Analysis Report

This report is structured as follow.

Contents

The comparison of frequencies between those who took the COVID and Influenza vaccines and those who did not

This test was performed using frequency tables and chi-square tests. Chi-square tests are used when one wishes to explore the relationship between two categorical variables. Each of these variables can have two or more categories. This test compares the observed frequencies or proportions of cases that occur in each of the categories, with the values that would be expected if there was no association between the two variables being measured. It is based on a cross-tabulation table, with cases classified according to the categories in each variable (e.g. male/female; smoker/non-smoker) (Pallant, 2010).

In cross-tabulated data, each cell contains the values for a specific row–column combination (e.g., sales of a specific product in a specific age group). Thus, the chi-square value is a measure of association between the row and column categories. Higher levels of association, just like higher levels of similarity, should be represented as closer together in the perceptual map than those with lower levels of association (Hair et al., 2014).

The table below shows the frequency of responses for each variable under study separated by those who took the COVID vaccine and those who did not.

| | | Have you already received the COVID-19 vaccine? | | p-value |
		No	Yes	
What is your sex?	Female	45 33.1%	91 66.9%	0.466
	Male	7 25.9%	20 74.1%	
What is your ethnicity?	Hispanic or Latino	2 50.0%	2 50.0%	0.426
	Not Hispanic or Latino	50 31.3%	110 68.8%	
What is your race?	African American	14 63.6%	8 36.4%	0.001**
	Other	0 0.0%	8 100.0%	
	White	38 28.4%	96 71.6%	
Do you live on campus?	No	47 32.2%	99 67.8%	0.704
	Yes	5 27.8%	13 72.2%	
What is your year of study?	Graduate Student	11 16.4%	56 83.6%	0.005**
	Junior	13	22	

		37.1%	62.9%	
	Senior	24	29	
		45.3%	54.7%	
	Sophomore	3	4	
		42.9%	57.1%	
Have you seen a medical provider in the past 6 months?	No	16	18	
		47.1%	52.9%	0.026*
	Yes	35	94	
		27.1%	72.9%	
Do you have health insurance?	No	3	3	
		50.0%	50.0%	0.332
	Yes	49	108	
		31.2%	68.8%	
Do you receive an annual influenza vaccination?	No	31	41	
		43.1%	56.9%	0.006**
	Yes	21	71	
		22.8%	77.2%	

Note:
*: p < 0.05.
**: p < 0.01.
***: p < 0.001.

The results of the chi-square analyses indicate there are significant associations between taking the vaccine and the following attributes (p < 0.05): race, year of study, seeing a medical provide in the past 6 months and receiving the annual influenza vaccine. The rest of the variables do not show any relationship with taking the vaccine or not. When looking at the frequencies themselves, the table shows that the proportion of vaccine takers is relatively higher among graduate student (83.6%), white people (71.6%), those who saw a medical provider (72.9%) and those who receive annual vaccinations for influenza (77.2%), in relation to other category levels of each attribute. The difference on the proportions for the other attributes are not statistically significant (p > 0.05).

The table below shows the same statistics for the influenza vaccination. In this analysis, there are no significant differences among races (p = 0.06). But there are still significant associations between taking the vaccine and year of study and having taken the COVID vaccine.

		Do you receive an annual influenza vaccination?		p-value
		No	Yes	
What is your sex?	Female	59 43.4%	77 56.6%	0.919
	Male	12 44.4%	15 55.6%	
What is your ethnicity?	Hispanic or Latino	2 50.0%	2 50.0%	0.804
	Not Hispanic or Latino	70 43.8%	90 56.3%	
What is your race?	African American	14 63.6%	8 36.4%	0.060
	Other	5 62.5%	3 37.5%	
	White	53 39.6%	81 60.4%	
Do you live on campus?	No	66 45.2%	80 54.8%	0.338
	Yes	6 33.3%	12 66.7%	
What is your year of study?	Graduate Student	21 31.3%	46 68.7%	0.011
	Junior	17 48.6%	18 51.4%	
	Senior	28 52.8%	25 47.2%	
	Sophomore	6 85.7%	1 14.3%	
Have you seen a medical provider in the past 6 months?	No	14 41.2%	20 58.8%	0.753
	Yes	57 44.2%	72 55.8%	
Do you have health insurance?	No	3 50.0%	3 50.0%	0.746
	Yes	68 43.3%	89 56.7%	
Have you already received the COVID-19 vaccine?	No	31 59.6%	21 40.4%	0.006
	Yes	41 36.6%	71 63.4%	

The comparison of age and attitudes towards the vaccine between those who took the COVID and Influenza vaccines and those who did not

This section presents the comparison of mean scores. The test used to evaluate if the differences are statistically significant was the Independent-Samples T-test, which is the appropriate test for when the scales are continuous (such as Liker-type scales) (Hair et al., 2014).

A Levene's test (Levene, 1961) was conducted to examine homogeneity of variances. The test showed that the following variables do not show equal variances between those who took the COVID vaccine and those who did not:

- I would receive the COVID-19 vaccine if I was encouraged by a health professional. (ie. a physician, nurse, or the campus student health center)
- I would receive the COVID-19 vaccine if I was encouraged by a family member.
- I believe that social distancing is effective against the spread of COVID-19.
- I believe that wearing a mask is effective against the spread of COVID-19.

Thus. the results of the T-tests were extracted from the 'Equal Variances Not Assumed' output from SPSS. These results use a Satterthwaite approximation for the degrees of freedom, which makes the test robust for unequal variances. With regards to the tests for Influenza shots, variances were equal for all variables.

The table below shows the results for the COVID vaccine. The only variable which has no significant association with taking the vaccine is age. All the attitudes have significant effects on the choice of taking the vaccine (p< 0.05). In other words, the mean scores are significantly different between these groups. On all significant cases, those who took the vaccine show a significant more positive attitude in comparison to those who did not (p < 0.05).

	Have you already received the COVID-19 vaccine?		p-value
	No	Yes	
	Mean	Mean	
What is your age?	22.83	23.44	0.371
I am aware of the cost of the COVID-19 vaccine.	2.62	2.98	0.029
I have time to get a COVID-19 vaccination.	2.83	3.54	< 0.001
I know where to receive a COVID-19 vaccination.	3.10	3.61	< 0.001
I believe that as a result of the COVID-19 vaccination I will not get COVID-19.	2.12	2.71	< 0.001
I believe that the COVID-19 vaccines have no side-effects.	1.37	1.77	< 0.001
I was informed that COVID-19 vaccines might be important.	3.06	3.63	< 0.001
I believe I am in danger of contracting COVID-19.	2.29	2.57	0.043
I would receive the COVID-19 vaccine if I was encouraged by a health professional. (ie. a physician, nurse, or the campus student health center)	2.19	3.44	< 0.001
I would receive the COVID-19 vaccine if I was encouraged by a family member.	2.15	3.38	< 0.001
I believe that vaccines are effective.	2.87	3.69	< 0.001
I believe that social distancing is effective against the spread of COVID-19.	2.75	3.47	< 0.001
I believe that handwashing is effective against the spread of COVID-19.	3.31	3.62	0.001
I believe that wearing a mask is effective against the spread of COVID-19.	2.63	3.44	< 0.001
I believe that disinfecting surfaces is effective against the spread of COVID-19.	3.21	3.50	0.007

The same pattern is present when analysing the influence vaccina uptake. Again, all attitudes are significantly related to this behaviour. Age is not different between the groups.

	Do you receive an annual influenza vaccination?		p-value
	No	Yes	
	Mean	Mean	
What is your age?	23.06	23.38	0.371
I have time to get a COVID-19 vaccination.	3.13	3.46	0.029
I am aware of the cost of the COVID-19 vaccine.	2.64	3.04	< 0.001
I know where to receive a COVID-19 vaccination.	3.31	3.55	< 0.001
I believe that as a result of the COVID-19 vaccination I will not get COVID-19.	2.51	2.53	< 0.001
I believe that the COVID-19 vaccines have no side-effects.	1.60	1.67	< 0.001
I was informed that COVID-19 vaccines might be important.	3.25	3.61	< 0.001
I believe I am in danger of contracting COVID-19.	2.39	2.55	0.043
I would receive the COVID-19 vaccine if I was encouraged by a health professional. (ie. a physician, nurse, or the campus student health center)	2.69	3.32	< 0.001
I would receive the COVID-19 vaccine if I was encouraged by a family member.	2.64	3.27	< 0.001
I believe that vaccines are effective.	3.06	3.72	< 0.001
I believe that social distancing is effective against the spread of COVID-19.	2.92	3.50	< 0.001

I believe that handwashing is effective against the spread of COVID-19.	3.35	3.65	0.001
I believe that wearing a mask is effective against the spread of COVID-19.	2.89	3.41	< 0.001
I believe that disinfecting surfaces is effective against the spread of COVID-19.	3.21	3.57	0.007

The attitude determinants to the COVID vaccine uptake

In order to test the effect of the attitude towards the vaccine on taking the vaccine, a logistic regression model was executed. Logistic regressions allow the test of a model to predict categorical outcomes. When the dependent variable has only two categories, then the model is named binary logistic regression, which was used here. When more than two categories are present, it characterizes as a multinomial logistic regression model. Logistic models provide the answer to how well a set of predictor variables explain the categorical dependent variable. That is, how well the set of personality traits explain the intention to open a business (Pallant, 2010).

The fourteen attitude statements scores were included as predictor variables and the choice to get the COVID vaccine was considered the target variable.

The model was statistically significant, $\chi2$ (14, N = 163) = 109.656, p < .001, indicating that the model was able to distinguish between those who took the vaccine and those who did not. The model as a whole explained between 49.0% (Cox and Snell R square) and 68.8% (Nagelkerke R squared) of the variance of choosing to take the vaccine. The table below shows the model coefficients (B), along with p-values (Sig.) and Odds Ratios (OR).

Variables in the Equation

	B	S.E.	Wald	df	Sig.	OR
I am aware of the cost of the COVID-19 vaccine.	-0.470	0.340	1.916	1	0.166	0.625
I have time to get a COVID-19 vaccination.	1.027	0.525	3.822	1	0.051	2.794
I know where to receive a COVID-19 vaccination.	0.572	0.612	0.876	1	0.349	1.773
I believe that as a result of the COVID-19 vaccination I will not get COVID-19.	0.858	0.451	3.619	1	0.057	2.359
I believe that the COVID-19 vaccines have no side-effects.	0.534	0.500	1.140	1	0.286	1.705
I was informed that COVID-19 vaccines might be important.	-0.331	0.672	0.242	1	0.623	0.718
I believe I am in danger of contracting COVID-19.	0.013	0.435	0.001	1	0.976	1.013
I would receive the COVID-19 vaccine if I was encouraged by a health professional. (ie. a physician, nurse, or the campus student health center)	0.358	0.580	0.381	1	0.537	1.431
I would receive the COVID-19 vaccine if I was encouraged by a family member.	1.808	0.641	7.960	1	0.005	6.096
I believe that vaccines are effective.	1.470	0.506	8.431	1	0.004	4.350
I believe that social distancing is effective against the spread of COVID-19.	-0.310	0.754	0.169	1	0.681	0.734
I believe that handwashing is effective against the spread of COVID-19.	0.143	0.730	0.039	1	0.844	1.154
I believe that wearing a mask is effective against the spread of COVID-19.	0.095	0.751	0.016	1	0.899	1.100
I believe that disinfecting surfaces is effective against the spread of COVID-19.	-0.920	0.810	1.290	1	0.256	0.398
Constant	-12.646	2.998	17.788	1	0.000	0.000

a. Variable(s) entered on step 1: I am aware of the cost of the COVID-19 vaccine., I have time to get a COVID-19 vaccination., I know where to receive a COVID-19 vaccination. , I believe that as a result of the COVID-19 vaccination I will not get COVID-19., I believe that the COVID-19 vaccines have no side-effects. , I was informed that COVID-19 vaccines might be important., I believe I am in danger of contracting COVID-19., I would receive the COVID-19 vaccine if I was encouraged by a health professional. (ie. a physician, nurse, or the campus student health center), I would receive the COVID-19 vaccine if I was encouraged by a family member. , I believe that vaccines are effective., I believe that social distancing is effective against the spread of COVID-19., I believe that handwashing is effective against the spread of COVID-19., I believe that wearing a mask is effective against the spread of COVID-19., I believe that disinfecting surfaces is effective against the spread of COVID-19..

The desire to take the vaccine if encouraged by a family member was a significant predictor of taking the shot (β = 1.808, p = 0.005, OR = 6.096). According to the Odds Ratio, a one-point increase in this scale (which means one option further on the agreement scale that was used) is expected to increase the likelihood of taking the vaccine by 6.096 times. Another significant predictor is believing that vaccines are effective (β = 1.470, p = 0.004, OR = 4.350). Two other predictors were slightly above the 5% significance level and should be noted: having the time to get the vaccine (β = 1.027, p = 0.051, OR = 2.794)

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and believing that they will not get COVID if they take the vaccine ($\beta = 0.858$, p = 0.057, OR = 2.359).

References

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