gender	.548	.558	.527	.538
	(.469, .627)	(.476, .640)	(.445, .609)	(.462, .615)
Evangelical Identity	.373	.402	.362	.383
	(.297, .449)	(.323, .482)	(.284, .440)	(.310, .457)
Political Affiliation	2.506	2.583	2.429	2.558
	(2.404, 2.608)	(2.490, 2.675)	(2.322, 2.536)	(2.467, 2.649)

Table S9. Effect of Messenger on Interest in Vaccination (1= "Not at all interested"— 5= "Very interested")

	Control Group	Political Messenger	Religious Messenger	Medical Messenger
Evangelicals (n=230)	1.394 (1.220, 1.568)	1.791 (1.377, 2.205)	2.081***(1.640, 2.522)	1.805* (1.488, 2.122)
Non-evangelicals (n=366)	2.134 (1.767, 2.501)	1.755 (1.468, 2.041)	2.413 (1.915, 2.910)	2.072 (1.769, 2.375)
Republicans (n=346)	1.659 (1.422, 1.897)	1.639 (1.438, 1.840)	1.812 (1.542, 2.083)	1.833 (1.597, 2.070)
Democrats (n=35)	2.731 (1.386,4.075)	1.760 (.685, 2.835)	4.269 (3.286, 5.251)	3.953 (2.874, 5.033)
Independents (n=210)	1.989 (1.463, 2.514)	2.080 (1.470, 2.691)	1.822 (1.446, 2.198)	1.910 (1.484, 2.337)
Younger than 65 (n=507)	1.840 (1.566, 2.114)	1.785 (1.528, 2.043)	2.352* (1.941, 2.762)	1.957 (1.718, 2.197)
65 or older (n=89)	2.027 (1.434, 2.620)	1.634 (1.057, 2.21)	1.914 (1.334, 2.49)	2.133 (1.496, 2.770)
Males (n=325)	1.75 (1.507, 2.002)	1.66 (1.368, 1.962)	2.24 (1.712, 2.773)	2.10 (1.795, 2.413)
Females (n=271)	1.985 (1.518, 2.453)	1.934 (1.555, 2.312)	2.399 (1.837, 2.961)	1.825 (1.508, 2.141)

Note: 95% confidence intervals in parentheses. ∗ p<0.05; ∗∗ p<0.01; ∗∗∗ p<0.001.

Figure S1: Survey Flow and Experimental Design

Invitation letters sent
(N= 44,000)

⇩

All participants
(N= 3,057)

⇩

Unvaccinated
participants (N= 709)

⇩

Unvaccinated participants were randomly assigned into one of four groups

| Political Messenger (n= 149) | Religious Messenger (n= 149) | Medical Messenger (n= 172) | Control Group (n= 158) |

⇩

Afterwards, all unvaccinated participants answered the following questions

Interest in receiving a COVID-19 vaccination

⇩

Order of the following question blocks was randomized

Demographic
Information

Political Affiliation

Personal/ family
COVID-19 history

Attention check