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RESEARCH ARTICLE

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The Relationship between the Light and Dark Triads of Personality, COVID-19 threat, and COVID-19 Vaccine status in College Students

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ABSTRACT

The rapid spread of the COVID-19 pandemic in the United States was due, or at least in part, to the resistance to health guidelines, minimal to no safety measures implemented by nearly half the U.S. citizens, and, to a lesser extent, the initial lack of understanding into the pathogenic mode of transmission. The present study examined links between the Dark (i.e.., narcissism, psychopathy, Machiavellianism) and Light (i.e.., compassion, empathy, altruism) Triad of personality traits, the perceived threat level of COVID-19, and COVID-19 vaccine uptake in an undergraduate college sample (N = 147). The study found no statistically significant differences in the overall Light or Dark Triad scores between students receiving and those not receiving the COVID-19 vaccine. The vaccinated students reported a higher perceived threat level than their non-vaccinated colleagues. Implications and limitations of the study are reported. Relationships between personality, vaccine practices, and perceived health threats offer important insights. These findings may be useful in developing strategies that effectively tackle the contradictions between the psychological and the sociocultural determinants of health behavior.

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Throughout history, humans have faced historical pandemic waves, resulting in significant loss of life globally. A few examples include The Black Death (1347-1352), the Smallpox Pandemic (1870-1874), the Spanish Flu (1918-1919), HIV/AIDS (1980), and more recently, COVID-19, which emerged in late 2019. The COVID-19 pandemic (2019-nCoV) is the most recent in the sequence of illnesses and diseases and is unequivocally the most significant health crisis of the last decade. The World Health Organization (WHO) declared the 2019-nCoV a global health emergency, an infectious viral disease caused by Sars-Cov-2 rapidly spread across the globe. Despite modern-day scientific advancement, public health officials did not understand the mode of transmission, pathogenic characteristics, or effective treatment protocols for COVID-19. This uncertainty led to heightened panic within the public, sparked mass fear, and overwhelmed hospital systems worldwide. In the United States, various measures were implemented by the Centers for Disease Control and Prevention (CDC) and state governments to mitigate the spread of the virus (e.g., communities locked down, domestic/international travel restricted, mask mandates, stay-at-home orders, and social distancing). Despite these resounding efforts, daily cases and death tolls continued to rise at an exponential rate, claiming the lives of over 7M globally by May 2024, with ~ 1.9M of those deaths occurring in the first year of the outbreak [1]. It is important to note that minorities were especially devastated by disease severity, in comparison to their white counterpart, as were the elderly and immunosuppressed populations, with the incident and mortality rate disproportionately plaguing these groups. The scientific warrant to mitigate the virus as quickly as possible brought about unprecedented timing in the development and emergency use authorization (EUA) of the first-ever FDA-approved Coronavirus vaccine.

In December 2020, two COVID-19 vaccines manufactured by Pfizer-BioNTech and Moderna/ Spikevax were made available to the prioritization group - those classified to be high-risk for mortality or severe complications, 16 years of age and older, and later expanded the age threshold to include those 12-15 years of age and older by May 2021. Among the first age group to be approved by The Food and Drug Administration (FDA) under the EUA included college-age students. In the randomized, controlled, ongoing clinical trials, the two initial COVID-19 vaccines had between a 94-95% success rate respectively at preventing severe complications or death for those infected with the virus; however, studies have shown young adults (18-25 years old) made up the largest group of vaccine hesitancy, with ~ 57% of eligible individuals between the age of 18-25 still refusing acceptance of the vaccine by the beginning of 2022. Vaccine hesitancy – the delayed acceptance or refusal, despite availability, notably within this age group, has been among the top 10 global health threats [2], even before 2019-nCov, making vaccine hesitancy a huge obstacle for public health officials.

Vaccine Hesitancy

Vaccine hesitancy is usually subjective and deeply tangled up with political or religious ideological underpinnings, a catalyst for vaccine decision-making, and the U.S. has a long history of

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'anti-vaccine' movements, but the seriousness of COVID-19 and its possible effects on society and public health underscores the importance to overcome indirect obstacles—like risk perception and personality traits—that contribute to vaccine hesitancy among this targeted subpopulation. We acknowledge several factors contributing to higher vaccine hesitancy within this age group, such as mistrust in the government, political or religious affiliations, and social influences. Comparatively, less is known regarding predictors that will play a pivotal role in vaccine uptake in this unique subpopulation, but mounting evidence suggests that the successful promotion of a vaccine is primarily based on trust. Vaccine hesitancy in any capacity is complex, and acceptance relies heavily on consistent information. Health officials cannot assume mass populations, especially college-age students, will trust solely based on prominence within society without intense scrutiny. One of the biggest pitfalls health officials faced during the initial promotion of the COVID-19 vaccine was a lack of transparency within government agencies. Historically, viruses that evolve quickly are not viable candidates for vaccines (e.g., cold, HIV) because they mutate so rapidly that vaccines in the past have been ineffective. Beyond that, past research has shown that viruses in the coronavirus family have failed in clinical vaccine trials because of their ability to mutate quickly; therefore, the aggressive promotion of the first-ever fast-tracked EUA COVID-19 vaccine candidly laid the foundation for mistrust in an already skeptical subpopulation.

A New York Times survey in 2021 reported ~ 700,000 confirmed COVID-19 cases linked to U.S. colleges and universities; however, this figure may significantly underrepresent the actual number of cases, as it does not account for untested or asymptomatic individuals. The U.S. higher education system is the second largest in the world, with ~ 20 million students enrolled across 4,000 colleges and universities [3]. College campuses have a high population density, which presents many opportunities for the spread of diseases, including COVID-19. Although college students are generally not considered vulnerable in terms of severe disease outcomes, research indicates that they may engage in higher-risk behaviors and are less likely to adhere to health guidelines compared to other demographics. While most COVID-19 cases reported among young adults tend to be mild and resolve quickly, the potential for these individuals to transmit the virus to nearby communities—often composed of more vulnerable populations raises public health concerns. The perception of risk regarding COVID-19 severity among college students may lead to noncompliance with health guidelines and vaccination efforts. Understanding how risk perception influences behavior is essential for addressing these societal challenges to mitigate future health risks within campus environments.

Behavior is strongly influenced by personality, which becomes problematic when behavioral norms and influences disrupt the safety and public health of the general population. In contrast to common beliefs that young adults display greater adaptability than other demographic groups, they often maintain their established behavioral patterns instead of adjusting to new societal information. Young adults tend to exhibit a higher level of entitlement in society, and an individual's risk perception is the central element of how healthy behaviors are formed. Individual risk perception factors include age and personality traits, which are known to affect an individual's perceived level of threat to a disaster. In fact, it is not unusual for different personality traits to present contrasting responses. The configuration of risk perception occurs in every aspect of an individual's life. Risk perception is the likelihood of a sudden or near future event directly affecting the individual, and their response is based on risk judgment - the magnitude of the outcome. Young adults are marred by the illusion that they are invincible and otherwise healthy; therefore, they are likely to perceive a novel virus as a low risk that outweighs the high risk of a vaccine's side effects.

Dark and Light Triads of Personality

During the 2019-nCOv, we suspect individuals with different personality traits were more influenced by differing risk perceptions. This variation led some to engage in risk-taking behaviors, such as disregarding health guidelines and vaccinations, while others were more apt to take preventive actions for their health as well as others. Our self-perception and social behaviors are significantly shaped by our personality traits, which correlate with how we perceive risk in different contexts. The fundamental elements of human psychological behavior, particularly personality, represent a dynamic phenomenon, especially in high-stakes situations. Within each of us, we exhibit a dominant dark or light core to our personality, a set of interrelated traits distinct from one another and the driving force of our unique behavioral patterns [4]. Social and environmental influences can alter which traits become more intertwined and how these interactions play a role in our daily lives and decision-making. For this study, we were interested in personality traits in the Dark and Light Triads and how these traits influence human behavior. To understand how these interpersonal and intrapersonal traits shape our personalities, it is crucial first to understand the components known as the Dark and Light Triads of personality and their prominent characteristics separately. Each standalone trio encompasses traits of Machiavellianism, psychopathy, narcissism, compassion, empathy, and altruism [5,6].

At the heart of darkness, we find three adverse (antisocial) traits: Machiavellianism- characterized as having manipulative tendencies, using whatever means possible to leverage power over others, with no morality [1]. These personality traits see the world through a foggy lens and often have a cynical view of those around them. Secondly, psychopathy- is characterized by a wanton disregard for others. Typically, those with psychopathy traits struggle with anxiety, tend to be wired for risk, and have little to no impulse control. It denotes a lack of empathy and an emotional response deficiency, often resulting in deviant behavior [7]. The third and final trait on the dark side is narcissism- a heightened focus on oneself. Displaying an elevated sense of entitlement and superiority over others. Thoughts and behaviors of an overinflated ego and power-seeking [6]. Much like psychopathy, narcissism also presents weak impulse controls.

In stark contrast, the Light Triad includes three positive (prosocial) personality traits: compassion - characterized by showing sympathy for those around them who are suffering

and acting with kindness and consideration to alleviate further suffering. People with compassionate personalities are motivated to help others without considering the cause. Next is empathy - having the innate ability to understand, take on, or share the feelings of another. Often, people with strong empathic traits are sensitive to the feelings of others. They feel deeply for others' misfortune and are more likely to offer help however they can to those in need. Lastly, altruism - is motivated to do something good for others without an ulterior motive for personal gain or covert expectations of anything in return. People with altruistic traits are seen by others as generous and kind-natured [5].

Researchers have found that those who score higher on the three interconnected dimensions of the Dark Triad have a higher tendency to be negatively influenced in society and are highly resistant to change, resulting in risky decision-making and rebellious behavior [8,9]. Although these dark traits are often interconnected and viewed negatively, evidence suggests that individuals may be able to adapt their behaviors in the short term to achieve personal gain within society - at least in certain contexts [10]. These risk-seeking behaviors validate their self-fulfilled need on the hierarchy, with little regard to how their actions can affect others. There are multitudes of research suggesting that other personality traits, such as those that typify the Light Triad, predict cooperation, conscientiousness, and agreeableness [4,11,12].

Current Hypotheses

We wanted to understand whether the dark trait personality types might shed light on predictive behavior with vaccine hesitancy and perceived threat in U.S. college students. In this study, we looked at personality traits of the Dark and Light Triads to determine if there were any relationships between the perceived threat of the COVID-19 virus and vaccine uptake. It was predicted that students who received the COVID-19 vaccine would score higher on the Light Triad and lower on the Dark Triad than those who did not receive the COVID-19 vaccine. Additionally, students who reported greater COVID-19 threats were predicted to score higher on the Light Triad and lower on the Dark Triad.

Method

Participants

A self-selected sample of undergraduate students (N = 147), obtained through a convenience psychology research pool at Coastal Carolina University, a public university in Conway, South Carolina, having a diverse student body, were invited to participate in this study. Respondents average age was 19.52, with 71% identifying as female, 26% as male, and 2% as other. Ethnicities consisted of White non-Latino (76%), African American (10%), Biracial or Multicultural (5%), Hispanic or Latino/Latina (3%), Asian (2%), or Other (3%). Respondents' identifiable information was kept confidential, and ethical standards set forth by the American Psychological Association [APA] (2002) when using human participants were followed [13].

Materials

A single yes/no question was asked to determine whether participants had been vaccinated, followed by a fill-in-the-blank, and which COVID-19 manufacturer vaccine they received. Demographics obtained were sex, ethnicity, age, and college year. To measure the COVID-19 threat, the social-psychological measurements of COVID-19 [14] were used. The Perceived Coronavirus Threat (PCT) subscale consisted of six items answered on a 5-point Likert scale (1 strongly disagree, 5 strongly agree). An example item was, “Thinking about the coronavirus (COVID-19) makes me feel threatened.”

A 27-item self-report short version of the Dark Triad scale [9] was used to measure prominent characteristics of Machiavellianism, narcissism, and psychopathy. Questions were broken up into three subcategories measuring each trait separately. All questions used the 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree), with 3 being neutral. A 36-item self-report personality questionnaire, known as the Light 3 scale, was used to assess personality traits on the Light Triad. Each subscale measured personality traits of empathy, compassion, and altruism [5]. A 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used for all questions.

Procedure

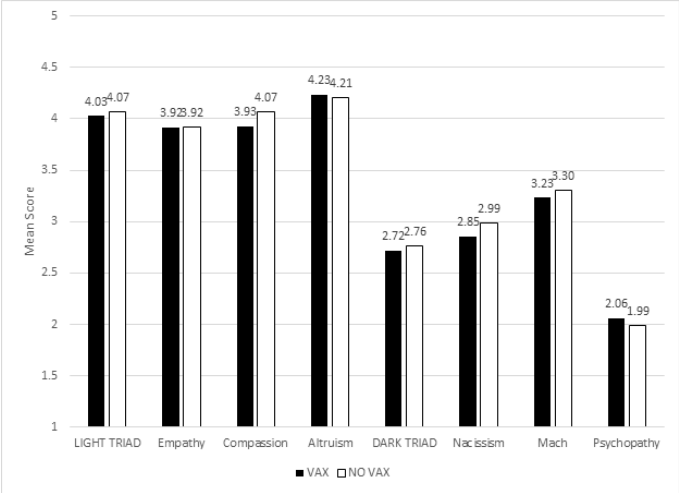
Students completed an online survey using the Sona Systems platform from September (2021) to April (2022). Participants were provided informed consent to participate. All data was self-reported, and students were awarded 0.5 of 6 required research credits as compensation in their general psychology course. The average time to complete the surveys was 16 minutes. After completing the survey, participants read a debriefing statement.

Results

The majority of participants (75.38%) had received the COVID-19 vaccine when they completed the online survey. Scores for the Light and Dark Triads, as well as individual scores for narcissism, Machiavellism, psychopathology, empathy, compassion, and altruism, were computed. Scores for overall COVID-19 threat (PCT) were also computed.

An independent means t-test was conducted to compare differences between those who were vaccinated against COVID-19 and those who were not vaccinated for each of the dependent variables. Students who were vaccinated for COVID-19 ($M = 2.72$, $SD = .49$) reported similar Dark Triad scores compared to those who were not vaccinated for COVID-19 ($M = 2.76$, $SD = .45$), $t(128) = .45$, $p = .65$. There were no significant differences between vaccinated groups for the individual personality traits of narcissism ($p = .29$), Machiavellianism ($p = .62$), or psychopathy ($p = .61$). Similarly, students who were vaccinated for COVID-19 ($M = 4.03$, $SD = .55$) reported similar Light Triad scores compared to those who were not vaccinated for COVID-19 ($M = 4.07$, $SD = .48$), $t(128) = .36$, $p = .72$. There were no significant differences between vaccinated groups for the individual personality traits of empathy ($p = .99$), compassion ($p = .29$), or altruism ($p = .82$). See Figure 1 for results of personality scores by vaccination status.

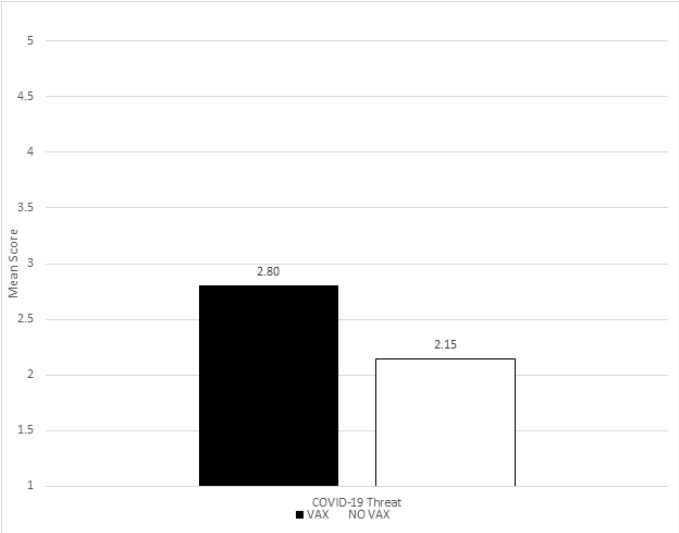
Figure 1: Mean Personality Score by COVID-19 Vaccination Status.



Note: Higher mean scores indicate a greater presence of the trait on a 5-point Likert scale. Independent means t-test indicated no statistically significant differences between vaccinated and unvaccinated participants for any of the traits.

Vaccinated students (M = 2.80, SD = .89) reported greater COVID-19 threat compared to non-vaccinated students (M = 2.15, SD = .81), t (128) = 3.68, p < .001, d = .88. See Figure 2 for results.

Figure 2: Mean COVID-19 Threat Score by COVID-19 Vaccination Status.



Note: Higher mean scores indicate greater perceived coronavirus threat (PCT) on a 5-point Likert scale. An independent means t-test indicated a statistically significant differences between vaccinated and unvaccinated participants (p < .001).

Pearson correlation coefficients were computed between COVID-19 threat (PCT) and Light and Dark Triad scores. COVID-19 threat was not correlated with the Light Triad, r (145) = .07, p = .39, but it was significantly negatively correlated with the Dark Triad, r (145) = -.16, p = .05. Additionally, none of the individual traits in the Light and Dark Triads yielded statistically significant correlations with COVID-19 threat. While the relationship between the Dark Triad traits and COVID-19 threat was negative, only the correlation between Machiavellianism and PCT was marginally significant (p = .09).

Discussion

The present study offers fascinating insights into the relationship between personality traits in the Light and Dark Triad and vaccine hesitancy among college students. Additionally, the study examined college students' perceived threat level from COVID-19 and whether certain personality traits could predict vaccine adherence. The study found no statistically significant differences in the overall Light or Dark Triad scores between students receiving and those not receiving the COVID-19 vaccine. Our findings align with previous research suggesting that personality traits, although persuasive in influencing attitudes or beliefs, are not usually sufficient to predict health measures, such as vaccination [15,16]. The decision to be vaccinated, particularly in the case of a novel virus and a politically charged pandemic, may be influenced by many external factors beyond personality traits.

Still, one aspect in which a statistically significant difference emerged was in the perceptual aspect of COVID-19. The vaccinated students reported a higher perceived threat level than their non-vaccinated colleagues. This finding supports previous research that perceptions of susceptibility and severity play a vital role in healthy behaviors. Viewed theoretically and empirically, perceived threat has consistently been identified as the primary cause of protective health behaviors, with vaccination being one of them. Contrary to personality traits, threat perceptions can be a more immediate driver of specific behaviors in a global health emergency, as the perceived risk fluctuates in response to news coverage, personal experiences, and public health recommendations.

Additional empirical evidence supporting this idea is provided by the correlational analyses in the current study, which revealed a small yet statistically significant negative relationship between COVID-19 threat perception and the overall Dark Triad score. Although the individual traits within the triad of narcissism, psychopathy, and Machiavellianism did not yield statistically significant associations on their own, Machiavellianism marginally approaches significance. This result aligns with the findings in previous research, suggesting individuals who score high on Machiavellianism are more likely to exhibit traits such as skepticism, distrust of governmental institutions, and a higher tendency to be reluctant to authority [17,18]. As Machiavellianism embodies features such as cynicism, manipulativeness, and emotional detachment, we can logically follow the idea that individuals who score high in this trait may be more inclined to navigate issues like public safety concerns related to a new vaccine or shifting governmental perspectives, thus leading to a lower perceived threat and less motivation to get vaccinated.

Despite these complex findings, personality variables have not been found to correlate strongly with vaccine behavior; one could assume that personality traits alone cannot, for the larger part, explain the complexity of a college student's decision on vaccines. This observation is consistent with the broad scope of behavioral research, underscoring contextual and community factors' crucial role in predicting public health behavior. Furthermore, studies have also found that social norms and perceived peer behavior are the primary influencers in

vaccine uptake, with institutional requirements and political or ideological beliefs reinforcing the stance [19,20]. In the current sample, for instance, the students may have opted for the vaccine for various reasons, such as work or school compliance, face-to-face learning, ease of family members' stress, or participating in activities such as travel. The findings in this current study should highlight the multilayered nature of the vaccine participation process. The conjunction of personal beliefs, contextual pressures, and perceived threat levels are all part of a more defined framework for understanding vaccine behavior.

While the present study substantially contributes to the existing literature on psychological predictors of health behavior and vaccine hesitancy, it also highlights certain limitations. First and foremost, the sample consisted solely of college students, which limits the generalizability of the results compared to other populations, such as older adults, individuals with diverse educational backgrounds, or those residing in culturally diverse communities. College students often face pressures outside of the societal norm, including social influences or university conformance. Additionally, the perceived threat was associated with vaccination status and certain personality traits; however, it remains unclear whether the perceived threat influenced vaccination decisions or whether the vaccination itself altered the perceived threat. A longitudinal study would help identify the directionality and stability of these links over time. Furthermore, the fact that all data was self-reported and collected through an online survey leaves open the possibility of social desirability bias or faulty self-perception. It is possible that participants underreported traits that most people perceive negatively (psychopathy) or overreported behaviors that contradict social values (empathy or vaccination). Furthermore, the stability of some personality measures may vary, and using both short scales—although they are time-efficient—could limit the measurement depth. Detailed personality assessments may reveal subtle relationship changes that the tools used here cannot yield. Lastly, the study lacked several other predictors of vaccine behavior, including political affiliation, level of trust in healthcare and government institutions, exposure to misinformation, and socioeconomic factors. These variables may interact significantly with personality and perceived threat and should be considered in future studies.

Further studies should consider exploring aspects beyond personality to include variables such as trust in government, the amount of misinformation one is exposed to, media literacy, health education, and social pressure. Longitudinal studies could also help discover how the development of trust or perceived threat, in an interactive manner, leads to variations in vaccine administration over time. By bringing to light the lens through which the vaccine hesitancy premium is seen, scientists can better inform the public of health problem-solving strategies that effectively tackle the contradictions between the psychological and sociocultural determinants of health behavior among the younger generations. These results may help plan for future pandemics.

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