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Ideological determinants of compliance with COVID-19 prevention behaviors

Joshua Bishop

bishopjd@gvsu.edu

Grand Valley State University

Kelsey Lantis

Grand Valley State University

Laura Andres

Grand Valley State University

Arianna Deherder

Grand Valley State University

Alexis Emelander

Grand Valley State University

Hannah Noorman

Grand Valley State University

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Abstract

Historically, college campuses have been vulnerable to the spread of diseases and infection [1]. University students contributed significantly to the spread of the COVID-19 virus, and it is important to understand how those in high-spreading environments respond to public health crises [2]. This cross-sectional study uses a stratified random sample of 614 college students from a Midwestern public university to explore what perspectives, experiences, and attributes predict compliance with recommended COVID-19 prevention guidelines. Data were gathered in November, 2020 as initial vaccines were being trialed [3]. Results found high degrees of compliance with mask-wearing guidelines and avoiding large gatherings, but less compliance with social distancing. This study found several variables associated with at least one type of COVID-19 prevention behavior: political ideology, religious service attendance, age, socioeconomic status, and social support. More research is needed to further understand these findings as implications concern public health officials and university administrators in their efforts to keep their communities safe during public health crises.

Introduction

When the World Health Organization declared an end to the COVID-19 public health emergency in May of 2023, over 700 million cases had been reported worldwide [4]. As of October 2025, the global number of estimated COVID-19 cases is about 779 million, where the United States experienced approximately 103 million of those total cases [5]. Before tracking ended, university students had accounted for over 700,000 of the confirmed cases in the US [2]. Early modeling suggested that in the United States, young adults may have been responsible for COVID-19 resurgence in summer 2020 [6]. Historically, universities have been aware that campus life creates a unique risk for spreading infectious diseases and have been proactive in their efforts to fight infection among their student populations [1]. Whether measles outbreaks [7], the seasonal flu [8], the Ebola virus [9], the SARS epidemic [10], or the emerging Mpox virus [11], universities have exercised strategies such as quarantining, contact tracing, and online learning to decrease transmission in their communities.

Despite the unprecedented nature of COVID-19, universities' responses to the pandemic mostly mirrored previous efforts to prevent the spread of infectious disease. However, university campuses and their local communities were at a significantly high risk of becoming COVID-19 super-spreading locations early in the pandemic [12]. The spread of COVID-19 among students may have been attributed to factors specific to campus life and residential settings [13].

Public health officials and university administrators need to understand what predicts public health compliance and which audiences need tailored messaging for pandemic prevention behaviors. This is particularly true for university students, a population both at low risk of serious or fatal complications from COVID-19, but at a high risk of super-spreader events. Because universities face unique challenges characteristic of their population, knowledge collected during the COVID-19 pandemic may also provide greater insight for future public health crises in these communities. The purpose of this study is to

investigate the perspectives, experiences, and attributes that might predict compliance with prevention behaviors among university students.

The following summarizes previous research that explores themes such as ideology, race, and gender, and how they relate to behaviors and reactions to infectious diseases and public health crises.

Ideology

Political ideology is an important variable in understanding prevention behaviors. Some research found that political conservatism was associated with less perceived personal vulnerability to COVID-19 [14], and prevention behavior recommendations given by government leaders in Democratic-leaning counties were more effective in increasing social distancing than Republican-leaning counties [15]. Other research suggests that trust in government officials does not predict compliance with precautionary guidelines; rather, beliefs regarding effectiveness of prevention behaviors are associated with stronger compliance [16]. Differences in beliefs and behaviors about COVID-19 prevention translated into different consequences. In 2020, COVID-related deaths did not differ in red and blue states; however, in 2021, there were significantly less COVID-related deaths in blue-states [17].

Some studies found that religion does not predict compliance with COVID-19 precautions [18], while others found that state stay-at-home orders weakened the impact on mobility in more religious states [19]. This may be due to more religious states permitting in-person religious services. Kranz and colleagues note that high religiosity is associated with unreasonable COVID-19 coping behaviors (avoiding 5G networks, hoarding of toilet paper, etc.) and not with reasonable ones (mask wearing, social distancing, etc.) [20].

Stigmatizing attitudes toward others may create more willingness to socially distance or engage in other prevention behaviors. Tomczyk and colleagues demonstrated that stigmatizing attitudes were associated with higher compliance to prevention behaviors. The perception that others are not engaging in adequate prevention behaviors may elicit an increase in prevention behaviors [21].

Lastly, ideology about immunizations may be predictive of other public health mandates or guidelines. During the COVID-19 pandemic, 60% of one college sample reported uncertain intention of receiving a vaccination [22], while another sample reported only 28% were uncertain [23]. Riggs and colleagues found that students reported overall positive attitudes toward mask-wearing, yet over half of the students did not believe that those fully vaccinated should have to wear a mask, even though college campuses still had mask-mandates [24].

Race

There is evidence that race plays a role in compliance to disease prevention guidelines. Several studies have demonstrated that non-white individuals were more likely to practice COVID-19 prevention behaviors than white individuals [25–26]. While there is support that Black, Hispanic, and Indigenous

communities were not as quick to adopt social distancing practices at the start of the COVID-19 pandemic [27], other findings demonstrate Black and Latinx individuals responded to the pandemic initially with higher overall prevention compliance compared to White individuals [25]. It is possible that more specific prevention behaviors vary by race or ethnicity. For example, Orom and colleagues found identifying as Latinx was associated with avoiding in-person work, whereas identifying as Black was associated with social distancing, both significantly greater than among those identifying as White [26].

It should be noted that Black and Latinx Americans were disproportionately burdened with COVID-related outcomes [28]. The relationship between race and COVID-19 prevention behaviors may be mediated by other factors. When comparing compliance with COVID-19 prevention behaviors between Black and White respondents, one study found that the respondents' perceived risk to others and importance of protecting their community mediated the relationship between race and prevention [26]. Moreover, other factors outside attitudes and behaviors regarding COVID-19 may disproportionately affect communities of color. There were significantly higher rates of COVID-19 infections and deaths among Black and Latinx Americans [28–29], with Black Americans being the most heavily impacted racial demographic [29]. This trend may be the result of high medical distrust caused by the historical marginalization of the Black community [30–31] and medical malpractices concerning Black individuals [32]. Other research suggests that minority communities with low SES or limited English proficiency may have less access to current, adequate public health communication during national pandemics compared to non-Hispanic, White adults and those of affluent backgrounds [27].

Gender

The literature shows that gender plays a role in compliance with prevention behaviors. Women are more likely than men to participate in behaviors intended to prevent infection such as hand washing and sanitizing surfaces [21, 33–34], adopting new personal health and dietary behaviors, and changing their social activities [34]. Additionally, women perceive themselves as more susceptible to risk and infection [21; 33–35], despite men being at a higher risk of COVID-19 complications [36]. While some studies depict a difference between genders and compliance with preventative measures, other studies find no differences [18], specifically mask-wearing intentions, mask-wearing behavior, and avoidance of crowds and public places [33].

This study seeks to contribute by answering the following research question: What perspectives, experiences, and attributes predict compliance with recommended COVID-19 prevention behaviors among university students?

Materials and Methods

This cross-sectional study utilized a stratified random sample, consisting of students from a Midwestern university. Prior to participating, all participants gave consent, were informed that all responses would be

anonymous and confidential, and reminded that participation was voluntary. The IRB from Grand Valley State University approved all procedures.

Sample and Data Collection

Data were collected through an online survey (Qualtrics) of university students in November 2020. At the beginning of the survey, participants were provided with information regarding the study, including purpose, procedures, voluntary participation, privacy and confidentiality, and agreement to participate. Informed consent was obtained from all subjects in the study, implied by voluntary continuation of the survey after the opening remarks. Participants were randomly selected from four strata: 2000 from the student population, 1000 from the college of business, 1000 from psychology majors, and all social work students (n = 467) were included. Of the 23,350 students enrolled in the university, 4,467 were invited to participate through one initial invitation email (November 2nd), and one reminder email (November 9th). This study used a participatory approach by including undergraduate and graduate students in all aspects of the study design, as well as in piloting survey items [37]. This study represents just one portion of the overall project which explored other topics related to COVID-19, childhood adversity, and racism. One article has previously been published from this dataset [23].

The final sample was 614 (response rate = 13.7%). Most participants identified as White (74.3%) and female (71.5%, Table 1). This was consistent with university demographics of majority female (62%) and White (82%). The mean age of participants was 22.9 years old with a range of 18–57 (Table 2). Half of participants reported having a family member in the medical field (Table 1) and most participants identified as middle class (Table 2). Politically, two-thirds of the sample expressed liberal affiliation, while less than a quarter expressed conservative affiliation (Table 1).

At the time of this study, most respondents were undergraduate students (72.2%) and participants had a mean GPA of 3.49 (Table 2). Of participants who reported employment status, over half held some degree of employment (51.5% part-time, 11.7% full-time). Prior to COVID-19 restrictions, 52.2% reported attending 0 monthly religious services or events, 38.1% reported attending 1–4, and 9.6% reported attending 5 or more services a month (Table 1).

Measures

The survey included 3 sections composed of 44 total questions: demographics, compliance with COVID-19 prevention guidelines, and covariates.

Demographics

Twelve demographic questions were developed for this study, including items such as: age, race/ethnicity, employment status, and socio-economic status, which was operationalized through the MacArthur Scale of Subjective Social Status [38]. For Gender, participants were asked if they identified

as male, female, or to specify if they identified as another gender. Additional demographic information included GPA and whether they had a family member that worked in the medical field. For analysis, academic status was modified to investigate differences between undergraduate and graduate students and differences between grade level of undergraduate students.

Political identity was assessed by participants reporting the extent to which they affiliate with a political ideology and party. Political ideologies included “Liberal,” “somewhat Liberal,” “Neutral,” “somewhat Conservative,” and “Conservative.” Political parties included “Democratic,” “Democratic-leaning,” “Independent,” “Republican-leaning,” “Republican,” and “Other” with the opportunity to specify.

Dependent Variable: Compliance to COVID-19 Prevention Guidelines

COVID-19 prevention guidelines included in this study consisted of wearing a mask in required locations, practicing safe social distancing by staying 6 feet apart from people who are not a part of the participant’s household, and avoiding large gatherings of people (more than 10) where social distancing is not possible. Participants were asked to describe the frequency of their participation in the previous week on a 5-point Likert scale ranging from Never (0), Some of the Time (1), Almost Half of the Time (2), Most of the Time (3), to Always (4). It should be noted that data were collected in early November 2020, which was a time when COVID-19 infections, hospitalizations, and deaths were rising at very high rates in many regions of the U.S.A.

In order to gain an overall snapshot of how participants followed the prevention guidelines, a COVID-19 Prevention Guidelines Score was calculated by summing the scores or mask-wearing, social distancing, and avoiding large gatherings. Internal reliability of the score total was acceptable (= 0.72). This score was used in bivariate analysis, but it was not used for multivariate analysis so that each prevention behavior could be included and understood separately.

Independent Variables

Researchers explored religiosity by looking at participants’ frequency of religious attendance, which was measured by asking participants to identify the typical number of religious services they attended each month before the COVID-19 pandemic, excluding weddings and funerals.

To capture general beliefs about vaccinations, participants were asked, “If you have children, or if you plan to have children in the future, how hesitant about childhood shots/vaccines do you consider yourself to be?” Responses ranged from Not Hesitant (1) to Very Hesitant (5). This is a modified question from one item on the Parent Attitudes about Childhood Vaccines survey [39].

Other covariates used in this study included the Adverse Childhood Experiences questionnaire [40], Patient Health Questionnaire-4 (“Mental Health Score”) [41], the Lubben Social Network Scale (“Social Support”) [42], the Perceived Stress Scale [43], (pp. 31–67), and the Rosenberg Self-Esteem Scale [44]. A

single-item question was created to assess participant's stigma toward mental illness as a proxy for stigmatizing attitudes.

Analysis

All analyses were conducted using IBM SPSS v.24. Bivariate analyses included Pearson correlations, Spearman's correlations, Fisher's exact test, Chi-Square, t-tests, and ANOVA. Multivariate analyses employed ordinal linear regression.

Results

Mask-wearing was the most consistently practiced prevention behavior, with nearly 98% reporting that they wore a mask most of the time (10.2%) or always (87.5%). Over 80% reported avoiding large gatherings most of the time or always, while 71% reported social distancing most of the time or always (Table 1). When these three prevention behaviors were combined into an overall prevention guidelines score by summing the scores, the mean was 9.79 (SD = 2.15) out of a possible score of 12. About 70% scored a 10 or higher, which includes a 20% who received the maximum score of 12, indicating complete compliance with the prevention guidelines (See Table 2 for descriptive statistics).

Bivariate Analysis

Bivariate analysis investigated associations between prevention behaviors and several independent variables. Table 3 displays results of correlation analyses and Table 4 displays associations with categorical variables.

Spearman's correlation was used for analysis of individual prevention behaviors and continuous variables (Table 3). There were many variables with significant correlations to all three prevention behaviors as well as the overall prevention guidelines score. Childhood vaccine hesitancy and attending religious services were the only variables that had a significant correlation with all three prevention behaviors ($p < 0.01$). As expected, the prevention guidelines were moderately correlated with each other, although social distancing and avoiding large groups were more correlated with each other than either was correlated with mask-wearing (See Table 3).
Table 4 demonstrates bivariate results. Men had lower compliance to overall prevention guidelines score than women (MD = 0.66, $p < 0.01$). Additionally, there were significant differences in compliance to overall prevention guidelines when analyzing both political ideology groups and childhood vaccine hesitancy groups ($p < 0.01$). When childhood vaccine hesitancy was defined and analyzed as three groups (hesitant, neutral, and not hesitant) individuals who had a neutral childhood vaccine hesitancy had a 1.13 decrease in overall prevention guidelines score than those not hesitant ($p < 0.01$), however, there were no differences in prevention guidelines score between those hesitant and non-hesitant.

Bonferroni post-hoc tests showed that political ideology played an important role. Those who identified as conservative, had a mean score on overall prevention guidelines score that was 1.94 lower than those

who identified as liberals ($p < 0.01$), and 1.32 lower than neutral political alignment. Moreover, those with neutral political alignment had a mean score on overall prevention guidelines less than 0.62 lower than those who identified as liberal ($p < 0.05$)

In Chi-Square analyses, childhood vaccine hesitancy and political ideology were associated with social distancing, avoiding large gatherings, and mask-wearing ($p < 0.01$). Gender was only associated with mask-wearing ($p < 0.05$). Because there was very low variability in mask-wearing, Fisher's exact tests were conducted for childhood vaccine hesitancy and political ideology, both of which were significantly correlated with Mask-Wearing ($p < 0.01$).

Ordinal Multivariate Models for COVID-19 Prevention Guidelines

Multivariate models used ordinal logistic regression with each dependent variable having 3 levels: Half the Time or Less, Most of the Time, or Always (reference variable). Covariate inclusion was based on bivariate associations. Participants who answered 51% or less of the survey, were excluded from the models ($n = 550$). Model results are reported for individual prevention behaviors in Table 5, Table 6, and Table 7. The most common variables to predict compliance were political ideology and religious service attendance. Some of the social and medical variables were significant predictors of compliance, but none of the mental health variables were significant in final models. Noted in Tables 5, 6, and 7, all models show an acceptable Goodness-of-Fit. The proportional odds assumption is met in all models with the exception to our model for mask-wearing. We discuss the limitations of this model later.

Mask-Wearing

The model for mask-wearing demonstrated that identifying as liberal increased the odds of being in a higher category of mask-wearing compliance by 3.49 times, compared to identifying as conservatives (Wald $\chi2(1) = 10.37$, $p < 0.01$). Identifying with a neutral political ideology did not significantly predict different mask-wearing behaviors. An increase in religious service attendance (expressed in services per month) was associated with a decrease in the odds of being at a higher level of mask-wearing behavior (OR = 0.86; Wald $\chi^2(1) = 8.61$, $p < .01$). No other variables in the model significantly predicted mask-wearing.

Social Distancing

An increase in religious service attendance (expressed in services per month) was associated with a decrease in the odds of being at a higher level of social-distancing behavior (OR = 0.91, Wald $\chi^2(1) = 5.3$, $p < 0.5$). Those who identified as liberal were 2.08 times more likely to be in a higher level of social distancing compliance than those who identified as conservative (Wald $\chi^2(1) = 7.21$, $p < 0.01$). An increase in SES (expressed as a unit-increase in perceived social standing) was associated with a decrease in the odds of being at a higher level of social-distancing behavior (OR = 0.88, Wald $\chi^2(1) = 4.27$, $p < 0.05$). Age significantly predicted social distancing compliance, with every year increase in age

predicting a 5% increase in reporting a higher compliance with social distancing. (Wald $\chi^2(1) = 9.37$, $p < 0.01$).

Avoiding Large Gatherings

The model investigating predictors of avoiding large social gatherings showed that an increase in social support (expressed as a unit-increase in perceived social support) was associated with a decrease in the odds of being at a higher level of avoiding large gatherings (OR = 0.96, Wald $\chi^2(1) = 4.61$, $p < 0.05$). Those who identified as liberal were 3.2 times more likely to be in a higher level of avoiding large gatherings compared to those who identified as conservative (Wald $\chi^2(1) = 21.2$, $p < 0.001$). Additionally, those who identified as politically neutral were 2.27 times more likely than conservatives to be in a higher level of avoiding large gatherings (Wald $\chi^2(1) = 7.57$, $p < 0.01$).

Discussion

This study investigates the attributes, perspectives, and experiences of university students that predict compliance with COVID-19 prevention behaviors, as well as to inform university responses through future public health crises. Bivariate analyses revealed many statistically significant associations, and multivariate models demonstrated that one of the most important predictors was political ideology, which significantly affected all three prevention behavior variables. Moreover, monthly religious service attendance was predictive of both mask-wearing and social distancing behaviors. Major findings and implications for public health officials and university administrators are discussed below.

Despite the divisiveness of mask wearing, nearly all participants reported compliance with mask-wearing, making it the most consistently practiced behavior (10.2% most of the time, 87.5% always). This is consistent with national surveys that have found that around 80% of Americans reported at the time of the study wearing masks frequently or always when they expect to be within six feet of other people [45]. Future research should consider the reasoning behind mask wearing as public health officials and higher education administrators encourage higher compliance with other prevention behaviors in future health crises.

Over three-fourths of participants reported avoiding large gatherings most of the time or always, while almost one-third reported social distancing “about half the time” or less, making social distancing the prevention behavior with the least degree of compliance. The decrease in compliance with social distancing is consistent with research during the early stages of the pandemic (2020) attributing social activities outside of academic settings to being a key contributor to the heavy spread of COVID-19 among college campuses [13]. Our study found that having a lower SES was associated with being in a higher level of social distancing compliance. Individuals with low SES may be more inclined to prevent infection due to limited financial and healthcare resources. Since social distancing was the only individual prevention behavior that had a significant relationship with SES in bivariate and multivariate analysis, particular attention should be given to this prevention behavior in future studies.

Age was also related to social distancing. As age increased, the likelihood of participants to be in a higher level of social distancing compliance also increased. Other studies have found older age to relate to higher health adherence regarding COVID-19 [46]. However, this literature regards differences in the general population, providing a larger age range than a university sample. Further research should seek to understand why the age differences exist, and whether they are primarily explained by structural factors. Younger students may be more likely to live on or closer to their university campus. It's also possible that older students are less likely to engage in social events, such as university clubs, due to other obligations (i.e., work or childcare obligations).

Political ideology is an important predictor of compliance with recommended COVID-19 prevention behaviors. Identifying as liberal was associated with an increase in compliance with COVID-19 prevention behaviors. This is consistent with studies reporting that non-compliance of COVID-19 prevention behaviors is highest among Republicans [14–15]. Health officials and university administrators should tailor messages to address the specific concerns of Conservative-identifying students, and messaging should be presented in an apolitical manner utilizing primary care physicians, religious leaders, local and state public health officials, and national or international medical associations.

Moreover, some literature suggests that the overwhelming disparity is not directly related to political party or ideology, but rather the political lean of the news source or modality that individuals receive their health information [47–48]. This could be attributed to informal sources or misinformation based on ideological lean, as criticism and skepticism of prevention behaviors was prominent from right-leaning officials at the beginning of the pandemic [47]. The role of accessing public health information through social media should be investigated. Public health officials should strategize in communicating the effectiveness of these prevention behaviors. Some studies have shown that rather than political figures endorsing mandates, beliefs that the mandate is effective and from a trustworthy source is a large determining factor in willingness to comply with preventive behaviors [16].

In the event of another pandemic or infectious outbreak, health and university officials should keep in mind the social motives behind action. One study finds that Republicans are 6.19 more likely to be vaccinated if their friends are vaccinated, which is a phenomenon not statistically significant among Democrats [49]. Groups may differ in motivation based on attitudes, experiences, and beliefs. They may be motivated by perceived risk to others, belief that they need to protect others, or peer diffusion. Nevertheless, the literature does provide evidence that no matter the demographic, health officials can cater to the individual's motivation to comply with behaviors that promote public health.

Similar research suggests men were 66% more likely to report non-compliance with recommended COVID-19 prevention behaviors compared to women [35, 50]. Research shows that men tend to perceive themselves as being at lower risk of infection and illness than women are [21, 33, 35], and are less likely to engage in infection preventive behaviors [21, 33–34]. However, men have been seen to be at a greater

risk of COVID-19 complications [36], and it is important that efforts to communicate and enforce COVID-19 prevention behaviors include presentation of these findings.

Results from this study suggest that those who do not participate in religious services regularly have a greater degree of compliance with recommended COVID-19 prevention behaviors. It is unsurprising that those who do not comply with prevention behaviors recommended by officials would also express greater attendance at religious services, as these events tended to breach social distancing and large gathering mandates. Additionally, some have argued that religious freedom has been infringed upon due to state mandates suspending in-person religious service or limiting capacities of these events [51]. Because protection of religious freedom is often associated with conservative political platforms, clear and consistent messaging that avoids politicization and debates may be effective as university administrators promote compliance among those who do not comply with prevention behaviors.

Limitations

External validity is limited in this study due to a sampling frame of one university, low response rate, and a disproportionate number of participants identifying as White and/or female. We did not find differences regarding race and compliance with prevention behaviors, but other studies have [25–27]. Sampling from a predominantly white institution narrowed the ability to study this relationship. Future research should recruit a more diverse sample to more confidently explore the role of race in compliance with prevention behaviors during public health crises, especially as it historically had a role in trust of government and health officials.

Moreover, slight unknown error potentially was introduced through the sampling method, as this study belongs to a bigger project that stratified based on major. Our study did not account for the stratification process in analysis due to major not significantly affecting mask-wearing ($p = 0.20$), social distancing ($p = 0.36$), avoiding large gatherings ($p = 0.45$).

The study also used cross-sectional data, which introduces a risk to internal validity. Covariates are described as predictors because they chronologically preexist compliance with prevention behaviors. Causation is theoretically assumed not based on study design.

The study's methodology operationalizes compliance to COVID-19 prevention guidelines based on three attributes: mask-wearing, social distancing, and avoiding large gatherings. However, at the time of the study, the CDC recommended more COVID-19 public health strategies in addition to these [52]. The three variables to measure compliance with COVID-19 prevention guidelines were chosen given their relevance to campus life and the sample population as well as their emphasis from government officials at the time.

Participants reported mark-wearing most of the time (10.2%) or always (87.5%). These results show a ceiling effect and may be due to mask-wearing being mandated on the university's campus during this time period. This effect may hinder the ability to determine accurate variability and accurate findings that

regard the relationship between mask-wearing and other variables. Moreover, the sample size and number of variables in the model may have negatively impacted the proportional odds assumption ($p < 0.01$). This implies that slope coefficients in relation to the independent variables were not consistent across all levels of mask-wearing.

Collecting data during the 2020 presidential election captured the highly politicized environment but also may have produced obstacles for generalization in less polarized circumstances. Moreover, the focus of this study is compliance with COVID-19 prevention guidelines as it relates to individuals' perspectives, attitudes, and experiences, but these things were measured in the early months of the pandemic, when confirmed COVID-19 infections were rapidly increasing in the United States [53]. Some participants may have been biased by a desire to seem more compliant than they were, while others may have desired to appear resistant to government recommendations and mandates. It is also possible that new data, new guidelines, and changing trends in prevalence, incidence, and lethality after these data were collected could influence the generalizability of the findings presented here.

Conclusion

The COVID-19 pandemic has impacted the well-being of people around the world, as well as disrupted many facets of life. While wide-spread compliance with prevention behaviors across the globe allowed successful containment of the virus, the U.S. struggled to produce similar results in the early stages of the pandemic. Although university administrators work to provide education and opportunities to their students while keeping their communities safe, campuses may always be at high risk of being super-spreading environments in the event of another pandemic. Public health crises are no novelty to university administrators, but COVID-19 posed greater difficulty in containing transmission among university communities. Fostering compliance with recommended prevention behaviors among a large, polarized population was an immense challenge. Thus, messaging of recommended prevention behaviors must be driven by the best available data to garner compliance. Because university students are at low-risk for serious complications of a COVID-19 infection but at high-risk for infecting others, it is important to understand what characteristics predict or inform compliance with recommended COVID-19 prevention behaviors for future public health crises.

This study found several variables associated with at least one type of COVID-19 prevention behavior: political ideology, religious service attendance, age, SES, and social support. Public health officials and university administrators should consider how best to tailor messaging to create a safe learning environment while reducing community transmission for future public health crises that impact university communities. Future research should explore motivations and reasons for compliance with prevention behaviors and ensure a diverse sample to increase external validity.

Declarations

Author Contributions

Conceptualization, all authors; methodology, all authors; validation, J.B.; formal analysis, all authors.; investigation, J.B. and K.L.; resources, J.B.; data curation, J.B., K.L., and L.A.; writing—original draft preparation, all authors; writing—review and editing, J.B., K.L., and L.A.; visualization, J.B., K.L., and L.A.; supervision, J.B.; project administration, J.B. and K.L. All authors have read and agreed to the published version of the manuscript.

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Ethical Approval

The IRB at Grand Valley State University approved all procedures in our study (#21-070-H). By proceeding to the survey after the informational page, respondents gave consent. All methods were carried out in accordance with relevant guidelines and regulations set forth by the IRB.

Consent to Participate

At the beginning of the survey, participants were provided with information about the study, including its purpose, procedures, voluntary nature of participation, privacy, confidentiality agreement, and a requirement declaring participants must be 18 or older to move forward to the survey. Participants were informed that they could discontinue the survey at any time without penalty. Informed consent was obtained from all subjects.

Consent to Publish

Participants were informed that this survey constituted a research study, implying that findings would potentially be published in a scholarly research journal. All data were collected anonymously, and no identifiable information is included in this manuscript.

Competing Interests

Three of the authors were students included in the sample frame of this study, their participation was voluntary and is unknown to the other authors. No identifying information was collected during the study, and all responses are anonymous. Additionally, they were students in the first author's course, however, authorship for this manuscript was voluntary and not connected to coursework or grades.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

1. Jin Y, Lee Y-I, Liu BF, Austin L, Kim S. How College Students Assess the Threat of Infectious Diseases: Implications for University Leaders and Health Communicators. J Int Crisis Risk Communication Res. 2021;4:129–64.
2. *The New York Times*. (n.d.). Tracking the Coronavirus at U.S. Colleges and Universities - The New York Times Available online: https://www.nytimes.com/interactive/2021/us/college-covid-tracker.html (accessed on 19 August 2024).
3. Centers for Disease Control and Prevention (CDC). (2023, March 15). CDC Museum COVID-19 Timeline. Centers for Disease Control and Prevention. https://www.cdc.gov/museum/timeline/covid19.html
4. Johns Hopkins University Coronavirus Resource Center. (n.d.). *Cumulative COVID-19 cases* [Web page]. https://coronavirus.jhu.edu/data/cumulative-cases
5. World Health Organization (WHO). (n.d.) COVID-19 Cases | WHO COVID-19 Dashboard Available online: https://data.who.int/dashboards/covid19/cases (accessed on 24 November 2024).
6. Monod M et al. (2021). Age groups that sustain resurging COVID-19 epidemics in the United States.*Science* 371. https://doi.org/10.1126/science.abe8372
7. Schwartz M. UCLA, CSU Quarantine 200 After Possible Exposure To Measles. National Public Radio; 2019.
8. Benjamin SM, Bahr KO. (2016). Barriers Associated with Seasonal Influenza Vaccination among College Students. *Influenza Research and Treatment*, *2016*, 4248071. https://doi.org/10.1155/2016/4248071
9. Redden E. (2014). U.S. Campuses Are on Edge over Ebola. *Inside Higher Ed*. https://www.insidehighered.com/news/2014/10/20/us-campuses-are-edge-over-ebola
10. Deurenberg-Yap M, Foo LL, Low YY, Chan SP, Vijaya K, Lee M. The Singaporean Response to the SARS Outbreak: Knowledge Sufficiency versus Public Trust. Health Promot Int. 2005;20:320–6. https://doi.org/10.2307/45152832.
11. Savinkina A, Chitwood M, Kwon J, Pitzer VE, Gonsalves G, Paltiel AD. Planning for Mpox on a College Campus: A Model-Based Decision-Support Tool. Ann Intern Med. 2023;176(3):340–7. https://doi.org/10.7326/M22-2734.
12. Closson T. College Students, Told to Report Covid Parties. Ask: To Snitch or Not to Snitch? The New York Times; 2020.
13. Walke HT, Honein MA, Redfield RR. Preventing and Responding to COVID-19 on College Campuses. JAMA. 2020;324:1727–8. https://doi.org/10.1001/jama.2020.20027.

14. Calvillo DP, Ross BJ, Garcia RJB, Smelter TJ, Rutchick AM. Political Ideology Predicts Perceptions of the Threat of COVID-19 (and Susceptibility to Fake News About It). SOCIAL Psychol PERSONALITY Sci. 2020;11:1119–28. https://doi.org/10.1177/1948550620940539.
15. Grossman G, Kim S, Rexer JM, Thirumurthy H. Political Partisanship Influences Behavioral Responses to Governors' Recommendations for COVID-19 Prevention in the United States. Proc Natl Acad Sci USA. 2020;117:24144–53. https://doi.org/10.1073/pnas.2007835117.
16. Clark C, Davila A, Regis M, Kraus S. Predictors of COVID-19 Voluntary Compliance Behaviors: An International Investigation. Global Transitions. 2020;2:76–82. https://doi.org/10.1016/j.glt.2020.06.003.
17. Güss CD, Boyd L, Perniciaro K, Free DC, Free JR, Tuason MT. The politics of COVID-19: Differences between U.S. red and blue states in COVID-19 regulations and deaths. Health Policy OPEN. 2023;5. https://doi.org/10.1016/j.hpopen.2023.100107. 100107, ISSN 2590 – 2296.
18. Corpuz R, D'Alessandro S, Adeyemo J, Jankowski N, Kandalaft K. Life History Orientation Predicts COVID-19 Precautions and Projected Behaviors. Front Psychol. 2020;11. https://doi.org/10.3389/fpsyg.2020.01857.
19. Hill TD, Gonzalez K, Burdette AM. The Blood of Christ Compels Them: State Religiosity and State Population Mobility During the Coronavirus (COVID-19) Pandemic. J Relig Health, 59, 2229–42, https://doi.org/10.2307/45299410.
20. Kranz DK, Niepel C, Botes E, Greiff S. Religiosity Predicts Unreasonable Coping With COVID-19. Psychol Relig Spiritual. 2023;15:1–5. https://doi.org/10.1037/rel0000395.
21. Tomczyk S, Rahn M, Schmidt S. Social Distancing and Stigma: Association Between Compliance With Behavioral Recommendations, Risk Perception, and Stigmatizing Attitudes During the COVID-19 Outbreak. Front Psychol. 2020;11. https://doi.org/10.3389/fpsyg.2020.01821.
22. Zhou Y, Li R, Shen L. Targeting COVID-19 vaccine-hesitancy in college students: An audience-centered approach. J Am Coll Health. 2024;72(9):3526–35. https://doi.org/10.1080/07448481.2023.2180988.
23. Bishop JD, Lantis KA, Deherder A, Emelander A, Noorman H. University Students' Willingness to Receive a COVID-19 Vaccine in the United States. J Am Coll Health. 2023;0:1–9. https://doi.org/10.1080/07448481.2023.2277198.
24. Riggs MA, Madni SA, Cornelius J, Zhang A, Czarnik M, Zullig K, Bensley RJ, Gibson-Young L, Gardner M, Waggett CE, Grabeel V, Pettyjohn SJ, Fisher C, Jones RM, Maniccia DM, Doyle J, Treuth M, Neatherlin J, Thomas E, Barrios L. Knowledge, attitudes, and behaviors with mask use and vaccines for COVID-19 prevention at 13 colleges and universities, April 2021. J Am Coll Health. 2024;72(8):2632–42. https://doi.org/10.1080/07448481.2022.2122719.
25. Mitchell J, Li X, Decker P, Park JM. Preventive health behaviour differences across racial groups during the early stages of COVID-19. J Infect Prev. 2024;25(5):166–81. https://doi.org/10.1177/17571774241238659.

26. Orom H, Allard NC, Kiviniemi MT, Hay JL, Waters EA, Schofield E, Tuman M. Racial/Ethnic differences in prosocial beliefs and prevention behavior during the COVID-19 pandemic. J Racial Ethnic Health Disparities. 2022;9(5):1807–17. https://doi.org/10.1007/s40615-021-01117-1.
27. Thakur N, Lovinsky-Desir S, Bime C, Wisnivesky JP, Celedón JC. The Structural and Social Determinants of the Racial/Ethnic Disparities in the U.S. COVID-19 Pandemic. What's Our Role? Am J Respiratory Crit Care Med. 2020;202:943–9. https://doi.org/10.1164/rccm.202005-1523PP.
28. Webb MH, Nápoles AM, Pérez-Stable EJ. COVID-19 and Racial/Ethnic Disparities. JAMA. 2020;323(24):2466–7. https://doi.org/10.1001/jama.2020.8598.
29. Gross CP, Essien UR, Pasha S, Gross JR, Wang S, Nunez-Smith M. Racial and Ethnic Disparities in Population-Level Covid-19 Mortality. J Gen Intern Med, 35, 3097–9, https://doi.org/10.1007/s11606-020-06081-w.
30. Funk C, Tyson A. Intent to Get a COVID-19 Vaccine Rises to 60% as Confidence in Research and Development Process Increases. Pew Research Center; 2020.
31. Quinn SC, Jamison A, Freimuth VS, An J, Hancock GR, Musa D. Exploring Racial Influences on Flu Vaccine Attitudes and Behavior: Results of a National Survey of White and African American Adults. Vaccine. 2017;35:1167–74. https://doi.org/10.1016/j.vaccine.2016.12.046.
32. Quinn S, Jamison A, Musa D, Hilyard K, Freimuth V. (2016). Exploring the Continuum of Vaccine Hesitancy Between African American and White Adults: Results of a Qualitative Study. *PLoS currents*, *8*, https://doi.org/10.1371/currents.outbreaks.3e4a5ea39d8620494e2a2c874a3c4201
33. Bish A, Michie S. Demographic and Attitudinal Determinants of Protective Behaviours during a Pandemic: A Review. Br J Health Psychol. 2010;15:797–824. https://doi.org/10.1348/135910710X485826.
34. Srivastav A, Santibanez TA, Lu P-J, Stringer MC, Dever JA, Bostwick M, Kurtz MS, Qualls NL, Williams WW. Preventive Behaviors Adults Report Using to Avoid Catching or Spreading Influenza, United States, 2015-16 Influenza Season. PLoS ONE. 2018;13:1–16. https://doi.org/10.1371/journal.pone.0195085.
35. Neumann-Böhme S, Varghese NE, Sabat I, Barros PP, Brouwer W, van Exel J, Schreyögg J, Stargardt T. Once We Have It, Will We Use It? A European Survey on Willingness to Be Vaccinated against COVID-19. Eur J Health Econ. 2020;21:977–82. https://doi.org/10.2307/45382016.
36. Dror AA, Eisenbach N, Taiber S, Morozov NG, Mizrachi M, Zigron A, Srouji S, Sela E. Vaccine Hesitancy: The next Challenge in the Fight against COVID-19. Eur J Epidemiol. 2020;35:775–9.
37. Baum F, MacDougall C, Smith D. Participatory action research. J Epidemiol Community Health. 2006;60(10):854–7. https://doi.org/10.1136/jech.2004.028662.
38. Adler NE, Epel ES, Castellazzo G, Ickovics JR. Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. Health Psychol. 2000;19(6):586–92. https://doi.org/10.1037/0278-6133.19.6.586.
39. Opel DJ, Mangione-Smith R, Taylor JA, Korfiatis C, Wiese C, Catz S. Development of a survey to identify vaccine-hesitant parents: The parent attitudes about childhood vaccines survey. Hum

Vaccin. 2011;7:4: 419–25. https://doi.org/10.4161/hv.7.4.14120.

40. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, Koss MP, Marks JS. Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults. The Adverse Childhood Experiences (ACE) Study. Am J Prev Med. 1998;14:245–58. https://doi.org/10.1016/s0749-3797(98)00017-8.
41. Kroenke K, Spitzer RL, Williams JBW, Löwe B. An Ultra-Brief Screening Scale for Anxiety and Depression: The PHQ–4. Psychosomatics. 2009;50:613–21. https://doi.org/10.1016/S0033-3182(09)70864-3.
42. Lubben JE. Assessing Social Networks among Elderly Populations. Family Community Health. 1988;11:42–52.
43. Cohen S. Perceived Stress in a Probability Sample of the United States. (1988). In *The social psychology of health*; Spacapan, S. Ed, Oskamp, S., Eds.; Sage Publications, Inc, 1988; pp. 31–67, 251 Pages ISBN 978-0-8039-3162-6.
44. Rosenberg M. (1965). *Society and the Adolescent Self-Image*; Princeton University Press, ISBN 978-0-691-09335-2. https://doi.org/10.2307/2575639
45. Kramer S. More Americans Say They Are Regularly Wearing Masks in Stores and Other Businesses. Pew Research Center; 2020.
46. Wollast R, Schmitz M, Bigot A, Speybroeck N, Lacourse É, de la Sablonnière R, Luminet O. Trajectories of health behaviors during the COVID-19 pandemic: a longitudinal analysis of handwashing, mask wearing, social contact limitations, and physical distancing. Psychol Health. 2024;39(13):1899–926. https://doi.org/10.1080/08870446.2023.2278706.
47. Yao SX, Carnahan D, Rhodes N. The partisan pandemic: Applying the reasoned action approach to understand the effects of politicizing a public health crisis. Analyses Social Issues Public Policy (ASAP). 2024;24(1):170–91. https://doi.org/10.1111/asap.12377.
48. L'Engle KL, Burns JR, Basuki A, Couture M, Regan AK. Liberals are believers: Young people assign trust to social media for covid-19 information. Health Commun. 2023. https://doi.org/10.1080/10410236.2023.2164959.
49. Konstantopoulos A, Dayton L, Latkin C. The politics of vaccination: a closer look at the beliefs, social norms, and prevention behaviors related to COVID-19 vaccine uptake within two US political parties. Psychol Health Med. 2024;29(3):589–602. https://doi.org/10.1080/13548506.2023.2283401.
50. Callaghan T, Moghtaderi A, Lueck JA, Hotez P, Strych U, Dor A, Fowler EF, Motta M. Correlates and Disparities of Intention to Vaccinate against COVID-19. Soc Sci Med. 2020;272:113638. https://doi.org/10.1016/j.socscimed.2020.113638.
51. Uddin A, Lewis A. (2020). Partisans Rush to Take Sides When COVID-19, Religious Freedom Collide. USA Today. https://www.usatoday.com/story/opinion/2020/12/11/partisans-rush-take-sides-when-covid-19-religious-freedom-collide-column/3876908001/
52. Honein MA. Summary of Guidance for Public Health Strategies to Address High Levels of Community Transmission of SARS-CoV-2 and Related Deaths, December 2020. MMWR Morb Mortal

Wkly Rep. 2020;69. https://doi.org/10.15585/mmwr.mm6949e2.

53. Mathieu E, Ritchie H, Rodés-Guirao L, Appel C, Giattino C, Hasell J, Macdonald B, Dattani S, Beltekian D, Ortiz-Ospina E et al. (2020). Coronavirus Pandemic (COVID-19). *Our World in Data*.

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