International Journal of
Psychology & Behavior Analysis

| Original Article | Open Access |

Behavioral Compliance with COVID-19 Health Regulations Among College Students

Mengfei Cai[1]* and Cheng Chi

Department of Psychology, Manhattanville College, 2900 Purchase Street, Purchase, NY 10577, United States

Abstract

Towards the end of 2019, the COVID-19 virus began to rapidly spread between and within countries, and eventually, spread around the globe. In the past three years, health departments have implemented multiple guidelines that were intended to lower the risk of contracting the COVID-19 virus. Recent research has attempted to identify who is most likely to comply with these guidelines and whether specific personal variables are correlated with behavioral compliance with COVID-19 guidelines. This study attempts to look at the relationship between specific personal variables among college-aged individuals and behavioral compliance with COVID-19 guidelines. The sample in this study consists of 33 students from a four-year Liberal Arts College in the New York area. Each participant was instructed to complete a questionnaire that involved questions relating to multiple categories such as personality, trust in science, behavioral compliance, etc. Pearson's correlations were conducted among these variables. The main findings of the study include: a) those who have higher trust in science have significantly higher behavioral compliance with the COVID-19 regulations. b) People who scored higher on conscientiousness and openness are more likely to be compliant with COVID-19 regulations. c) People who believe health is due to chance are significantly less likely to comply with COVID-19 regulations.

Introduction

COVID-19 is an infection caused by the SARS-CoV-2 virus. The virus attacks the respiratory system in affected individuals. Over the course of 2020 and 2021, there have been millions of cases reported around the globe. The disease can be contracted by people of all ages, but more severe symptoms are typically observed in individuals who are either older or have a pre-existing health condition that may affect their body's immune system [1]. The disease is highly infectious, has spread rapidly through many countries, and has negatively impacted millions of people. The virus has developed multiple variants, such as the Delta and Mu variants, which, despite governments and health organizations' efforts to combat the virus through vaccination and social distancing, the virus is still spreading rapidly. One factor which has contributed to the spread of this virus is the lack of compliance with health regulations that have been imposed by government bodies. The proposed study will be an exploratory study of associations between variables associated with acceptance of compliance with recommendations/requirements regarding COVID-19 among college-aged individuals.

Literature Review

Trust

Previous work has indicated that a variety of individual, personal variables are associated with acceptance/compliance with COVID-19 regulations. A study done in 2021 in Switzerland found that non-compliance with COVID-19 public health regulations was positively associated with low trust in authorities and low self-control among college students [2]. Trust in sources of information has emerged as a major influence on compliance with COVID-19 recommendations/regulations. According to a recent study by Ayalon [3], people with low trust in government, scientists, primary healthcare providers, etc tend to not engage in preventive health behaviors as often as people with moderate or high levels of trust in various authority groups.

Accuracy of knowledge

Accuracy knowledge about diseases has been found to be associated with compliance with health recommendations/regulations [4]. A study of knowledge and beliefs about H1N1 flu and people's behaviors related to it showed that many respondents have misconceptions about the mode of transmission of the disease, as well as the efficacy of preventive behaviors [4]. Those who had a higher belief in the efficacy of handwashing and those who had higher levels of the tendency to worry were more likely to wash their hands [4]. Their findings highlight the multiple variables related to knowledge of the disease that simultaneously influences compliance.

Personality

Previous research has found that individual personality characteristics are associated with compliance with COVID-19 recommendations and regulations [5]. One major personality factor which was correlated with behavioral compliance with COVID-19 health guidelines is agreeableness, which is characterized by higher levels of compassion [5]. In 2021, a study was conducted by Blais et al. that assessed the relationship between personality variables and compliance with COVID-19 health protocols. It was found that traits that involved careful planning, such as conscientiousness and openness, were positively correlated with compliance with health regulations. They also found that conscientiousness and openness are positively correlated with social distancing, while extraversion has a negative relationship with social distancing. Additionally, the participants

*Corresponding Author: Prof. Mengfei Cai, Department of Psychology, Manhattanville College, 2900 Purchase Street, Purchase, NY 10577, United States
E-mail: Mengfei.Cai@mville.edu

who scored higher on conscientiousness were more likely to support lockdown COVID-19 protocols [5]. These findings are consistent with past research related to diabetes [6]. The differences in treatment compliance for diabetes for personality Type A, B, and D people were measured in this study. Type A people are ambitious, impatient, and high achieving, while Type B people do work steadily and enjoy their achievements. Type D people have a vulnerability factor that translates to high neuroticism, low extraversion, and low conscientiousness on the Big Five Inventory [6]. The study found that people who are Type D were more likely to be compliant in self-monitoring of their glycemic state and less compliant to visit the family physician for a check-up [6]. This means that people with a higher level of neuroticism were more likely to comply with self-monitoring actions, like protocols in COVID-19 such as social distancing and mask-wearing. Lastly, a large study was conducted that involved surveying over 100,000 individuals across 55 countries to identify the relationship between personality and "shelter-in-place compliance" [7]. The results found that all the Big Five traits except extraversion, were positively correlated with compliance with regulations. Extraversion, on the other hand, was negatively correlated with compliance because of their need for social interaction and new experiences [7].

Health locus of control

One well-known factor influencing people's health-related behaviors is their health locus of control [8]. Health locus of control refers to the degree to which one believes that their health is in their control, is controlled by others, or is due to chance [8]. Past research has shown that people who believe that their health is in their control are more likely to comply with health recommendations, while people who believe that their health is due to chance are less likely to comply with health recommendations [8].

The proposed study

The current study attempts to identify the relationship among personal variables, such as levels of trust, accuracy of knowledge, personality factors, & health locus of control, and behavioral compliance with health regulations. Based on the review of previous literature, the following hypotheses will be tested in this study:

Hypothesis 1: Higher levels of trust in science and scientists, and accurate knowledge regarding COVID-19 will be positively correlated to behavioral compliance with COVID-19 regulations.

Hypothesis 2: Higher scores of agreeableness, openness, conscientiousness, and neuroticism from the big five personality traits will be positively associated with behavioral compliance with COVID-19 regulations, while a higher score on extraversion will be negatively associated with compliance with COVID-19 regulations.

Hypothesis 3: Higher scores on the external locus of control (chance subscale) will be negatively correlated with behavioral compliance with COVID-19 regulations.

Hypothesis 4: Higher scores on the internal locus of control and the external locus of control (powerful others subscale) will be positively correlated with behavioral compliance with COVID-19 regulations.

Method

Participants & procedures

A sample of 33 undergraduate students from Fundamentals of Psychology classes in a 4-year liberal art college was recruited for this study. 23 of them are females (69.7%) and 10 are males (30.3%). The participants who volunteered all signed the consent form. Data were collected using online surveys administered on Google Forms. The data collection is anonymous and no identifiable personal information was collected. This study was approved by the IRB committee of the institution.

Measures

Multiple measures will be used to assess the relationship between personality variables and levels of behavioral compliance with COVID-19 health recommendations.

Trust in science and scientists

The Trust in Science and Scientists Inventory [9] measures the extent that people trust science and scientists, as this can directly affect behaviors and feelings regarding guidelines and information in relation to COVID-19. It has 21 items, on a 5-point Likert scale ranging from "Strongly Disagree" and "Strongly Agree." This measure has questions such as this: "When scientists change their mind about a scientific idea it diminishes my trust in their work." This is a reliable measure, as it has a Cronbach's alpha of 0.86 [9].

Knowledge regarding COVID-19

The Knowledge Regarding COVID-19 scale used in the current study is a modification of a scale used by Rizwan et al., in a 2020 study that measured knowledge regarding COVID-19. The only things that have been modified for the current study are the wording of the questions for the ease of the reader, as well as the ordering of the Likert scale ratings. The modifications were reviewed and permitted by the original developer of the scale. The modified Knowledge Regarding COVID-19 scale contains 20 questions, all of which are rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Examples of questions from this measure are: "COVID-19 can be spread by singing." and "Difficulty breathing is a symptom of COVID-19."

Big five inventory-II

The Big Five Inventory-II [10] measures the Big Five Personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness. The BFI-II has 60 questions and is scored on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). An example of a question from this questionnaire is "I see myself as someone who is outgoing, and sociable."

The BFI-2 has a mean alpha reliability of 0.87 and a mean test-retest reliability of 0.80 [10]. The 15 facets of the BFI-2 have mean alpha reliability of about 0.76 and men test-retest reliability of 0.73 [10]. These data indicate that the BFI-2 has good reliability. In terms of convergent validity, the BFI-2 has moderate to strong correlations similar to measures such as the Big Five Aspects Scales (BFAS) and the Revised NEO Personality Inventory-Revised (NEO PI-R) (r = 0.63-0.93) [10].

COVID-19 Locus of Control

The COVID-19 Locus of Control Scale is a modified version of the Multidimensional Health Locus of Control Form C scale [11] (Wallston, 1978). The modification was reviewed and permitted by the original scale developer. This scale measures the degree to which people believe that whether they contract COVID-19 is in their control (internal locus of control), due to the actions of chance (external locus: chance), or the medical professionals (external locus:

powerful others). The COVID-19 Locus of Control scale contains 18 questions, all of which are rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). An example of a question from this measure is: "Often, I feel that no matter what I do, if I am going to get contract COVID-19, I will contract COVID-19."

The Internality and Chance subscales both showed average Alpha reliabilities over 0.8, while the Doctors and Other People subscales show average Alpha reliabilities of 0.7 [12]. These scores suggest good internal consistency. Form B of the MHLC is like Form C but lumps together the Doctors and Other People subscales into one subscale called Powerful Others (Wallston, n.d., Scoring Instructions for the MHNC Scales). For convergent validity, the Form C and Form B subscales moderately correlate with one another [12].

COVID-19 behavioral compliance measure

The COVID-19 Behavioral Compliance Measure will serve as the dependent variable measure. We created this measure based on the American Centers for Disease Control and Prevention's (CDC) COVID-19 prevention guidelines as listed on their website and implemented questions that were used by Daoust in his study assessing compliance with COVID-19 health recommendations (Daoust et al., 2020). The scale contains 13 questions, all of which are rated using a 4-point scale containing the answers (1) "No", (2) "Only when necessary", (3) "Occasionally", and (4) "Yes" regarding each behavior. An example of a question from this measure is: "Do you wear your mask indoors when within 6 feet of people who do not live in your household." We used four questions from Daoust et al. but reworded two of them, and 9 questions were created on their own. Answers 2 and 3 (Only when necessary and occasionally) serve as "face-saving options", which Daoust found increased the likelihood of participants reporting non-compliance. The use of Daoust et al.'s measure questions was permitted by the author.

Results

A Pearson's r correlation analysis is conducted among the variables: Trust in science, Knowledge of COVID-19, Big Five Personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness), Locus of control (internal, external-chance, external-powerful others), and Behavioral compliance. Analysis results are shown below in Tables 1 to 3.

Trust, knowledge, and compliance

Hypothesis 1 predicts Trust in science and Knowledge regarding COVID-19 will be positively correlated to behavioral compliance with COVID-19 regulations. The prediction of the association between trust and compliance is supported by the significant correlation coefficient ($r = .716$, $p < .001$). However, accurate knowledge regarding COVID-19 does not seem to influence regulation compliance ($r = -.071$, $p > .05$).

	Compliance		
	n	Pearson Correlation	P value
Trust	33	.716**	<.001
Knowledge	33	-.071	.694

Table 1: Correlation of Trust in Science, Knowledge of COVID-19 and Behavioral Compliance
Note: **Correlation is significant at the 0.01 level.

Personality and compliance

In terms of the Big Five personality traits, conscientiousness has a significant positive relationship with compliance ($r = .395$, $p < .05$). Similarly, openness also demonstrated a significant positive correlation with regulation compliance ($r = .403$, $p < .05$). No significant correlations were found for agreeableness ($r = .195$, $p > .05$), extraversion ($r = -.233$, $p > .05$), neuroticism ($r = .029$, $p > .05$) in their relationship with compliance. So hypothesis 2 is partially supported.

	Compliance		
	n	Pearson Correlation	P value
Extraversion	33	-.233	.192
Agreeableness	33	.195	.278
Conscientiousness	33	.395*	.023
Neuroticism	33	.029	.875
Openness	33	.403*	.020

Table 2: Correlation between Big Five personality traits and Behavioral Compliance.
Note: *Correlation is significant at the 0.05 level.

Control and compliance

As for locus of control, the subscale of chance demonstrated a significant negative relationship with regulation compliance ($r = .556$, $p < .001$) which supports hypothesis 3. The subscale of powerful others has a weak positive correlation with compliance ($r = .298$, $P > .05$), while the internal locus of control has a weak negative correlation with compliance ($r = -.128$, $P > .05$).

	Compliance		
	n	Pearson Correlation	P value
Chance	33	-.556**	<.001
Internal	33	-.128	.479
Powerful Others	33	.298	.092

Table 3: Correlation between Locus of Control and Behavioral Compliance.
Note: **Correlation is significant at the 0.01 level.

Discussions

As expected in the hypothesis, participants with higher levels of trust in scientists are also more likely to follow COVID-19 regulations which confirms the findings in Nivette et al.'s [2] research. It would make sense given that the guidelines are developed and recommended to the public by scientific authorities. It could also suggest that developing public campaigns that feature trustworthy public figures giving COVID-19 guidelines information could boost compliance. However, knowledge of COVID-19 seemed to have no relationship with participants' willingness to comply with COVID-19 guidelines, which could suggest that only having an understanding of the disease is not sufficient to promise behavioral compliance.

Our hypothesis regarding the relationship between personality traits and regulation compliance is partially confirmed. Participants who are high on conscientiousness and openness are more willing to follow COVID-19 regulations, similar to the findings of Blais et al. [5] in which the relationship was found to be due to the careful planning aspect within these traits. In addition, people who are high on openness may have an easier time adapting to such a new way of

living (following regulations during the pandemic) while those who are high on conscientiousness may be compliant due to the responsible nature of this trait. The correlational directions of extraversion and agreeableness only marginally confirm the hypothesis, which could be due to the small sample size. Surprisingly, the association between neuroticism and regulation compliance is almost equal to zero, which could suggest that the level of participants' emotional instability does not play a significant role in their willingness to follow COVID-19 guidelines, which contradicts prior research stating that people who are high on neuroticism are more likely to be self-monitoring and social distancing [6].

Furthermore, participants who believe that their health is due to chance are less likely to be compliant with COVID-19 regulations, which is to be expected considering that they tend to believe that their health is not in control of themselves but due to uncontrollable and unpredictable force, thus it is unnecessary to follow regulations. Lastly, the positive relationship between the belief that whether one contracts COVID-19 or not is in the hands of health professionals and regulation compliance is relatively weak. Similarly, the internal locus of control is not a significant factor either. Perhaps the belief that one's health is in their own control, or health professionals' control, does not necessarily lead to compliance with guidelines. An explanation could be various levels of risk tolerance among people and some may be okay with facing the risk of getting infected by not following the guidelines.

Implications

The findings of this study provide useful information on a better understanding of people's decision to be either compliant or non-compliant with COVID-19 guidelines, as well as suggestions for ways to improve behavioral compliance. For example, developing public campaigns that feature trustworthy celebrities and authority figures speaking on the importance of following the guidelines could be one way to increase behavioral compliance. In addition, people with high openness have an easier time following COVID-19 guidelines could imply that other people may need additional support to help them adapt to this new way of living during the pandemic, as isolation is likely to have a negative impact on mental health. The positive association of conscientiousness and behavioral compliance could mean that teaching people how to be mindful may help with regulation compliance. In other words, educating the public about following the guidelines is a way to not only be responsible for oneself, but also for others in their community because they can lower the risks for the vulnerable population, such as the elderly people, to get infected as well.

Limitations and Future Work

It should be noted that this research study is based on a relatively small sample using solely college students. Thus, it may be possible that certain relationships were not revealed based on our sample, and the generalizability of our results is limited as well. Future studies based on a larger sample and a more diverse population would be beneficial for a more in-depth understanding of this issue. In addition, given that our study suggests that the difficulty to adapt could contribute to low behavioral compliance, future studies should look at potential factors that affect people's adaptability and resilience, such as organization, mental flexibility, stress management, etc. Another limitation of this study is found in self-report responses. Due to the pandemic, all the data were collected remotely through a self-report survey. Future studies could use experiments or observations to measure variables such as behavioral compliance, which will increase the validity of measurement.

Competing Interests

The authors declare that they have no competing interests.

References

1. Centers for Disease Control and Prevention (CDC) & National Center for Immunization and Respiratory Diseases (NCIRD) (2019) 2009 H1N1 Pandemic (H1N1pdm09 virus). Centers for Disease Control and Prevention.

2. Nivette A, Ribeaud D, Murray A, Steinhoff A, Bechtiger L, et al. (2021) Non-compliance with COVID-19-related public health measures among young adults in Switzerland: Insights from a longitudinal cohort study. Soc Sci Med 268: 113370.

3. Ayalon L (2021) Trust and Compliance with COVID-19 Preventive Behaviors during the Pandemic. Int J Environ Res Public Health 18: 2643.

4. Kanadiya MK, Sallar AM (2011) Preventive behaviors, beliefs, and anxieties in relation to the swine flu outbreak among college students aged 18-24 years. Z Gesundh Wiss 19: 139-145.

5. Blais J, Chen PG, Pruysers S (2021) Who Complies and Who Defies? Personality and Public Health Compliance. Front Polit Sci 3: 660911.

6. Milicevic R, Jaksic N, Aukst-Margetic B, Jakovljevic M. Personality traits and treatment compliance in patients with type 2 diabetes mellitus. Psychiatr Danub 2: 586-589.

7. Götz FM, Gvirtz A, Galinsky AD, Jachimowicz JM (2021) How personality and policy predict pandemic behavior: Understanding sheltering-in-place in 55 countries at the onset of COVID-19. Am Psychol 76: 39-49.

8. Wallston KA, Stein MJ, Smith CA (1994) Form C of the MHLC scales: a condition-specific measure of locus of control. J Pers Assess 63: 534-553.

9. Nadelson LS, Hardy KK (2015) Trust in science and scientists and the acceptance of evolution. Evo Edu Outreach 8: 9.

10. Soto CJ, John OP (2017) The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. J Pers Soc Psychol 113: 117-143.

11. Wallston KA, Wallston BS, DeVellis R (1978) Development of the Multidimensional Health Locus of Control (MHLC) Scales. Health Educ Monogr. 6:160-170.

12. Wallston KA, Smith MS (1994) Issues of control and health: The action is in the interaction. In Penny G, Bennett P, Herbert M (Eds.), Health psychology: A lifespan perspective (pp. 153-168). Chur, Switzerland: Harwood.