The Factor Structure of a Brief Vaccine Hesitancy Scale

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Background: A significant portion of the population is reluctant to get vaccinated for COVID -19. Despite the increasing availability of vaccines and growing number of COVID-related deaths, only 68.2% of the United States population has received a primary series of vaccinations, with 49% receiving a booster (CDC, 2022). As vaccinations and boosters remain the most effective ways to combat severe disease and deaths, understanding vaccine hesitancy is important for public health efforts. The present study utilized confirmatory factor analysis to compare two models of a vaccine hesitancy scale. The first model was a one-factor model that contained all 6 items, and the second model was a two-factor model with trust and fear as the two factors. Previous research has shown that mistrust in medical officials is positively correlated with vaccine hesitancy, while fear of disease is negatively correlated (Willis et al., 2021). We chose to investigate these aspects of vaccine hesitancy in order to determine the optimal method of modeling it.

Participants and Measures: One hundred and sixty-four individuals responded to a 6-item COVID-19 vaccine hesitancy inventory administered via Qualtrics. Vaccine hesitancy was measured on a scale of 0 to 24, with higher scores indicating a more vaccine hesitant individual. All analyses were conducted in Jamovi using the R package `lavaan`.

One Factor Model

The most parsimonious one-factor model provided a good fit to the data (χ2 (9, N = 164) = 17.4, RMSEA = .08, TLI = .97, CFI = .98) (p = .042).

Factor Loadings

Factor	Indicator	Estimate	SE	Z	p
Factor 1	I do not feel confident in the information provided by the CDC	0.806	0.0928	8.69	< .001
	I am concerned with how quickly the COVID-19 vaccines were deve	1.163	0.0918	12.67	< .001
	I am worried about the potential long-term effects of the COVI	1.257	0.1011	12.43	< .001
	I have avoided COVID-19 so far, so I do not feel that a vaccin	0.499	0.0602	8.30	< .001
	I am not convinced of the efficacy of the COVID-19 vaccine.	1.067	0.0912	11.69	< .001
	I often get sick after receiving a vaccine.	0.534	0.1057	5.05	< .001

Two Factor Model

The two-factor model of fear and trust also provided good fit (χ2 (8, N = 164) = 12.9, RMSEA = .06, TLI = .98, CFI = .98), but it did not fit the data significantly better. (p = .117).

Factor Loadings

Factor	Indicator	Estimate	SE	Z	p
Fear	I am worried about the potential long-term effects of the COVI	1.185	0.1077	11.00	< .001
	I have avoided COVID-19 so far, so I do not feel that a vaccin	0.491	0.0592	8.30	< .001
	I often get sick after receiving a vaccine.	0.502	0.1049	4.78	< .001
Trust/Mistrust	I am concerned with how quickly the COVID-19 vaccines were deve	1.144	0.0919	12.46	< .001
	I am not convinced of the efficacy of the COVID-19 vaccine.	1.062	0.0904	11.74	< .001
	I do not feel confident in the information provided by the CDC	0.797	0.0925	8.61	< .001

Conclusion:

The results of our confirmatory factor analyses show that both a one-factor and two-factor model of COVID-19 vaccine hesitancy provide adequate model fit. Because we heavily value parsimony in our models, and because the improvements made in model fit in the two-factor model are not statistically significant, we will retain the one-factor model for future research. It is important to note that, while this study does support the structure of our model, more research is necessary in order to investigate the validity of the scale.

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