COVID-19 and Alternative Postsecondary Learning

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Abstract

As a result of the coronavirus pandemic, many individuals now engage in remote activities that they would otherwise not. While other research has assessed the impact of coronavirus on K-12 education, this paper fills a gap in the literature regarding the impact to professional certifications and other unaccredited postsecondary credentials. This paper investigates the results of an original online questionnaire (n=350) to understand the effects of COVID-19 on support for alternative postsecondary learning. Respondents are U.S. citizens over the age of 18. Cross-sectional analysis using ordinary least squares (OLS) and Iteratively Reweighted Least Squares (IRLS) indicates that individual perception of a large negative impact from coronavirus is significantly correlated with higher favorability to alternative credentials. Some important industrial, ethnic, and state effects are also identified. Independent factors including the level of education, income, age, and gender were identified as insignificant.

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1. Introduction

This study is concerned with postsecondary alternative credentials. This category includes professional certifications, coding bootcamps, portfolios of work, and other proof of education other than traditional credentials. Traditional credentials include a high school diploma or an accredited degree from a university. Many alternative credentials are obtained as a result of education that involves a substantial component of remote learning. This study tests the hypothesis that the impact of coronavirus is associated with increased favorability toward alternative credentials. Results favor the hypothesis, with a few interesting caveats.

There are three theoretical reasons to suppose that a pandemic would make alternative postsecondary credentials more attractive. The first is that a pandemic would induce increased remote learning. This causes exposure, and exposure effects are generally positive on favorability. Secondly, alternative learning providers tend to be smaller organizations with increased market exposure and less regulation compared to the traditional postsecondary provider of education, the accredited university. As a result, alternative learning providers will adapt more quickly during a pandemic. Quicker adaptation will lead to a higher quality product at a lower price, and consumers are then expected to improve in favorability accordingly.

The third theory is that a pandemic is a time when normal strangeness increases across the economy. This would theoretically reduce any relative stigma which the alternatively educated invididual might face. The stigma is reduced by two mechanisms. First, society changes many norms during a pandemic, so the general strength of social norms is reduced. In this way, the general preference for traditional over alternative education is reduced. Secondly, consuming alternative education is specifically reasonable as a pandemic adaptation. During a pandemic, many of the attractions of university life are unusable, remote learning provides protection against becoming ill, and pinching pennies is more understandable than it is during times of flourishing.

While exposure to some stigma generally increases favorability, there are several special cases where it declines instead. It could be the case that coronavirus-induced remote learning and work are an exceptional case where decline is observed. This paper is valuable in part because it replaces this ambiguity with empirical evidence. Pandemic exposure is an interesting case of exposure because it is a harmful, unwanted, or forced exposure. It is not clear that coronavirus-induced exposure to remote learning and work will result in Remote work and learning which are taken as a result of the pandemic might be perceived negatively by association, or they might be perceived as a useful option that becomes more valuable in light of an unfortunate pandemic. Familiarity bias and mere-exposure effects are generally positive on favorability to some stimulus, but these exposures are generally voluntary. Unwanted exposure can generate positive or negative favorability changes, and when the exposure involves harm it tends to reduce favorability. Backfire, boomerang, and blowback effects are some examples of negative favorability reactions to exposure. One study hits remarkably close to COVID-19 pandemic relevance because it found a backfire effect in efforts to market flu vaccine usage, unintentionally resulting in reduced willingness to take the flu vaccine [1]. Even repeated unwanted exposure to harm can eventually lead to positive favorability through as documented in the work on Stockholm syndrome.

The actual effect of coronavirus could mimick a combination of the above effects. As a result, it is not obvious a priori whether the actual effect is positive, negative, or insignificant, and this ambiguity calls for empirical investigation. Individual favorability to alternative credentials is also like to vary for a variety of personal reasons which are unrelated to the pandemic. This paper uses multiple regression to identify the net effect of coronavirus on favorability while holding constant these other sources of variation.

There are already several papers examining the impact of coronavirus on the education system. These papers focus on education from kindergarten through high school, but it is reasonable to expect postsecondary education to be impacted in a similar way.

2. Description of Data and Methodology

This paper uses an original set of response data (n = 350) obtained through the administration of an online questionnaire. This cross-sectional data was obtained at the beginning of February in 2021. Respondents are United States citizens at or over the age of eighteen. The Amazon Mechanical Turk platform was used to recruit qualified participants.

Responses are investigated using regression analysis and descriptive statistics including skew [1]. Regression analysis includes multiple regression of linear and curvilinear effects with either ordinary or robust linear modelling. Ordinary linear modelling uses ordinary least squares, and robust linear modelling (RLM) uses iteratively reweighted least squares. Factor coefficients across these approaches are comparable, but RLM does not generate a useful R-squared statistic for model-level comparison.

Appendix A contains the exact wording and response options for each question. Appendix A also contains the wording for a priming message presented at the start of the survey. The priming message lays out the definition of alternative credentials for the purposes of the study. The message also provides several concrete examples of alternative credentials, including "a Certified Project Manager certification, a portfolio of work, a Khan Academy profile, or a Nanodegree from Udacity."

The questionnaire is composed of fourteen questions. There is one for the dependent variable of interest, favorability, one for the independent variable of interest, coronavirus impact, ten control factors, and two questions on causality.

Eight of the ten control factors are common controls in the literature. These eight controls are categorical measures for for age, gender, ethnicity, income, level of education, employment status, industry of occupation, and state of residence.

[1] While the data for this analysis is not public, the analytical code is open-source. See `https://github.com/Vandivier/research-dissertation-case-for-alt-ed/tree/master/papers/alt-ed-covid-2/data`

The two remaining controls are unique to this study. The first is expectated conventionality. This is question three in the appendix. This control is meant to explain the favorability effect attributable to the normative acceptability of alternative credentials. This allows the favorability effect to be interpreted along simple lines of individual favorability, holding constant an important side-question about the way social norms relate to individual favorability.

The second unique control is support for online education. This is question four in the appendix. This control allows an analyst to hold constant the mode of instruction when interpreting favorability to alternative credentials.

The primary interest of this study is to identify the effect or lack of effect of coronavirus on favorability. If an effect is found, however, an interesting question arises on the mechanism which supports that effect. Both unique controls and the two questions on causality support this investigation about mechanism. Specifically, one hypothesized mechanism is that coronavirus stimulates remote activity, then exposure to remote activity improves favorability to all remote activities, then alternative credentials improve in favorability through a normative association with remote learning.

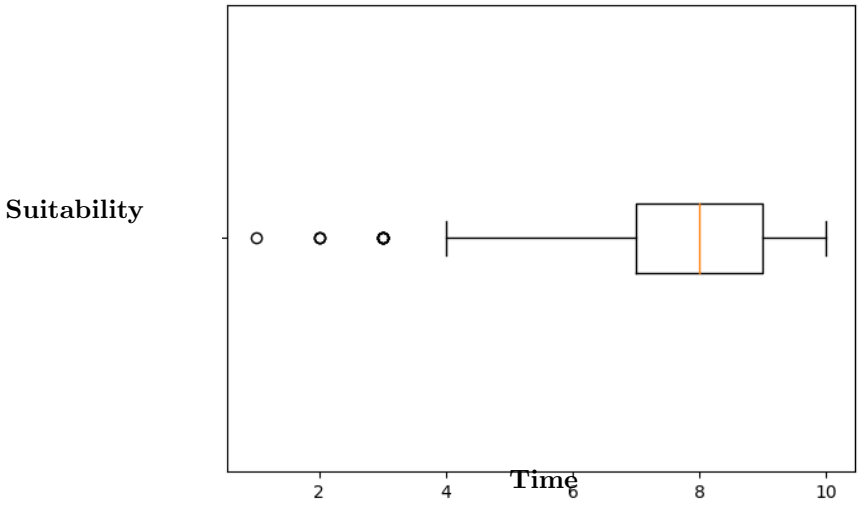
The variables of interest, causality questions, and the two unique controls obtain Likert-type responses. The impact of coronavirus and the causality questions use a 4-point scale. Favorability and the unique controls use a 10-point scale. Continuous treatment of items on the 10-point scale permits curvilinear analysis, including investigation of interesting marginal effects [2].

[2]It is an accepted practice to treat Likert-type responses as either categorical or continuous for regression analysis. Jaccard and Wan provide support for continuous analysis of Likert-type data. They note that severe departures from the assumptions on cardinality "do not seem to affect Type I and Type II errors dramatically," particularly when the Likert scale is five or more points[1]. This paper treats responses on a 10-point scale as continuous. This paper treats responses on a 4-point scale as categorical.

3. Results

The median favorability response was eight out of ten. Figure **??** visualizes the distrobution of responses. Of 350 responses, 11 responses indicate a favorability of less than four out of ten. Regression analysis indicates a significant and positive coronavirus impact effect, invariant to whether outliers are dropped. As a conservative interpretation, the magnitude of the coronavirus impact coefficient is not held with confidence over the outlier range.

Figure 1: Employer Driven Favorability



These responses generate a slight skew in the The average favorability response was about 7.8 on a scale from one to ten.

Table 1 provides selected coefficients across four models of interest.

M-2019-2 involves a larger sample size compared to M-2019. Coefficient significance and direction of effect is replicated. Coefficient magnitude varies with a general lack of importance. The coefficient on being a college graduate changes notably, but it is not a significant factor.

M-2020 introduces factors of personality. The effect of mental effort is insignificant. Being a college graduate is a significant and important factor in this specification. Including factors of personality improves total and adjusted

explanatory power by about 5 percent. Grit, conscientiousness, and openness were important in the model. These factors were significant at the $p < .18$ level.

Partialling out personality modifies the pro-regulatory effect in a direction opposite expectation. The coefficient on regulatory favorability is amplified, rather than attenuated. The result is significant and falls within the range of prior estimates. Evidence does not indicate that conservative opposition to alternative credentials is an effect of personality or constrained mental effort. The general concept of conservatism does seem to apply to the problem. The social category of conservatism also does not seem to provide an explanation. Correction for religiosity in 2018 shows that social conservatives tend to support alternative education.

The most significant personality factor is an interaction between grit and familiarity ($p < 0.005$). If this factor is replaced with simple grit, the negative direction of effect is maintained, but the significance is reduced ($p < 0.17$). Notice that the negative direction of effect is opposite in sign when compared with conscientiousness.

Familiarity bias is usually associated with favorability. This bias is reproduced in work on alternative credentials, but the favorability response is heterogeneous by personality. Specifically, concurrently higher grit and familiarity yield lower favorability to alternative credentials. The interaction effect is not reproduced when conscientiousness is substituted for grit.

4. Conclusions

This study introduced controls for mental effort and personality into an estimate of favorability of alternative postsecondary learning. The main hypothesis was that these controls would deflate an apparent paradox in conservative opposition to a market solution. Contrary to expectation, the paradoxical pro-regulatory effect was amplified with significance. Personality factors were identified with importance and contributed to superior model power.

Conscientiousness and openness were important Big Five traits. Grit was

Table 1: Table of Multiple Regressions

	favor_alt_creds I	favor_alt_creds II	favor_alt_creds III	favor_alt_creds IIII
conventional_alt_creds	0.44***	0.45***	0.38***	0.45***
covid_impact_large_negative_impact	0.32	0.32	0.07	
covid_ind_fav_online_large_degree	-1.00***	-0.85***	-0.71**	-0.80***
covid_ind_fav_online_moderate_degree	-0.75***	-0.65***	-0.70***	-0.66***
covid_ind_fav_online_slight_degree	-0.64**	-0.52**	-0.66***	-0.53**
covid_ind_remote_large_degree	0.55***	0.51**	0.58***	0.56***
ethnicity_hispanic	0.80*	0.77*	0.59	0.76*
ethnicity_other	1.51*	1.58**	1.39**	1.52*
ethnicity_white_caucasian	0.48***	0.43**	0.38**	0.44**
favor_online_ed^2	0.11***	0.10***	0.10***	0.10***
income_100000_124999	0.45			
income_10000_24999	0.43			
income_125000_149999	1.15			
industry_health	0.56*	0.52*	0.62**	0.55*
industry_information_technology	0.35*	0.34*	0.36**	0.34*
industry_manufacturing	0.57*	0.66**	0.73***	0.68**
industry_real_estate	1.06*	1.13*	0.87	1.14*
is_manager	0.32*			
state_florida	-0.38			
state_georgia	1.21**	1.18**	1.08**	1.22**
state_idaho	-0.89			
state_iowa	-2.48***	-2.63***	-0.87	-2.66***
state_kentucky	-1.28*	-1.22*	-0.33	-1.24*
state_north_carolina	0.73			
state_ohio	-1.46**	-1.35**	-1.59***	-1.34**
state_pennsylvania	-1.02**	-1.04**	-0.71	-0.99**
state_tennessee	-1.75			
Intercept	3.29***	3.48***	4.13***	3.48***
N	350	350	339	350
R-squared	0.39	0.36	0.35	0.35
R-squared Adj.	0.33	0.32	0.31	0.32

Table 2: Table of Factors for Robust Linear Model

	coef	std err	z	P> |z|	[0.025	0.975]
Intercept	4.5848	0.360	12.735	0.000	3.879	5.290
conventional_alt_creds	0.4445	0.041	10.792	0.000	0.364	0.525
covid_ind_remote_large_degree	0.5702	0.188	3.040	0.002	0.203	0.938
covid_ind_fav_online_large_degree	-0.6131	0.284	-2.159	0.031	-1.170	-0.056
covid_ind_fav_online_moderate_degree	-0.7287	0.224	-3.249	0.001	-1.168	-0.289
covid_ind_fav_online_slight_degree	-0.6705	0.231	-2.898	0.004	-1.124	-0.217
industry_health	0.6316	0.266	2.377	0.017	0.111	1.152
industry_information_technology	0.4122	0.176	2.346	0.019	0.068	0.757
industry_manufacturing	0.7248	0.272	2.666	0.008	0.192	1.258
ethnicity_other	1.6102	0.699	2.302	0.021	0.239	2.981
ethnicity_white_caucasian	0.2874	0.158	1.818	0.069	-0.022	0.597
state_georgia	1.0125	0.463	2.188	0.029	0.105	1.920
state_ohio	-1.1001	0.580	-1.896	0.058	-2.237	0.037
state_pennsylvania	-0.6778	0.445	-1.525	0.127	-1.549	0.194

independently important in a multiple regression over and above conscientiousness. Individuals high in grit experienced weaker familiarity bias.

Robustness of the pro-regulatory effect may be explained using a combination of three alternative hypotheses. First, the pro-regulatory effect may represent an unobserved logical structure. This hypothesis makes sense of improved effect identification resulting from added controls. This hypothesis also makes sense of the lack of important mental effort effects.

A second hypothesis is that the measure of status quo bias is ineffective. This explanation holds that status quo bias in education is particularly strong. After correcting for the status quo proxy, there could be residual status quo bias remaining in the estimate.

In this study, the favorability of artificial intelligence is used as an innovation proxy. Low favorability is taken to indicate status quo bias. As artificial intelligence becomes normal, favorability tends to become a poor tool to distinguish innovation from the status quo. It seems plausible that for some respondents, artificial intelligence is less a deviation from the status quo compared to unaccredited learning.

The hypothesis of proxy failure may dovetail with an explanation from an unobserved logical structure. That is, some conservatives may carve out education as a logical-ideological exception to general market favorability.

A third hypothesis is that there is systematic variation in the sample. This explanation leverages an unexpected difference in the favorability to artificial intelligence in the current sample compared to prior periods. This variation can be taken as random, but it might also be attributable in part to a recent massive social adoption of new technologies. COVID-19 has forced massive social change to technology use. This may contribute to an unexpectedly rapid normalization of artificial intelligence. This third hypothesis need not exclude some effect from the other two.

References

[1] J. Jaccard, C. K. Wan, J. Jaccard, LISREL approaches to interaction effects in multiple regression, no. 114, sage, 1996.