

INTENT TO RECEIVE A COVID-19 VACCINATION AMONG COLLEGE STUDENTS:  
THEORY OF PLANNED BEHAVIOR AND SOCIODEMOGRAPHIC PREDICTORS

A Thesis  
by  
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## **Abstract**

### **INTENT TO RECEIVE A COVID-19 VACCINATION AMONG COLLEGE STUDENTS: THEORY OF PLANNED BEHAVIOR AND SOCIODEMOGRAPHIC PREDICTORS**

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The COVID-19 pandemic created health and financial consequences across the world and will likely be managed through vaccination. College students have been identified as large spreaders of COVID-19 and adhere less to guidelines provided by professional institutions. A sample of college students ( $N = 228$ ) was recruited from a public southeastern university prior to widespread dissemination of COVID-19 vaccines and completed an online survey. The survey assessed sociodemographic variables (race, geographical location, religiousness, political leaning) and used Theory of Planned Behavior items (attitudes, subjective norms, and perceived behavioral control) to predict intent to receive the COVID-19 vaccine when available. The constructed model for COVID-19 vaccine intent was significant and explained approximately 74% of the variance observed in vaccine intent. Political leaning, attitudes, and perceived norms towards vaccination emerged as the strongest predictors of intent to vaccinate against COVID-19. Consistent with general population surveys, conservative political leaning related to greater vaccine hesitancy,

suggesting the need for tailored vaccine messaging from trusted sources. This study was limited by small sample variability, missing data, and a cross-sectional design that relied on self-reports and only assessed intent to receive the vaccine rather than behavior. Future studies should continue to assess college students' COVID-19 vaccine-related behavior and vaccine messaging as the pandemic continues to evolve.

**Keywords:** COVID-19, Theory of Planned Behavior, vaccine hesitancy, vaccine uptake, intent to vaccinate, college students

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## **Intent to Receive a COVID-19 Vaccination Among College Students: Theory of Planned Behavior and Sociodemographic Predictors**

COVID-19 has resulted in over 1,000,000 deaths in the United States alone and over six million deaths worldwide as of November 7, 2022 (Johns Hopkins Coronavirus Resource Center, 2022). To curb the spread of the virus, individuals were encouraged to social distance, wear masks in public, increase frequency of hand washing and take any authorized COVID-19 vaccine (Center for Disease Control and Prevention, 2022). In addition, large social gatherings like concerts, school attendance, and work environments shifted to a virtual format or were cancelled entirely to curb viral spread. Experts note that the pandemic will be controlled through herd immunity (i.e., enough members of the population with immunity for COVID-19), which is likely achieved, at least in part, through using a vaccine (Charumilind et al., 2020). Vaccine progress, in just one year since the emergence of COVID-19 in the United States, was immense, and currently four different COVID-19 vaccines have been authorized for use by the Food and Drug Administration. Even though vaccinations have been available to the public, vaccine hesitancy presents another hurdle to controlling the pandemic (Tyson et al., 2020). Preliminary polling among a large representative sample of Americans revealed the public's lack of confidence in the safety, effectiveness, and utility of the vaccine upon its initial development (Hamel et al., 2020). Current polling suggests that while most American adults have taken the vaccine (75%), hesitancy will need to be addressed to achieve herd immunity and rebuild from the economic and health effects of COVID-19 (Lopes et al., 2022).

This work investigated attitudes toward and potential barriers to COVID-19 vaccine uptake in emerging adults prior to widespread vaccine access. Emerging adults experienced



unique challenges in response to the COVID-19 pandemic, as many entered the job market when openings were low, shifted to virtual learning formats (if in school), and experienced heightened rates of anxiety and depression during the pandemic in comparison to other age groups (Hawes et al., 2021; Salari et al., 2020; Varma et al., 2020). Emerging adults are also of particular interest because they more often experience less severe forms of COVID-19 and are implicated as a group responsible for a large portion of the spread of COVID-19 (Monod et al., 2021). Emerging adults also reported less certainty about receiving the COVID-19 vaccine prior to the dissemination of the vaccine and following dissemination, and continue to have the lowest rate of vaccine uptake amongst all adult age groups (Hamel et al., 2020; Lopes et al., 2022). Emerging adults also engaged in fewer COVID-19 preventative behaviors than other age groups (Faasse & Newby, 2020). Relatedly, many colleges around the U.S. experienced high rates of infection from COVID-19 upon reopening; it remains to be seen if the COVID-19 vaccine will be mandatory for all college students. Understanding more about the intentions of college students, who often live in congregated living environments, to vaccinate against COVID-19, as well as potential sociodemographic factors associated with vaccine hesitancy could better inform future public health efforts.

### **Sociodemographic Predictors of Vaccine Uptake and COVID-19 Prevention Behaviors**

Vaccination uptake is a major public health effort throughout the United States and the world; vaccine hesitancy, which is defined as “the reluctance or refusal to accept vaccines despite availability,” was listed as one of the top 10 global health problems to be addressed by the World Health Organization in 2019 prior to the occurrence of the COVID-19 pandemic (World Health Organization, 2020). Much literature has focused on vaccination intention and uptake for vaccines that consistently have low rates of uptake, such as the

Human Papillomavirus (HPV) vaccine and the influenza vaccine (Ventola, 2016). COVID-19 is one of the most recent of public health vaccine efforts, and currently, several pharmaceutical companies have created COVID-19 vaccines (Saplakoglu, 2020). While progress towards widespread vaccination moves ahead, less is known about predictors of intent to vaccinate for this vaccination specifically, and how this might change over time. Sociodemographic characteristics often predict vaccine uptake as well as vaccine hesitancy. Demographic variables identified within the literature are interrelated, and no single demographic variable should be interpreted as having a causal relationship with vaccine uptake or hesitancy (Schmid et al., 2017).

### ***Race/Ethnicity***

Individuals from racial and/or ethnic minority groups, specifically African American, Hispanic, and Asian American individuals often have lower rates of vaccination uptake in comparison to White individuals (Britt & Englebert, 2018; Lu et al., 2015; Quinn & Lewin, 2019). Lu and colleagues (2015) found these differences, while shrinking, persisted after controlling for other demographic variables, such as socioeconomic status (SES). Woinarowicz and Howell (2020) compared American Indian and White children in North Dakota and found that American Indian children often had lower rates of vaccination in comparison to White children, and often encountered delays in reaching age-specific vaccinations.

In addition, Quinn and Lewin (2019) reported that individuals from African American and Asian backgrounds were less likely receive the HPV vaccine and were less familiar with the purpose of the vaccine in comparison to Whites. Similarly, Gelman and colleagues (2013) found that Hispanic individuals born outside of the U.S, Hispanic individuals born in

the U.S., and African American individuals were less likely to receive the HPV vaccine in comparison to White individuals. A meta-analysis of influenza vaccine hesitancy found that African American individuals were less likely to receive the vaccine than White individuals and were more likely to anticipate negative side effects from receiving the vaccine (Quinn et al., 2017). Distrust in medical providers and racial discrimination in medicine are proposed as likely related to vaccine hesitancy (Freimuth et al., 2017; Quinn et al., 2017). In multiple studies, African American individuals reported less trust in medical institutions than their White counterparts (Freimuth et al., 2017; Jamison et al., 2019; Musa et al., 2009).

For COVID-19 in particular, a poll conducted in May 2020 by the Associated Press – NORC (formerly National Opinion Research Center) at the University of Chicago found that around 25% of African American individuals polled endorsed that they planned to get the COVID-19 vaccine (Neergaard & Fingerhut, 2020). The authors hypothesized that poor treatment from medical professionals may drive distrust between individuals from minority groups and medical providers, which has been supported by literature (Paradies et al., 2014). Initially, individuals who were hesitant to receive the vaccine reported fear of side effects and distrust of the government (Hamel et al., 2020). Kim and Crimmins (2020) found that although hesitant to receive the vaccine, non-White individuals were more likely than White individuals to engage in COVID-19 health behaviors, such as wearing a facemask, cancelling large gatherings, and washing hands. Polling conducted in November of 2020 from Gallup found that non-White respondents were less likely to endorse intent to receive the COVID-19 vaccine in comparison to White individuals (40% in comparison to 58%; Reinhart, 2020).

*Socioeconomic Status*

In general, individuals with lower socioeconomic status (SES) are less likely to be vaccinated, which could be a result of many factors related to SES (Abbas et al., 2018; Britt & Englebert, 2018; Merten et al., 2015). Despite initiatives to vaccinate school-aged children, children from poorer families tend to be vaccinated at lower rates than their higher SES counterparts (Merten et al., 2015). Although vaccinations are free or low cost, indirect costs to receiving vaccines such as transportation, lost income from time away from work, and childcare costs must be considered (Merten et al., 2015). In addition, inconsistent access to healthcare, as well as underinsurance or uninsurance, could pose a barrier to routine vaccination (Britt & Englebert, 2018; Bryant et al., 2006). For example, Abbas and colleagues (2018) found that individuals without health insurance were less likely to receive a yearly influenza vaccine than those with healthcare coverage.

COVID-19 vaccination in the United States was and is currently intended to be handled without the use of fees and has been rolled out in designated waves (Department of Health and Human Services, 2020). While eliminating the cost of the COVID-19 vaccine may help, indirect socioeconomic barriers may pose barriers to receiving the vaccine, such as needing to take time off work and/or needing to find transportation (Lewis, 2021). Outside of socioeconomic concerns to receiving the COVID-19 vaccine, SES is associated with COVID-19 preventative health behaviors. Kim and Crimmins (2020) found that individuals from lower SES backgrounds were less likely to engage in behaviors to prevent the spread of COVID-19 than their higher SES counterparts.

### ***Geographical Location***

Individuals within rural areas have lower rates of vaccination compared to their urban counterparts (Britt & Britt, 2016; Britt & Englebert, 2018). Rural residents may have less access to primary care and long wait times for appointments, may be uninsured or underinsured, and may be less familiar with vaccines that are not mandatory for public school attendance, such as the HPV vaccine. They may also have to travel long distances to receive vaccines, which may not be feasible with work and family demands (Britt & Englebert, 2018). Indeed, rural individuals have been identified as a group with higher-than-average vaccine hesitancy in regard to receiving the COVID-19 vaccine, which is separate from the issue of access (Hamel et al., 2020). According to data from January 2021, rural residents, over time, have become more receptive to receiving a vaccine, but persist as a group that is most hesitant to uptake the vaccine (Hamel et al., 2020).

### ***Religiousness***

Another sociodemographic factor explored within the vaccine literature is religiousness. Individuals higher in fundamentalism are sometimes more likely to reject vaccination, specifically in regard to the HPV vaccine (Fernandez-Pineda et al., 2020), and individuals that identify as Evangelical have been more likely than non-Evangelicals to request vaccination exemptions for their children in school (Wang et al., 2014). Higher religiousness has been particularly studied with HPV vaccination, given the relationship with sexual activity. Supporting this finding, Reuben and colleagues (2020) found that HPV-vaccine hesitant parents often were higher in self-reported religiousness.

Religious exemptions have been cited throughout the literature as a reason for vaccine exemption. Specifically, in North Carolina, a state allowing both medical and religious

exemptions for vaccinations for school-aged children, a noticeable increase occurred in religious exemptions for vaccination from 2011 to 2017. Religious exemptions occur for a number of reasons, some of which are the use of porcine products, fetal tissue, or religious rules forbidding vaccines, in general (Wombell et al., 2015). McDuffie (2020) explains that while most states allow for religious exemptions, many of the required vaccines do not violate most major religious customs, and that religious vaccine exemptions have been utilized to refuse vaccine for other reasons, which has threatened public health and safety. Clemens (2020) notes that providers often lack effective approaches to discuss religious concerns with vaccines with parents who are vaccine hesitant.

### ***Political Affiliation***

In previous literature, political affiliation has been explored as a sociodemographic variable in regard to intent to vaccinate. Vaccine hesitancy has been endorsed by public figures across differing political affiliations, (Baumgaertner et al., 2018; Reich, 2020) and findings of vaccine hesitancy in the United States by political affiliation are somewhat inconclusive. Baumgaertner and colleagues (2018) found that individuals who identify as more conservative are more likely to report lower trust and intent to vaccinate in comparison to individuals who identify as less conservative. The authors argue that low trust in the government is associated with vaccine hesitancy, and conservative political affiliation is often related to lower trust in the government in comparison to individuals who are less conservative. In contrast, some studies find that it is not necessarily conservative political affiliation that is predictive of vaccine hesitancy, but rather select individuals on opposite ends of the political spectrum that are more likely to endorse hesitancy in vaccination (Lewandowsky et al., 2013). The authors of this article discuss the rejection of scientific

findings that occurs across the political spectrum, and how conspiratorial thinking can impact belief in science. This finding is supported specifically regarding COVID-19, as Romer and Jamieson (2020) found that endorsement of conspiracies about COVID-19 in March of 2020 predicted lower engagement in COVID-19 preventative behaviors four months later.

However, some researchers find that political affiliation is not a significant predictor of vaccine hesitancy (Reuben et al., 2020). A resurgence of anti-vaccination attitudes has emerged within the last few decades in the United States, especially with children entering public schools (Reich, 2014). Krok-Schoen and colleagues (2018) found that individuals who self-identified as Republican or Independent were more likely to support the idea of opting out of mandatory vaccines for school-aged children than parents who self-identified as Democrat.

A second consideration for vaccination that is specific to COVID-19 is the previous Trump administration's stance on vaccination and the severity of threat of the coronavirus. Hornsey et al. (2020) found that individuals who identified as supporters of the Trump administration reported being less likely to endorse intent to receive the COVID-19 vaccine prior to widespread availability. In addition to this comparison, Kim and Crimmins (2020) investigated political affiliation and willingness to participate in COVID-19 health behaviors by characterizing political leaning based on self-report of trusting Fox News, trusting CNN, and trusting either equally. Individuals more trusting of CNN news were more likely to engage in COVID-19 health behaviors in comparison to individuals more trusting of Fox News (Kim & Crimmins, 2020). Furthermore, Romer and Jamieson (2020) found that individuals more reliant on conservative news sources were more likely to support conspiracies regarding COVID-19 and were less likely to engage in preventative behaviors,

such as wearing a mask; however, there was no significant difference regarding intent to vaccinate amongst individuals more conservative or more liberal leaning.

Previous poll data from the Kaiser Family Foundation found that those identifying as Republican are more hesitant to receive the COVID-19 vaccine in comparison to their Democrat counterparts (Hamel et al., 2020). Common reasons cited for hesitancy to receive the COVID-19 vaccine include perceived exaggeration of the risk of COVID-19, distrust of government involvement in funding and disseminating the vaccine, and the involvement of politics in handling the COVID-19 vaccine (Hamel et al., 2020). Republicans represented one of the largest groups identified as vaccine hesitant regarding the COVID-19 vaccine in a community-based sample in the United States, as 29% reported they would likely not or definitely not receive the vaccine (Khubchandani et al., 2021).

### **Theory of Planned Behavior**

The Theory of Planned Behavior (TPB) is a conceptual framework often utilized to predict health behaviors (Ajzen, 1991). The TPB has been used to predict behavior in several contexts, such as medication adherence, healthy lifestyles, leadership and entrepreneurial skills, as well as vaccine intent (Bosnjak et al., 2020). The TPB aims to understand how individuals evaluate decision-making. To accomplish this, the TPB considers three types of beliefs: behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 1991).

Behavioral beliefs include specific thoughts about the result of engaging in a specific behavior and tend to shape an individual's attitudes towards that behavior. Favorable attitudes have been cited as a significant predictor of vaccination intent for flu vaccination (Xiao & Wong, 2020), HPV vaccination (Britt & Englebert, 2018), and COVID-19 vaccination (Guidry et al., 2021). Evidence of attitudes as a specific predictor of vaccine



intent in emerging adult populations, particularly college students, has been supported in HPV research (Britt & Englebert, 2018; Catalano et al., 2017) and flu research (Agarwal, 2014).

Normative beliefs are the beliefs that an individual holds regarding how others feel about a specific behavior, which leads to subjective norms, or the influence an individual may feel around engaging in a specific behavior. Subjective norms have found to be a significant predictor of intent to vaccinate across several different studies and vaccine research (Guidry et al., 2021; Xiao & Wong, 2020). In emerging adult samples, subjective norms predict willingness to receive a vaccine (Agarwal, 2014; Catalano et al., 2016).

Control beliefs refer to the beliefs an individual holds about the obstacles or supports to be able to complete a specific behavior, which forms perceived behavioral control, or an individual's ability to be able to complete a behavior. Perceived behavioral control can impact the relationship between attitudes and subjective norms and can also act as a solo predictor of health behavior (Bosnjak et al., 2020). Perceived behavioral control has been shown to be a significant predictor of vaccine uptake intent, specifically in COVID-19 intent to vaccinate research (Husain et al., 2021).

Attitudes, normative beliefs, and perceived behavioral control, consistent with the TPB, are used to predict intent to engage in a specific health behavior (Arafat et al., 2018; Bosnjak et al., 2020). The TPB has successfully predicted vaccine intent across different age groups and different vaccine types. A study by Britt and Englebert (2018) found that the TPB was a significant predictor of intent to vaccinate against HPV in a sample of predominantly rural college students, which is consistent with the work of Catalano and colleagues (2016), which found that the TPB was a significant predictor of intent to vaccinate against HPV in a

sample of college men. Further studies have examined the TPB regarding parental decision to vaccinate children. A meta-analysis by Xiao and Wong (2020) supported that the TPB is predictive of intent to vaccinate children against influenza. These findings were supported by Wu et al. (2020) as these authors found that the TPB was a strong predictor of vaccine intent for parents getting their children influenza vaccines in previously vaccinated children. The TPB has also been supported as a predictive model regarding intent to receive a COVID-19 vaccine with and without emergency authorization use, after controlling for known sociodemographic variables associated with vaccine hesitancy (Guidry et al., 2021) in a general adult sample (mean age = 49.7 years) in the United States.

While the literature regarding vaccine hesitancy is vast, less is known about COVID-19 vaccination specifically, especially as the COVID-19 pandemic evolves rapidly. This study aims to add to our understanding of COVID-19 vaccine hesitancy among college students, to potentially inform public health efforts to distribute the vaccine to as many individuals as possible. More specifically, we aim to better understand associations between different demographic and psychological variables for college-aged adults and vaccine hesitancy to add to the overall understanding of the phenomenon.

### **Hypotheses**

In terms of demographic variables, individuals identifying as a minoritized race or ethnic group are predicted to endorse lower intent to receive the COVID-19 vaccine, as preliminary poll data demonstrated that individuals from minority groups already endorse less intent to receive the vaccine and are already vaccinated at lower rates due to systemic barriers to healthcare access and racial inequity in the United States (Quinn & Lewin, 2019; Reinhart, 2020). For socioeconomic status, it is predicted that individuals from lower

socioeconomic status backgrounds will be less likely to endorse intent to receive the COVID-19 vaccine in comparison to individuals from higher socioeconomic status backgrounds (Abbas et al., 2018; Kim & Crimmins, 2020). For geographical location, it is predicted that individuals from more rural areas will be less likely to endorse intent to receive the COVID-19 vaccine in comparison to individuals who are from more urban areas, as rural individuals face barriers to access, such as long distances from clinic and longer wait times for appointments, which may make receiving the COVID-19 vaccine more challenging (Britt & Englebert, 2018). For religiousness, it is hypothesized that individuals who report higher levels of religiousness will be less likely to uptake the COVID-19 vaccine, as individuals higher in religiousness have previously been more vaccine hesitant (Fernandez-Pineda et al., 2020; Reuben et al., 2020). Further, it is predicted that individuals who self-identify as more conservative will be less likely to endorse intent to receive a COVID-19 vaccine in comparison to individuals who identify as more liberal (Krok-Schoen et al., 2018; Neergaard & Fingerhut, 2020).

All three TPB variables (attitudes, subjective norms, and perceived behavioral control) are hypothesized to predict intent to receive a COVID-19 vaccine among college students after accounting for the variance explained by sociodemographic predictors. This prediction follows other studies demonstrating the predictive power of the TPB (positive attitudes, perceived supportive subjective norms, and greater perceived behavioral control) as a model for vaccine intent (Britt & Englebert, 2018; Xiao & Wong, 2020).

## Method

### Participants and Procedure

College students aged 18-24 were eligible to participate, as individuals younger than 18 years old cannot receive the COVID-19 vaccine without parental consent. Ages 18-24 are also consistent with the typical range of college-aged adults and comparable to other studies of students and vaccine uptake (Whisnant et al., 2020). A power analysis indicated that approximately 119 participants would be minimally needed for the study, based upon a moderate to large effect size (Guidry et al., 2021; Britt & Englebert, 2018; Catalano et al., 2017), power of at least .95, and a Type I error rate at .05 with three predictors in Block 2 of the hierarchical regression model and eight predictors total (Erdfelder et al., 1996). This study received exempt status from Appalachian State University's IRB. Data was collected from April 7<sup>th</sup>, 2021 to April 28<sup>th</sup>, 2021.

Participants ( $N = 228$ ) were recruited through Appalachian State University's voluntary participant pool (SONA). Students, who were enrolled in university psychology classes, self-selected to participate in this study from among others through SONA to receive Experiential Learning Credit (ELC). Upon selecting the survey, students were directed to an informed consent page (Appendix A). Participants verified that they understood that participation was voluntary and that they could withdraw at any time, as well as that their responses would only be linked to them to grant ELCs, and student response would not be linked with their identifying information. After reviewing informed consent, students were directed to the remainder of the survey on Qualtrics, which included demographic questions, and assessed student perceptions of the vaccine and intent to receive the COVID-19 vaccine. All surveys were completed in one sitting.

Of the total 228 responses, 75 responses did not meet inclusion criteria and were removed from the sample. Removal reasons included: receiving a COVID-19 vaccine ( $n = 33$ ), declining to consent to participate ( $n = 25$ ), duplicating responses ( $n = 8$ ), submitting primarily incomplete responses ( $n = 8$ ), and exceeding the age criterion for participation ( $n = 1$ ). The total number of participants after removing individuals that did not meet criteria was  $n = 153$ .

Of the final sample, most participants identified as White (88.2%) and female (71.9%). The average age of participants was 19.5 years old ( $SD = 1.28$ ). Most participants were financially dependent (88.1%) and resided primarily in more urban areas prior to attending college (Rural Urban Continuum Codes 1, 2, 3 = 70.7%). Roughly half of the participants identified as conservative (49.1%), while the remainder of the sample identified as moderate (22.2%) or liberal (28.8%). Most of the sample identified as non-Catholic Christians (63%). Demographic information regarding participants that met inclusion criteria can be found in Tables 1 and 2.

**Table 1***Discrete Sociodemographic Variables*

Characteristic	n	%
<b>Race</b>		
White/Caucasian	135	88.2
Black/African American	7	4.6
Asian/Asian American	2	1.3
Hispanic and/or Latinx	2	1.3
Self-identify (e.g., two or more races)	7	4.6
<b>Gender</b>		
Female	110	71.9
Male	40	26.1
Gender nonbinary	3	2.0
<b>Religious Affiliation</b>		
Protestant	93	63.3
Roman Catholic	11	7.5
Orthodox such as Greek	2	1.4
Muslim	1	.7
Atheist and/or Agnostic	28	19.0
Other	12	8.2
Self-identified as Evangelical	53	34.6

**Table 2***Continuous Sociodemographic Variables*

Sociodemographic Variables	Mode	Median	Mean	Standard Deviation
Age (in years)	19	19	19.5	1.28
Political Leaning	3	4	3.75	1.93
Geographical Location	1	1	2.04	1.71
Religiousness	8	7	5.82	3.20

*Note.* Political leaning is measured from one (very conservative) to seven (very liberal).

Geographical location is measured using Rural Urban Continuum Codes which categorizes geographical location from one (most urban) to nine (most rural). Religiousness is measured from 0 (not at all religious) to 10 (extremely religiousness).

**Measures***Sociodemographic Predictors*

Age, race, and gender were assessed using one-item face valid questions in which participants self-identified. A one-item measure was also used to assess political leaning and/or identity. This item asked individuals to place themselves on a scale from one (very conservative) to seven (very liberal). These types of questions have been used in previous vaccine research to self-identify political affiliation (Baumgaertner et al., 2018; Krok-Schoen et al., 2018; Shook et al., 2020).

Socioeconomic status was measured using three items, as recommended by the American Psychological Association (2015). A question determined if students were financially independent from caregivers. Then, parental educational attainment, total household income (for self and family), and occupation (for individual or for family) were

assessed. Occupational information was coded using the Hollingshead Index (1975). The Hollingshead Index codes major occupations on a scale from zero to nine, where higher values represent occupations that require enhanced training and skills. Occupations provided by participants were independently coded by seven raters. An average interrater agreement of 75% was obtained by first selecting the percent agreement amongst raters for each entry (i.e., the number of raters that selected the modal value). Once percent agreement was obtained for each item, an average agreement for all entries was obtained.

Geographical location was measured using two items. Students specified the state and county in which they maintained primary residence prior to attending college. Student answers were coded using the Rural-Urban Continuum codes that range from one (most urban) to nine (most rural; United States Department of Agriculture, 2013). These codes account for population size and proximity to major metropolitan areas.

Three items were used to assess religiousness. The first item asked participants to self-identify levels of religiousness on a scale from zero (not at all religious) to ten (extremely religious). Two additional items, used by the Pew Research Center, were used to identify religious affiliation, if any (2021). The first item reads, “What is your present religion?” where individuals select from present major world religions, if applicable. A follow-up item was given to individuals that self-identified as any type of Christian. This item reads, “Would you describe yourself as a born-again or evangelical Christian, or not?” This item provided further description amongst a large religious group and is relevant given that Evangelical Christians have been associated with vaccine hesitancy in some studies (Wang et al., 2014).



### *Theory of Planned Behavior Variables*

Student perceptions regarding taking the COVID-19 vaccine were measured using sample Theory of Planned Behavior questions developed by Ajzen (2019). These questions gauge individual attitudes toward a specific behavior, perceived norms about a specific behavior, and individual control to complete a specific behavior.

To assess attitudes toward receiving the COVID-19 vaccine, participants rated “Once a recommended COVID-19 vaccine is available to the public, getting it would be” on six dimensions using a 7-point scale ranging from one to seven: unsatisfactory (1) – satisfactory (7), negative (1) – positive (7), bad (1) – good (7), worthless (1) - valuable (7), harmful (1) – beneficial (7), foolish (1) – wise (7). An average of the six dimensions was calculated, with higher scores indicating more positive attitudes towards receiving the COVID-19 vaccine. A previous study found an internal consistency of .97 (Guidry et al., 2021). Internal consistency was similar in the current study ( $\alpha = .98$ ).

Subjective norms around receiving a COVID-19 vaccine aim to address how an individual’s social group (e.g., family, friends, others in their environment) is associated with their intent to receive a COVID-19 vaccine. Subjective norms were measured using five items. The first three items were, “People who are (a) important to me (b) my family (c) my friends would” in which participants chose between one (disapprove) and seven (approve) “of my receiving of the COVID-19 vaccine.” The last two items for subjective norms read as, “I feel under pressure to receive a COVID-19 vaccine,” and “People who are important to me influence my decision to have a COVID-19 vaccination” in which participants selected from strongly disagree (one) to strongly agree (seven). Items were averaged to yield one score for each participant for subjective norms, with higher scores indicating greater subjective norms

for positive vaccine intent. A previous study looking at the TPB on intent to vaccinate against COVID-19 found internal consistency of .76 (Guidry et al., 2021); another study looking at intent to vaccinate against the swine flu found an internal consistency of .79 (Myers & Goodwin, 2011). The internal consistency for these items in the present study is .64. Given the lower achieved internal consistency of the subjective norms items, further reliability analysis was conducted to determine if internal consistency of the item set could be strengthened by removing items. Analyses indicated that removing item four (regarding feeling under pressure to receive a COVID-19 vaccine) was not as highly related to other items and was the only item that was explicitly directional in nature (e.g., pro-vaccine). Removing this item from the data resulted in an internal consistency value of .74. Values in the table below represent an average of subjective norms items that omits item four from analyses.

Perceived behavioral control items were also derived from a sample bank of items in accordance with the TPB (Ajzen, 1991; Ajzen, 2019). Perceived behavior control was measured using two items. The first item was, “The number of events outside of my control which would prevent me from having the COVID-19 vaccine when it is available to me are” and participants rated their response from very few (one) to numerous (seven). This item is reversed scored. The second perceived behavioral control item is, “It is mostly up to me whether I receive a COVID-19 vaccine when it is available to me” in which participants response from strongly disagree (one) to strongly agree (seven). These items were averaged to yield a score for perceived behavioral control, with higher scores indicating greater perceived control over COVID-19 vaccine behavior. Previous research utilizing these items for swine flu research indicated an internal consistency of .79 (Myers & Goodwin, 2011).

The current study yielded an unacceptable internal consistency of .35. Given the lower internal consistency obtained from these two items, it was deemed optimal to include only one of these items to represent the construct of perceived behavioral control. The second item was used given it directly assessed an individual's agency towards receiving the vaccine, rather than the first, which assessed individual barriers toward receiving the vaccine. In addition, logistical barriers associated with receiving the vaccine for this specific population were reduced by the university's support, which notified students that they could receive the COVID-19 vaccine for free on campus.

One question was used to gauge intent to receive a COVID-19 vaccine (Ajzen, 2019); "I intend to get the COVID-19 vaccine when it becomes available to me." Respondents selected from "I definitely will not" (one) to "I definitely will" (seven). This item was used in previous research (Britt & Englebert, 2018; Guidry et al., 2021; Myers & Goodwin, 2011). See Appendix C and Appendix D for the questionnaire completed by participants.

**Table 3**

*Theory of Planned Behavior Descriptive Statistics*

TPB Variables	Mode	Median	Mean	Standard Deviation
Attitudes	7.00	5.00	5.01	1.76
Subjective Norms	7.00	5.00	4.93	1.49
Perceived Behavioral Control	7.00	7.00	6.07	1.30
Intent	7.00	4.00	4.28	2.22

**Results**

Data analysis was conducted using Jamovi (The Jamovi project, 2021; Version 1.6). Data were prepared by running exploratory analyses to assess distributions of the outcome variables. Data were also assessed for normality and homoscedasticity. Nonnormal

distributions were noted for political leaning, religiousness, attitudes, subjective norms, perceived behavior control and intent to vaccinate against COVID-19. Given that constructs associated with vaccine intent can be related (e.g., religiousness and geographical location, political leaning and religiousness), correlations for each construct with one another were conducted to examine for potential multicollinearity. While some variables were significantly correlated (e.g., political leaning and religiousness), no violations of multicollinearity requiring data transformation were noted from examining the Variance Inflation Factor (VIF).

Due to limitations within the sample population and data obtained, some planned analyses were not conducted. Due to the overrepresentation of White participants, no meaningful conclusions can be drawn regarding vaccine intent amongst individuals from different racial and/or ethnic backgrounds. Additionally, data for socioeconomic status (individual or caregiver/parent) was largely unable to be coded (e.g., students did not know parental income, broad descriptions of parental occupation did not permit occupations to be coded). Given these limitations, information regarding SES could not be meaningfully included within the regression model. A significant portion of data regarding individual geographical location prior to moving to college was missing due to participant misunderstanding and/or confusion of county and country (No code available,  $n = 32$ , 20.9%). Given the missing data for this sociodemographic variable this variable was also not included in the regression analysis.

### **Descriptive and Correlational Analyses**

Overall, participants tended to display favorable attitudes toward receiving the COVID-19 vaccine when it was available to them. Students reported that their social

networks had slightly favorable attitudes towards receiving the vaccine as well. Average of student responses indicated that they felt strong control over their decision to receive the COVID-19 vaccine when it was available to them. Overall, students displayed variability regarding their stated intent to receive the COVID-19 vaccine; however, the modal response for stated intent is that students would “definitely” receive the vaccine when it was available to them.

Correlation analyses were conducted amongst sociodemographic variables and Theory of Planned Behavior variables (see Table 3). Amongst sociodemographic variables, a significant, negative correlation was observed between religiousness and political leaning, which suggests that as students reported higher levels of religiousness, they tended to identify as more politically conservative. In addition, attitudes and subjective norms were significantly and positively correlated, suggesting that as individuals had more favorable attitudes about receiving the COVID-19 vaccine, individuals around them also had more favorable attitudes towards taking the COVID-19 vaccine.

Several factors were significantly associated with intent to vaccinate. Religiousness and vaccine intent were negatively correlated, which demonstrates that as participants identified themselves as more religious, the less likely they were to report high vaccine intent. In addition, political leaning was significantly related to vaccine intent, and suggests that individuals were more likely to report high intent to receive the COVID-19 vaccine when it became available to them if they identified as more liberal politically.

Regarding Theory of Planned Behavior variables, both attitudes and subjective norms were significantly associated with intent to receive a COVID-19 vaccine. Individuals with more favorable attitudes towards vaccination were more likely to express intent to receive the

vaccine, as well as individuals with social groups that had more favorable attitudes regarding COVID-19 vaccination.

**Table 4**

*Correlation Matrix of Study Variables*

	1	2	3	4	5	6
1. Political leaning	-					
2. Religiousness	-.51**	-				
3. Attitudes	.50**	-.28**	-			
4. Subjective Norms	.42**	-.14	.70**	-		
5. Perceived Behavioral Control	-.10	.02	-.09	-.00	-	
6. Intent	.61**	-.31**	.83**	.67**	-.03	-

\*  $p < .05$ , \*\*  $p < .01$

**Hierarchical Regression**

A hierarchical regression was used to test a model of prediction for receiving the COVID-19 vaccine based upon several sociodemographic and psychological variables. After removing sociodemographic variables that were unusable, political leaning and religiousness were loaded into block one. Theory of Planned Behavior variables were loaded into block two with the criterion as intent to vaccinate. Block one accounted for approximately 40% of the observed variance in intent to vaccinate (Adjusted  $R^2 = .40$ ,  $F(2, 141) = 48.1$ ,  $p < .001$ ). Adding block two to the model (i.e., Theory of Planned Behavior variables) increased the overall proportion of variance explained ( $\Delta R^2 = .34$ ), with the full model accounting for 74% of the variance observed in reported vaccine intent (Adjusted  $R^2 = .74$ ;  $F(5, 138) = 82.2$ ,  $p < .001$ ). When looking at the overall model, only political leaning was a significant predictor of intent to vaccinate against COVID-19 in block one ( $\beta = .29$ ,  $t = 5.07$ ,  $p < .001$ ).

Within the second block, attitudes towards COVID-19 vaccination ( $\beta = .59, t = 9.19, p < .001$ ) and subjective norms around vaccination ( $\beta = .13, t = 2.07, p < .04$ ) were significant predictors of intent to vaccinate in the overall model.

**Table 5**

*Block One of Hierarchical Regression for Prediction of Intent to Vaccinate*

Predictor	Estimate	SE	Beta	t	p
Intercept	1.40	.56	-	2.53	.01
Political Leaning	.74	.09	.65	8.64	<.001
Religiousness	.02	.05	.03	.36	.72

**Table 6**

*Full Model Regression for Prediction of Intent to Vaccinate*

Predictor	Estimate	SE	Beta	t	p
Intercept	-2.37	.64	-	-3.69	<.001
Political Leaning	.33	.06	.29	5.07	<.001
Religiousness	.02	.03	.02	.46	.64
Attitudes	.75	.08	.59	9.19	<.001
Subjective Norms	.19	.09	.13	2.07	.04
Perceived Behavioral Control	.10	.07	.06	1.44	.15

**Table 7**

*Model Fit Measures*

Overall Model Test							
Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F	d1	d2	p
1	.64	.41	.40	48.1	2	141	<.001
2	.87	.75	.74	82.2	5	138	<.001

### **Discussion**

The current study assessed the utility of specific sociodemographic and TPB variables to predict intent to receive the COVID-19 vaccine with a sample of college students. Consistent with hypotheses, political leaning, attitudes and subjective norms significantly predicted COVID-19 vaccine intent within the regression model. Although religiousness and vaccine intent were significantly correlated, religiousness was not a significant predictor of intent to vaccinate for COVID-19 when considered in the context of other predictor variables within the regression model. Political leaning was highly correlated with religiousness in this sample, consistent with previous literature (Malka et al., 2012). Several variables initially identified in the literature that were proposed for testing (e.g., SES) were not able to be analyzed. Each finding is discussed below.

In terms of sociodemographic predictors of intent to receive the COVID-19 vaccine when available to them, political leaning was both a significant correlate and remained a significant predictor in the regression analysis that included other predictors. Consistent with literature on the topic, individuals identifying more conservatively were less likely to report intent to receive the COVID-19 vaccine when it became available to them (Berg & Lin, 2021; Latkin et al., 2022; Ruiz & Bell, 2021). Previous literature identified conservative identifying individuals as more vaccine hesitant overall than individuals identifying as more liberal. More specifically regarding COVID-19, supporters of former President Donald Trump were less likely to state intent to receive the vaccine once it was available to them (Hornsey et al., 2020; Jung & Lee, 2021).

Subsequent polling conducted by the Kaiser Family Foundation has supported research aimed at gauging intent by tracking vaccine behavior (Hamel et al., 2020). The



Kaiser Family Foundation surveys American adults via telephone to assess attitudes regarding COVID-19 vaccination. The survey stratifies sampling to assess COVID-19 vaccination behaviors of Americans across adulthood, as well as adults of differing racial and/or ethnic background, SES, geographical location, educational attainment, and gender (Lopes et al., 2022). Since May of 2021, when the vaccine was widely available to all Americans, Conservative-identifying individuals have been one of the largest groups identified as vaccine-hesitant and one of the groups within the United States that continues to have the lowest rate of uptake of the vaccine (Lopes et al., 2022). In addition, Republican-identifying individuals under the age of 50 (younger American adults) tend to have lower rates of uptake than older Republican individuals, per the Kaiser Family Foundation (Lopes et al., 2022). The pattern observed in the present sample has persisted throughout the duration of vaccine rollout and is likely related to the politicization of the COVID-19 pandemic and vaccine rollout (Bolsen & Palm, 2022). More specifically, college students who identify as Republican reported less intention to take the vaccine, which is supported by other research that demonstrated that college students that identified as more Republican and consumed more right-wing media were more likely to be vaccine hesitant regarding COVID-19 (Lasher et al., 2022). A large percentage of unvaccinated individuals obtained in a community sample identify as Republican (68%), per KFF tracking data; however, more than half of individuals identifying as Republican have gotten at least one dose of a COVID-19 vaccine (Lopes et al., 2022).

Attitudes towards receiving the vaccine correlated significantly with stated intent to receive the vaccine in univariate analyses and was the most powerful and significant predictor of stated intent to receive a COVID-19 vaccine when one becomes available in the

final hierarchical regression model. Supporting previous vaccine research using the Theory of Planned Behavior, individuals that reported more favorable attitudes towards receiving a vaccine (i.e., the COVID-19 vaccine) were more likely to state intent to receive the vaccine when it becomes available to them (Wolff, 2021; Yahaghi et al., 2021). Attitudes have been found to be a significant predictor of vaccine uptake across numerous vaccine types, such as the seasonal flu vaccine, the HPV vaccine, and the COVID-19 vaccine (Agarwal, 2014; Catalano et al., 2017; Chu & Liu, 2021; Lee et al., 2014). Indeed, attitudes have consistently emerged as a significant predictor of intent across most COVID-19 studies in various countries (e.g., Norway, China, United States) as well as with emerging adult college students, (Chu & Liu, 2021; Fan et al., 2021; Kecojevic et al., 2021; Wolff, 2021).

Subjective norms was significantly associated with intent to receive a vaccine and was a significant predictor of vaccine intent for COVID-19 vaccination within the regression model. Many studies have found subjective norms to be a significant predictor of COVID-19 vaccine intent (Chu & Liu, 2021; Guidry et al., 2021; Husain et al., 2021). On the other hand, some studies did not find subjective norms to be a significant predictor of intent to receive a COVID-19 vaccine (Fan et al., 2021). This aspect of the Theory of Planned Behavior is relevant to the population at hand given the many sources of social influence (i.e., parents or caregivers, peers, significant others). Many students still rely on parents and caregivers for financial and social support (as demonstrated by 88% of the population relying on parents/caregivers for financial support), which could be influential in decision making regarding vaccination, especially as this could be one of the first independent health-care decisions that students make. Research suggests that parental views on vaccination for young adults (like the present sample) are influential in their decision-making (Sandler et al., 2020).

Vaccine behavior of an individual's friend group has also shown to be a predictor of intent to receive the COVID-19 in college students (Jaffe et al., 2022). Public health efforts to address vaccine uptake were large-spread and pervasive in everyday media, especially on college campuses (Centers for Disease Control and Prevention, 2022). Lastly, larger societal networks, such as social media, are influential in how information regarding COVID-19 and COVID-19 vaccination is disseminated. Information regarding vaccination is widely available on social media platforms, which can include information about where and how to become vaccinated, but also, misinformation. Online discourse around vaccination information could alter individual behavior regarding vaccine intention (Cascini et al., 2021). Given the multiple sources of potential influence, it is consistent that subjective norms would be significantly associated with an individual's stated vaccine intent and would be predictive within the regression model. While subjective norms was a significant predictor of vaccine intent within the model, much of the observed variance within vaccine intent was accounted for by individual attitudes toward receiving a COVID-19 vaccine.

Religiousness and vaccine intent yielded mixed findings. While religiousness and vaccine intent were correlated, religiousness was not a significant predictor of vaccine intent in the context of other sociodemographic and TPB variables. When loaded into the multiple regression model, political leaning was a significant predictor of vaccine intent, while religiousness was not, suggesting that political leaning is the more powerful predictor of COVID-19 vaccine intent in comparison to religiousness. Most of the sample endorsed practicing Christianity (63%), but only roughly half (49%) identified as Conservative. While these aspects of identity do overlap ( $r = -.51$ ), in this sample, political leaning was a stronger predictor of vaccine intent, and was more strongly correlated with intent to vaccinate

than religiousness. The relationship between religiousness and vaccine intent has been investigated, but findings have been mixed. Specifically, for COVID-19 vaccination in general, Evangelical Christians have been identified as one of the most vaccine-hesitant groups per Pew Research Center (2021). In addition, other studies found that Christian nationalists are one of the most vaccine-hesitant groups within the United States (Corcoran et al., 2021). Since the collection of this data, further support from KFF polling data demonstrates political affiliation as one of the strongest predictors of vaccine intent and uptake (Hamel et al., 2020). While religiousness and political leaning can be highly linked, this study provides some support for political leaning as a more predictive variable regarding COVID-19 vaccine intent.

Perceived behavioral control findings within the literature are also mixed. Within the current model, perceived behavioral control was not significantly correlated with intent to receive a COVID-19 vaccine, nor was the construct a significant predictor of vaccine intent within the regression model. Some studies have demonstrated perceived behavioral control as a significant predictor of vaccine intent for COVID-19 (Hayashi et al., 2022; Husain et al., 2021). Other studies did not find perceived behavioral control to be significant in predicting COVID-19 vaccine intent (Chu & Liu, 2021; Guidry et al., 2021). When examining distribution of respondent data, most students reported high control over their ability to receive a COVID-19 vaccine with limited variance, regardless of their intent to receive any COVID-19 vaccine, which could potentially contextualize the low association between perceived behavioral control and intent to vaccinate against COVID-19.

**Limitations**

This study has several limitations. One of the major limitations is the sample variability. This sample of college students was predominantly White and from the Southeastern United States, limiting the number of students of color and generalizability to U.S. college students. This is especially limiting in the context of COVID-19 vaccine research because it does not allow for comparisons between groups and because individuals of color have experienced negative effects, both financially and health-wise, due to the COVID-19 pandemic in comparison to White students (Correia et al., 2022; Molock & Parchem, 2021). This limits the generalizability of the findings. In addition, missing data prevented the analyses of certain critical variables identified within the literature regarding vaccine intent (e.g., geographical location, socioeconomic status), even if these variables were potentially less salient regarding vaccine access given that vaccines were free of cost and administered on campus. These variables could inform colleges aiming to understand how students on campus may differ in their intent to be vaccinated against COVID-19, which limits the utility of this data for campus vaccination efforts. Lastly, this study is limited by the time the data were collected. The COVID-19 pandemic continues to shift on a regular basis, and with each change to the course of the pandemic, the vaccine options and behavior of Americans changes as well. This information was collected right before the widespread dissemination of the COVID-19 vaccine, meaning that the vaccine was available to specific groups within the U.S. (e.g., essential workers, older adults), but most Americans were not yet eligible to receive the vaccine. Since this time, the vaccine has been available to all Americans, and booster vaccinations have been available as well. Additionally, two different prominent variants have emerged, which changed trajectory of those who were not yet

vaccinated, as well as changed the understanding about the efficacy of vaccines and how to manage the pandemic going forward. As COVID-19 continues to impact individuals around the world, managing the effects of COVID-19 through vaccination remains critical.

### **Implications and Future Directions**

Since the collection of this data, most American adults are fully vaccinated (~75%), but young adults, like the individuals included in the sample, comprise a large portion of unvaccinated adults, as roughly 27% of unvaccinated adults are aged 18-29 per recent polling data (Lopes et al., 2022). Young adults comprise roughly 52.5 million out of roughly 330 million people in the U.S.; they comprise roughly 15% of the total population, yet they represent a much larger proportion of individuals that have not received the COVID-19 vaccine (United States Census Bureau, 2021). Given that college populations are largely comprised of young adults and are typically embedded within larger communities, the relatively low uptake of the COVID-19 vaccine potentially increases the risk for COVID-19 spread, tasking college campuses with mitigating the effects of COVID-19 (Khubchandani et al., 2021).

This study demonstrated that the most powerful predictor of intent to vaccinate amongst college students was individual attitudes towards the vaccine. Research does suggest that individual attitudes towards COVID-19 vaccination can be targeted. Some evidence suggests that students (i.e., young adults) may be more concerned about potentially infecting other individuals with COVID-19 than infecting themselves (Cohen et al., 2020; Cohen-Winans, 2022). Messaging may continue to remind students about vaccination as an option to reduce risk associated with the transmission of COVID-19.

For example, Conlin and colleagues (2022) presented individuals who were identified as vaccine hesitant with conversion messages (i.e., acknowledging reasons for vaccine hesitancy in addition to demonstrating vaccine benefits) or advocacy messages (i.e., pro vaccination messages). Results demonstrated that those who received conversion messages were significantly more likely to endorse positive attitudes and behavioral intentions to receive the COVID-19 vaccine in comparison to those that were shown advocacy messages. In addition, results demonstrated that the credibility of the messages mediated the relationship between conversion messages and vaccine attitudes. This information could be used to help individuals or campus groups that have been identified as vaccine hesitant. Acknowledging both why someone may be hesitant to take the vaccine in addition to credible sources of evidence to take the vaccine may be a more effective messaging strategy that universities could implement, especially as vaccine and booster rollout continues.

In addition, some evidence suggests that it could be helpful for individuals to receive messaging regarding vaccination from sources they trust, especially given how influential political leaning is to vaccine intent. While it may be difficult for individuals to determine which sources of information to trust, one study found that vaccine attitudes for some individuals (“middle-of-the-road” Republicans) were more amenable to change when presented with co-partisan information sources (Sylvester et al. 2022). This strategy could potentially be helpful at universities, especially when trying to encourage students to take vaccines via personally trusted sources.

Literature suggests that conservative individuals are underrepresented at colleges in comparison to the U.S. population, and some evidence suggests that Conservative students may be more likely to censor their views or speech in comparison to individuals that identify

as Democrat (Larson et al., 2020). It may be difficult for students to raise their concerns with vaccination given this tendency for students to censor attitudes or beliefs if they are deemed unacceptable on college campuses. Given the significance of attitudes regarding stated intent to vaccinate, universities may aim to create safe spaces for students to voice their concerns regarding COVID-19 policies on campus, in addition to concerns regarding taking a COVID-19 vaccine. Understanding student attitudes and behaviors regarding COVID-19 vaccination will be necessary as universities continue to adapt to changes in the learning environment due to COVID-19.

Future research regarding vaccination may include repeated sampling to better understand how vaccine intent may change over time for college students. As previously mentioned, at the time of sampling, many of these students were not yet eligible to receive the COVID-19 vaccine. In addition, more information could be helpful regarding individual decision-making for this age group. While understanding trends regarding different demographic aspects can be helpful to inform community efforts, more research could better pinpoint how students made decisions regarding COVID-19 vaccination, which could also supplement group level data that the present study established. Further research could also help to better clarify the role of variables that were not able to be tested in the present study (i.e., geographical location, socioeconomic status).

Future research may also target college students more specifically regarding programming for increasing vaccine uptake. Given that most college students sampled in this study were not financially independent, helping students navigate personal health decisions should be an area of future study. Research could also help better understand how to best reach vaccine hesitant individuals in ways that are conducive, such as the previously



mentioned conversion strategies or strategies to present individuals with information that they trust and relate to regarding political leaning. The COVID-19 pandemic presents an ongoing health-care concern that will likely continue to impact higher education. Research that can best assist universities to empower their students to make personal and public health care-decisions will potentially help mitigate the effects of COVID-19 as the pandemic continues.

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Theory of Planned Behavior to explain Iranians' intention to get COVID-19 vaccinated. *Vaccines*, 9(7), 684. <https://doi.org/10.3390/vaccines9070684>

**Appendix A**

## IRB Status

**Date:** 4/05/2021**RE:** Notice of Exempt Research Determination**STUDY #:** 21-0234**STUDY TITLE:** COVID-19 Vaccination Attitudes**Exemption Category:** 2. Survey, interview, public observation

**NOTE:** This project, like all exempt and non-exempt research with human subjects at Appalachian State University, is subject to other requirements, laws, regulations, policies, and guidelines of the University and the state of North Carolina. As of August 24, 2020 and until further notice, this includes the requirement by the Office of Research to pause in-person research projects until it receives an additional review to ensure the existence of an adequate COVID-19 mitigation protocol. Please see the full requirement on the [Research Protections website](#), as well as answers to questions you may have

This study involves no more than minimal risks and meets the exemption category or categories cited above. In accordance with the 2018 federal regulations regarding research with human subjects [45 CFR 46] and University policy and procedures, the research activities described in the study materials are exempt from IRB review. If this study was previously reviewed as non-exempt research under the pre-2018 federal regulations regarding research with human subjects, the Office of Research Protections staff reviewed the annual renewal and the initial application and determined that this research is now exempt from 45 CFR 46 and thus IRB review.

## Appendix B

### Informed Consent form for Participation

#### COVID-19 Vaccine Attitudes

Principal investigator: Kelly Davis

Faculty Advisor: Lisa Curtin

Department: Psychology

Contact Information: Contact Information: [curtinla@appstate.edu](mailto:curtinla@appstate.edu); 828-262-8936;

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We are asking you to be in a research study. This form gives you information to help you decide whether or not to be in the study, such as the purpose of study; the procedures, risks, and benefits of the study; how we will protect the information we will collect from you; and how you can contact us with questions about the study or if you feel like you have been harmed by this research. Please read it carefully. You should ask any questions (see email addresses and phone number above) you have about the research and, once they are answered to your satisfaction, you can decide whether or not you want to be in the study. Being in the study is voluntary, and even after you agree to participate, you can change your mind and stop participating at any time.

#### **What is the purpose of this study?**

The purpose of this study is to learn about attitudes and perceptions about COVID-19 among college students who are between 18 and 24 years old and have not received a COVID-19 vaccine.

#### **What does this study involve?**

This study involves a one-time completion of a survey. It will take approximately 20-30 minutes to complete. In this study, you will complete a Qualtrics questionnaire regarding COVID-19 attitudes and perceptions. You will also be asked to provide demographic information. You may skip or refuse to answer any items you see fit.

#### **What are possible harms or discomforts that I might experience during the research?**

To the best of our knowledge, the risk of harm for participating in this research study is no more than you would experience in everyday life. It is possible that you could experience psychological distress as you reflect on your personal attitudes regarding COVID-19. If you experience feelings of distress, you can contact the campus Counseling Center at 828-262-3180 on the first floor of the Miles Annas Student Support building (<https://counseling.appstate.edu>). It is also possible that you may have concerns about your physical health as you reflect on your attitudes toward COVID-19. If that is the case, you can contact Student Health Services at (828) 262-3100.

#### **What are the possible benefits of this research?**

You will not receive individual benefit from participating in this study.

**Will I receive payment for taking part in this research?**

No. You will not be paid for taking part in this research. If you participate in this research, you will receive one Experiential Learning Credit (ELC). There are other research options and non-research options for obtaining extra credit or ELC's. One non-research option to receive 1 ELC is to read an article and write a 1-2 page paper summarizing the article and your reaction to the article. More information about this option can be found at: <https://psych.appstate.edu/research-labs>. You may also wish to consult your professor to see if other non-research options are available.

**How will my private information be kept confidential?**

This study is confidential. No one, not even members of the research team, will know that the information you gave came from you. We have no intention of trying to match your data back to you. However, for a brief time, you will be listed in SONA as signed up for this research, in order for us to issue the ELC. However, we will not be able to match your individual responses to your name even during this brief period of time as we use a different platform for the collection of data.

**What are my rights as a participant?**

Your participation in this research is completely voluntary. If you choose not to participate, there will be no penalty and you will not lose any benefits or rights you would normally have.

If you choose to take part in the research, you can change your mind at any time and stop participating. If you agree to participate but decide later that you don't want to be in this study, please stop completing the survey. If you have questions or concerns about your rights as someone taking part in research, please contact the Appalachian State University Office of Research Protections at **828-262-4060** or [irb@appstate.edu](mailto:irb@appstate.edu).

By signing below, I volunteer for this study and agree that:

- I understand the purpose and procedures of the study;
- I have been informed of the risks of participation;
- The study is voluntary, I do not have to participate, and I can withdraw at any time;
- I have had the opportunity to ask questions, and was able to get all of my questions satisfactorily answered;

If I have questions later about the research, or if I have been harmed by participating in this study, I can contact one of the researchers

**By continuing to the research procedures, I acknowledge that I am at least 18 years and not older than 24, have not received a COVID-19 vaccine, have read the above information, and agree to participate.**

## Appendix C

### Demographic Measures

**Race:**

What race(s) or ethnic group(s) do you identify with?

Black/African American

Hispanic/Latinx

White/Caucasian

Asian/Asian-American

Pacific Islander

Native American

Self-identify: \_\_\_\_\_

**Gender:**

What is your current gender identity? Choose all that apply:

Female

Male

Gender nonbinary

Transgender

I don't know

Choose not to disclose

Self-identify \_\_\_\_\_

**Socioeconomic Status:**

1. Are you financially independent from your parent(s) or caregiver(s)?

Yes

No

2. What is the occupation(s) of the person(s) who raised you? \_\_\_\_\_

OR

What is your occupation (if you are financially independent)? \_\_\_\_\_

3. What is your family's total yearly household income before taxes? OR What is your total yearly income before taxes?

Less than \$5,000

\$5,000-\$9,999

\$10,000-\$14,999

\$15,000-\$19,999

\$20,000-\$29,999

\$30,000-\$39,999

\$40,000-\$49,999

\$50,000-\$59,999

\$60,000-\$74,999

\$75,000-\$99,000

- \$100,000-\$124,999
- \$125,000-\$149,999
- \$150,000 or more
- Don't know

4. What is the highest completed education level of any or your parents/caregivers?
- N/A, unknown
  - Less than 7<sup>th</sup> grade
  - Junior high school, including 9<sup>th</sup> grade
  - Partial High school, including 10<sup>th</sup> and 11<sup>th</sup> grade
  - High school graduate/GED
  - Associate's 2-year degree/partial college
  - College graduate
  - Graduate/professional training

**Geographical Location:**

1. What U.S. state or territory did you (primarily) grow up in? \_\_\_\_\_
2. What county did you (primarily) grow up in? \_\_\_\_\_

**Political Leaning:** How would you describe your political views?

- Very conservative
- Somewhat conservative
- Slightly conservative
- Moderate
- Slightly liberal
- Somewhat liberal
- Very liberal

**Religiousness:**

1. How religious are you, in general? Please select the number that best describes your experience, with 0 indicating the minimum and 10 indicating higher religiousness:
 

0	1	2	3	4	5	6	7	8	9	10
Not at all religious								Extremely Religious		
2. What is your present religion, if any? Are you Protestant, Roman Catholic, Mormon, Orthodox such as Greek or Russian Orthodox, Jewish, Muslim, Buddhist, Hindu, Atheist, Agnostic, something else, or nothing in particular?
  - Protestant
  - Roman Catholic
  - Mormon
  - Orthodox such as Greek or Russian Orthodox
  - Muslim

Buddhist

Hindu

Atheist

Agnostic

Self-identify: \_\_\_\_\_

3. Would you describe yourself as a born again or Evangelical Christian?

Yes

No

**Appendix D**

Theory of Planned Behavior Items

**Attitudes:**

Once a recommended COVID-19 vaccine is available to the public, getting it would be:

1	2	3	4	5	6	7
Foolish			Wise			
1	2	3	4	5	6	7
Harmful			Beneficial			
1	2	3	4	5	6	7
Worthless			Valuable			
1	2	3	4	5	6	7
Bad			Good			
1	2	3	4	5	6	7
Negative			Positive			
1	2	3	4	5	6	7
Unsatisfactory			Satisfactory			

**Subjective Norms:**

1. People who are (a) important to me (b) my family, and (c) my friends would... of my having of the COVID-19 vaccination.

- a. *People important to me*
- b. *My family*
- c. *My friends*

1	2	3	4	5	6	7
Disapprove			Approve			

2. I feel under social pressure to have a COVID-19 vaccination.



1 2 3 4 5 6 7  
 Disagree Agree

3. People who are important to me influence my decision to have a COVID-19 vaccination.

1 2 3 4 5 6 7  
 Disagree Agree

**Perceived Behavioral Control:**

1. The number of events outside of my control which would prevent me from having the COVID-19 vaccine when it is available to me are:

1 2 3 4 5 6 7  
 Few Numerous

2. It is mostly up to me whether I receive a COVID-19 vaccine when it is available to me.

1 2 3 4 5 6 7  
 Strongly Disagree Strongly agree

**Intent:**

I intend to receive a COVID-19 vaccine when it becomes available to me.

1 2 3 4 5 6 7  
 I definitely will not I definitely will

**Prior Behavior:**

Have you ever taken a vaccine that was not required?

Yes

No

### **Vita**

Kelly Davis was born in Trinity, NC to parents Alan and Helen Davis. She attended the University of North Carolina at Chapel Hill (UNC-CH) and obtained a B.S. in Psychology and B.A. in Sociology in 2018. Upon her graduation, she reenrolled at UNC-CH with the intent to become a clinical mental health counselor; she graduated from UNC-CH in May 2020 with a M.S. in Clinical Rehabilitation and Mental Health Counseling. Kelly's graduate studies further developed her interest in clinical psychology. Kelly enrolled at Appalachian State University's Clinical Psychology Doctoral Program (PsyD) in Fall of 2020. Her faculty mentor is Lisa Curtin, Ph.D.