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Does Age, Masculinity and Vaccine Conspiracy Beliefs Impact Covid-19 Vaccination Status?

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A thesis submitted in partial fulfillment for the Bachelor of Science degree in Psychology

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Abstract

The Covid-19 pandemic has negatively impacted numerous aspects of daily life. The CDC states that one of the best ways to combat the virus to end the pandemic is high vaccination rates. However, despite this knowledge numerous US citizens remain vaccine hesitant resulting in lower vaccination rates across the country. Two possible variables that may explain the gap in vaccination rates is the adherence to traditional gender norms and vaccine conspiracy beliefs. To measure the effects of both these variables on vaccination rates two survey scales were used: The Male Role Norm - Revised Scale, (Brannon & Junni, 1984) and the Vaccine Conspiracy Beliefs Scale (Shapiro et al., 2016). The results did not show a significant relationship between males' levels of masculinity and their likelihood of being vaccinated. However, the results did show that women with lower scores of masculinity had increased voluntary vaccination rates. Further, the results demonstrated that both older individuals (50-60 years old) with higher levels of masculinity as well as those with high vaccine conspiracy beliefs had significantly lower odds of being vaccinated. Future research should investigate masculinity levels using more modern scales of masculinity and see if they are better predictors of vaccination status. Moreover, it is important to investigate effective methods to deter the spread of vaccine conspiracy theories, as well as identify ways to decrease a person's belief in the validity of vaccine conspiracy theories.

Introduction: The Vaccine Gap

In May 2020, then President Donald Trump introduced Operation Warp Speed, which sounds a bit like a sci-fi-movie. You would be wrong to think that. Operation Warp Speed was the United States government's aim to create and accelerate the development and distribution of a Covid-19 vaccine for United States citizens (U.S. Government Accountability Office, 2021). In the past, a new vaccine took between 5 to 10 years to be completely and thoroughly assessed for safety and efficacy (The World Health Organization, 2022). In his address to the public, President Trump noted that "the gold standard vaccine has been done in less than nine months" regarding the creation of Covid-19 vaccine (Turnure, 2021). This quick timeline may help explain why many Americans have refused to get vaccinated given questions about the vaccine's safety, especially in terms of side-effects, and effectiveness. While these concerns are reasonable, we know that vaccines play a critical role in preventing deaths, hospitalization, and single handedly contribute to controlling the spread of the disease, illustrating the importance of the Covid-19 in our world's return to relative normalcy.

Three years later, and two years after the creation of the Covid-19 vaccine the pandemic continues to impact daily life, affecting not only the health care systems, but also the United States' society, economics, politics, and workforce, despite the availability of vaccines. In December of 2020, the FDA approved the Pfizer-BioNTech Covid-19 Vaccine for emergency use authorization (U.S. Food & Drug Administration, 2021). Despite receiving FDA approval not all US citizens have chosen to be vaccinated; today there remains a gap between vaccinated and unvaccinated citizens which prevents bringing about an official end to the pandemic. This gap comes because of vaccine hesitancy, which encompasses the misperceptions of the COVID-19 vaccine safety, efficacy, risks, and an overall mistrust in the institutions/corporations that created the vaccines (Lazarus et al. 2022). In addition to mistrust, there may be various psychological factors that inhibit individuals from obtaining a covid vaccine, including the concepts of masculinity and conspiracist thinking.

To understand and hopefully minimize the gap that exists between vaccinated and unvaccinated Americans, there is the need for effective and comprehensive vaccination strategies and up to date research that looks specifically into the potential perceptions that drive Covid-19 vaccine hesitancy. Understanding the reasons that a person may be hesitant to accept a vaccine requirement, can help to not only identify potential misperceptions but also help to target these perceptions and provide proper information for future inoculation to increase vaccine acceptance (Ratan et al., 2020).

The Urgency in Closing the Vaccine Gap

Between December 2020 through November 2022, it is estimated that the Covid-19 vaccination program prevented more than 18.5 million additional hospitalizations and 3.2 million additional deaths (Fitzpatrick et al., 2022). As promising as these statistics are, according to the CDC, Covid-19 remains the world's third leading cause of death since 2020 (Kaiser Family Foundation, 2022) despite the vaccine's creation and authorization in 2020. This illustrates the growing need of closing the vaccine gap to decrease the number of lives lost each year due to the Covid-19 virus. One way to minimize this gap is to identify and target variables that might influence a person's willingness to be vaccinated and bring them to the forefront as a potential direction for health promotion efforts for populations that are vaccine hesitant.

Vaccine Hesitancy

The SAGE group, otherwise known as the World Health Organization Strategic Advisory Group, was established in 2012 and their first task was to provide a complete definition of vaccine hesitancy and develop a model that delineates the factors that affect the decision to accept a vaccine. Vaccine hesitancy as defined by the SAGE is the “delay in acceptance or refusal of vaccination despite availability of vaccination services” (MacDonald & Sage Working Group, 2015, p. 4161). Therefore, when looking at this framework in terms of the Covid-19 pandemic; we can see how many Americans would fit this definition of vaccine hesitancy.

The SAGE group delineated grouped different vaccine hesitancy factors into three distinct categories: contextual, individual, and group vaccine specific influences (MacDonald &

Sage Working Group, 2015). Contextual influences included historical, economic, and political influences. Individual and group influences included personal perception of the vaccine or an individual's social/peer environment. Individual factors consisted of vaccine specific issues for personal reasons directly related to a person such as their attitudes towards healthcare professionals. These different categories provide insight into which factors may influence Covid-19 vaccination uptake.

Due to the Covid-19 pandemic, vaccine hesitancy has gained worldwide attention. Specifically, we can see that a percentage of United States citizens seem to be vaccine hesitant (Elflein, 2021). Despite its authorization by the FDA around 30% of U.S. adults aged 18 or older in the United States continue to be unwilling to take approved vaccinations against Covid-19 (Elflein, 2021). However, to bring an eventual end to the pandemic it is vital to identify the most pertinent reasons that lead people to be vaccine hesitant and target those populations to increase vaccine uptake.

General Health Issues Related to Gender Norms, Roles & Stereotypes

Gender norms, as described by the American Psychological Association (2015) refers to them as "the socially constructed roles, behaviors, activities, and attributes that a given society considers appropriate for boys and men or girls and women" (Fleming & Brune, 2015, p.1). These norms have the potential to play a powerful role in a person's life since deviating from these norms is often met with backlash or judgment (Fleming & Brune, 2015). More importantly, conforming to gender norms can have serious implications for a person's health because certain behaviors considered to be the norm for a group are associated with specific health decisions and outcomes. For example, men tend to engage in behaviors that negatively impact their health. Research shows that men do not utilize general practitioner services as often as women do because of their adherence to male norm roles (Noone & Stephens, 2008). In contrast, women report they would prefer to look "thin" and "pretty", therefore they limit physical activity to fit this ideal version of feminine (Spencer et al., 2015, p.2). Gender norms play a different but important role in the health behaviors of men and women.

The American Psychological Association defines gender roles as, “the pattern of behavior, personality traits and attitudes that define masculinity or femininity in a particular culture” (American Psychological Association, 2015, p.451). When looking at it from a health perspective, Waldron (1997) notes that one hypothesis surrounding gender differences in health behaviors is due to complementary aspects of gender roles, specifically males’ greater risk taking and females greater health concerns. This hypothesis brings to light the idea that men, because of the gender roles set by society, are socialized to take risks, whereas females are socialized to be more cautious and want to protect their health. Therefore, men are more likely to put their health at risk, while women engage in more preventive measures to ensure a healthy life (Waldreon, 1997).

Gender stereotypes, defined by the American Psychological Association is, “a relatively fixed, overly simplified concept of the attitudes and behaviors considered normal and appropriate for a male or female in a particular culture” (American Psychological Association, 2015, p.451). A popular gender stereotype regarding boys or men is the belief that they suppress their emotions (Pederson & Vogel, 2007). This is likely to have been taught to them by other men. Conforming to this stereotype can be extremely dangerous when it comes to mental and physical health implications. Pederson & Vogel (2007) looked at undergraduate college age men and examined the link between gender role conflicts and willingness to seek counseling for psychological or personal concerns. They found that men experiencing greater gender role conflict were more likely to self-stigmatize and less likely to self-disclosure, which led to less willingness to seek counseling. Ultimately, men confirmed the gender stereotype of keeping their emotions and problems hidden and not seeking mental health assistance. Along with conforming to gender norms and roles, gender stereotypes also play a role in mediating health behaviors that an individual engages or follows in.

Gender norms, roles and stereotypes may offer another potential variable to account for the gap between those who are vaccinated and those that are not. Adhering to these gender rules

created by gender norms, roles and stereotypes may influence the decision males and females make in terms of Covid-19 vaccination acceptance.

Conformity to Gender Standards, Age and Health Outcomes

While adherence to masculine norms has been associated with various negative health consequences (Noone & Stephens, 2008), less research has focused on how adhering to typical gender norms changes with age. The literature that has been published thus far shows that older men tend to adhere less strictly to typical norms than their younger counterparts. A study by Herreen et al. (2021), looked at the relationship between conformity to masculine norms and age in Australian men, focused on vaccine acceptance, for the influenza vaccine. They found that conformity to masculine norms decreased significantly with age. This illustrates that as men age, they are less likely to adhere to the preconceived norms they once had at a younger age. Similarly, Kini et al. (2021), looked at how sociodemographic variables predicted influenza uptake and outcomes. The researchers found that age, along with other variables such as gender and race, significantly influence vaccine acceptance. Based on information from 1,005 US adults, they found that 14.2% of respondents in the 19 to 30 age group would not get a vaccine, whereas 40.2% of the respondents in the 65+ age group intended to receive the influenza vaccine. Taken together these findings confirm that as men age, they are more likely to engage in positive health behaviors such as vaccinating for the flu. These findings demonstrate that in general older men would be less likely to adhere to masculine norm roles, which has implications regarding Covid-19 vaccination uptake based on age.

A study by Veronese et al. (2021), however, looked specifically at the unwillingness and uncertainty to vaccinate against Covid-19 in older people, showing contrasting findings. They found that when it comes to Covid-19, older people were more hesitant than younger people to get the vaccine (Veronese et al., 2021). The researchers then looked specifically at the reasons for unwillingness to vaccinate against Covid-19. The big concerns of older adults were the risk of side effects and the fear of death. These are therefore barriers to vaccinate for Covid-19. Other

factors found in this study were financial reasons, being less educated and being Hispanic (Veronese et al., 2021).

The literature pertaining to gender and age has showed mixed findings for both Covid-19 vaccination and more typical vaccinations like the influenza vaccine. We see that when it comes to vaccinating for influenza, older adults are more likely to be vaccinated, whereas the opposite findings have been uncovered when looking at potential reasons for not taking the Covid-19 vaccine.

Traditional Masculine Gender Socialization & Health Implication

In the United States, women live longer than men (Population Reference Bureau, 2001). Many experts have tried to explain this phenomenon based on reasons such as genetic predispositions and hormones (Population Reference Bureau, 2001). However**,** recent research has pointed to the idea that perhaps this difference in life expectancy cannot be explained solely in terms of biology, but instead that differences in life expectancy and overall health can be accounted for by an interaction between biological, behavioral, environmental, and socio-economic factors (Zarulli et al., 2018).

Gender, as expressed by individuals, falls within the behavioral category (Zarulli et al., 2018). Based on the gender norms and roles that various cultures have, males or females may put themselves in a position of dangerous health implications because of adhering to their set norms. Empirical studies have shown that men are more likely to engage in risky health behaviors which increase their risk of disease, injury, and death such as smoking cigarettes and drinking more often (Mahalik et al., 2007). Similarly, a study by Oksuzyan et al. (2013), found that men have higher levels of mortality at all ages than women, due to biological predispositions, as well as behavioral differences in the choices they make based on gender norms which increase their risk of death, illness, and injury.

To prevent undue sickness, injuries and death for men researchers need to understand why they make these risky health decisions. According to Mahalik et al. (2007) one explanation for males' risky health behaviors may be that masculinity, as well as the perceived normativeness

of other men's health behaviors predict the way a man handles his own health issues. Mahalik et al. (2007), suggest that men will often behave in a similar way to how other males around them act. For example, if a man's father did not regularly go to a doctor, then the son is less likely to regularly go to a doctor. Mahalik et al. (2007) investigated the role of masculinity and men's perception of normativeness of other men's behaviors. In this study Mahalik et al. (2007), looked at 140 men between the ages of 18-78 and had them complete online measures assessing masculinity and their perception of normative health behaviors for men as well as eight specific health behaviors. They found that masculinity and the perceived normativeness of other men's health behaviors significantly predicted participant's own health behaviors.

Another study by Mahalik et al. (2007), approached men's health behaviors from a gender socialization framework. In line with the results from the previous study by Mahalik et al. (2007), they hypothesized that men's health behaviors would relate to their conformity to traditional masculine norm roles; therefore, explaining why they may engage in these risky health behaviors due to its commonness and normativeness. They looked at a total of 253 Australian men and had them complete the Health Behavior Inventory and Conformity to Masculine Norms Inventory. The results showed that the higher the masculinity score the more reports there were of risky health behaviors and fewer preventative health behaviors were taken by the participants. Both studies by Mahalik et al. (2007) emphasize that when men adopt traditional masculine ideals, they are also adopting certain health practices that may lead men to put their health at higher risk.

The idea that men act in a similar fashion to other men around them, also aligns with research conducted by Harrison et al. (1992). They found that gender role socialization encourages men to put their health at risk. For example, a man who view of masculinity include acting as a risk-taker may engage in risky or dangerous behaviors, such as not wearing a seatbelt when driving. The findings from Harrison et al. (1992) study suggest that the way in which boys are taught to behave as they grow up encourages them to engage in negative behaviors more often than girls and women are encouraged to do so.

The findings from these three studies emphasize that men who embrace the traditional construction of masculine ideologies are more likely to engage in risky health behaviors. Adherence to these masculine norms typically leads to partaking in behaviors that lead to negative health consequences.

All these findings offer reasons why women tend to live a longer and healthier life when it comes to gender comparisons. One key reason is how males are socialized, which has serious negative health implications. When they adhere to typical male norm roles, they are more likely to put their own health at risk resulting in preventable illness and premature deaths. Men's health behaviors are both embedded in and influenced by the social and environmental context in which they live, therefore it is important to consider how men in the context of male gender roles as expressed in concepts of masculinity would respond to a health crisis like the Covid pandemic.

Low Threat Perception Based on Gender & Covid-19 Vaccination

We can see that adhering to traditional masculine gender norms plays a critical role in a man's health and well-being; only more so when looking through the lens of the Covid-19 pandemic. An important question to ask is whether gender norms can account for the gap in vaccination rates both between men and women and for individuals with varying perceptions of masculinity.

From the start of the pandemic, the CDC recommended actions such as masking, which has seen to be an efficient way to reduce transmission of Covid-19 (Eikenberry et al., 2020). Despite this research showing the effectiveness of mask wearing it has become a controversial issue in the United States. There are numerous reasons why individuals have refused to wear a mask ranging from social stigma to skepticism about its effectiveness. One reason which can be linked to gender norms is risk perception. As researchers have studied the reasons surrounding anti-mask wearing, one common trend to emerge is that risk perception can explain unwillingness to engage in preventative behaviors like mask wearing (Byrne et al., 2021). This suggests that those who perceive the Covid-19 as less threatening will be less likely to adhere to CDC preventative guidelines.

A factor which seems to play a crucial role in the relationship between risk perception of the Covid-19 virus, including engaging in protective behaviors is gender, and conformity to masculine or feminine norms. DeSalvo et al. (2022), found that men's lower risk perceptions are related to the socialization of masculine norms. Therefore, we would expect that men would view the Covid-19 virus as much less threatening than women, causing them to ignore preventive measures like mask wearing and hand washing. DeSalvo et al. (2022) investigated the role of relevant masculine and feminine norms in people's Covid-19 risk perceptions and health preventative behaviors. They found that conformity to gender norms-controlled risk perceptions and mask wearing behaviors. Specifically masculine norm roles predicted less mask wearing, due to lower perceived threat to self or others (DeSalvo et al., 2022). Their findings suggest that men view the Covid-19 virus as less threatening therefore they do not engage in preventative behaviors. These findings also align with the findings of a study by Roccato et al. (2022), which explored the perceived vulnerability to Covid-19 for males and females. They found that men perceived themselves to be less likely to suffer severe consequences if they did fall ill from Covid-19 than women. The results from these studies show that men perceived the Covid-19 virus as less threatening or dangerous to their health or others, which may account for why some males may decide not to become vaccinated.

Traditional Masculine Gender Socialization & Covid-19 Adherence to Preventive Behaviors

Roccato et al. (2022) focused on how adherence to masculine ideologies affected the likelihood that men would adopt protective behaviors against the Covid-19 virus. They found that identifying as a man had significant negative associations with social distancing and good hand hygiene related behaviors. By adhering to traditional masculine ideologies men were less likely to adopt protective health barriers to the Covid-19 virus. Another study by Mahalik et al. (2022) looked at how masculine norms related to preventative Covid-19 measures and vaccination intentions. In this study, of 596 participants in the United States, they found that higher levels of conformity to traditional masculine norms and attitudes contributes to negative

beliefs in Covid-19 health preventative behaviors. The study showed that by conforming to male norm roles, men do not look out for their health as often as women do. Finally, the researchers found that conformity to traditional masculinity norms negatively correlates to whether a man was concerned about a vulnerable person's health. This could offer a potential explanation for the vaccination gap that exists between males and females. These studies illustrate that adherence to masculine norm roles makes an individual less likely to follow CDC recommendations when it comes to preventive measures for Covid-19.

Female Health Behaviors During the Pandemic

Past literature has suggested that females typically engage in more preventive and positive health behaviors in general that help them live a longer and healthier life (Hildt-Ciupinska, 2020; Zwolinsky et al., 2016). During the Covid-19 pandemic similar trends in women's health behaviors emerged. These trends showed that women took more protective measures against the Covid-19 virus to help both themselves and others stay safe.

A study by Luo et al. (2022) explored the impact of gender on various preventive health behaviors during the Covid-19 pandemic. The results showed that females exhibited better preventive health behaviors than males such as good hygiene habits, social distancing and engaging in behaviors intended to help mitigate the spread of the epidemic. These results are congruent with findings from Tan et al. (2022) which looked at the influence of gender factors on accepting and utilizing protective health behaviors. This study looked at Taiwanese participants' intention to adopt protective health behaviors during the Covid-19 pandemic. The results showed significant gender disparities regarding risk perception on and health protective behaviors. Specifically, the study showed that women exhibited a higher threat perception of the pandemic and believed it riskier to their health than men did. Women were therefore more likely to adopt protective health behaviors like avoiding public places and wearing a mask. Together both these studies illustrate how females' adherence to society's construction of feminine health norms transfers to their behaviors during the Covid-19 pandemic. Adherence to feminine norms

during the pandemic resulted in the use of protective health behaviors to prevent negative consequences for both participants and others.

Otterbring & Festila (2022) investigated gender differences in preventative health behaviors, as well as personality traits such as agreeableness and conscientiousness, at the start of the pandemic. The researchers first found that women score higher than men on agreeableness and conscientiousness and were also more willing than men to comply with preventive health behaviors such as social distancing, wearing a face mask, and good hand hygiene. Another important finding was that personality traits were found to mediate the gender compliance relationship to preventive health behaviors. This suggests that women's greater compliance levels to preventive health behaviors was partly due to their higher levels of agreeableness and consciousness. Perhaps men's lower reports of agreeableness and consciousness could partly explain why they are less likely to engage in preventive health behaviors.

The findings from these three studies show that women are more likely to adhere to preventive health behaviors during the Covid-19 pandemic. These studies rely on data collected during the start of the pandemic when a vaccine was not yet readily available. Therefore, even though the studies do not specifically mention the Covid-19 vaccination as a preventive behavior, we can extrapolate that based on females' preventive health behaviors during the onset of the pandemic they would likely get vaccinated once it was available. This is an important reminder for public health to take into consideration specifically the importance of gender differences during public health emergencies.

Discrepancy for Women Between Vaccine Hesitancy and Vaccine Acceptance

The findings thus far concerning male gender norms suggest that men due to their conformity to masculine ideology, would be less likely to engage in preventive health behaviors like vaccinating for the Covid-19 virus. However, past literature shows that it is women who report higher vaccine hesitancy than men despite women's higher rates of vaccination. Although women report more vaccine hesitancy, according to data from May 2023, they have higher rates of Covid-19 vaccination than men (CDC, 2023).

A meta-analysis conducted by Zintel et al. (2022) analyzed gender differences in Covid-19 vaccination intentions. They used data from sixty studies for the review and found that a majority (58%) of papers reviewed reported men to have higher intentions to get vaccinated against Covid-19 than women. Their results showed that significantly fewer women stated that they would get vaccinated than men, showing lower vaccination intentions among women than men. Despite socio-cultural constructs and behavioral ideologies, like adherence to masculine norm roles, several studies did uncover findings where women reported more vaccination hesitancy than men.

Studies examining influenza vaccine hesitancy also noted instances of women's greater hesitancy. In 2009 a global influenza pandemic was declared by the WHO, a vaccination program against the H1N1 flu was created; however, it had relatively little uptake (Bish et al., 2011). Bish et al. (2011), examined the psychological and demographic factors that were associated with variation in uptake levels during the 2009 pandemic. By conducting a systematic literature review by of thirty-seven studies. The researchers found that, within the general population, as well as with health care professionals, men were more likely to report the intention to be vaccinated against the influenza virus than women. The researchers also found that women were more likely to express fears about the safety of the vaccine. Interestingly, the review by Bish et al. (2011) found that, similarly to the work of DeSalvo et al. (2022), the degree of threat of the influenza strain dictates the likelihood of being or intending to be vaccinated. They uncovered that more men were less vaccine hesitant partly due to the fact they viewed the influenza pandemic as more threatening than women. This could possibly be due to influence from the media which disproportionately emphasize men's susceptibility to the influenza virus.

It is evident that there exists a discrepancy between female vaccine hesitancy and female vaccination uptake. Even though women may express more hesitancy towards vaccines they still end up getting vaccinated more often compared to other groups. Perhaps this phenomenon can be explained by researching adherence to gender norms and their influence on vaccination status.

Conspiracy Theories, Beliefs & Thinking

Conspiracist thinking, as well as belief in conspiracy theories, seem to be abundant in both social and political narratives. Across history this type of thinking has played an important role as a catalyst to the start of genocides and witch hunts. A conspiracy theory has the power to make a person reject modern medicine or vaccines as leads to a lack of faith in scientific evidence. The belief in scientific evidence is essential for individuals to trust the efficacy of the Covid-19 vaccine to be willing to choose to be vaccinated.

To best understand conspiracists beliefs, it is important to have a clear definition. According to Keeley (1999) and Pidgen (1995), a conspiracy is "a secret plot by two or more powerful actors". Conspiracy theories as defined by Byford (2011) are "attempts to explain the ultimate causes of significant social and political events and circumstances with claims of secret plots by two or more powerful actors" (pg.21). Therefore, someone who has conspiracist thinking believes in conspiracy theories. Conspiracy theories are typically targeted at the government, but they could target any group or organization (Douglas et al., 2019). For example, a theory which has received much traction was that the Bush administration was responsible for 9/11. Conspiracy beliefs, refers to the belief in a specific conspiracy theory, meaning that an individual believes a conspiracy theory to be true. One popular belief is that John F. Kennedy's assassination was planned by the CIA. Evidence suggests that if a person believes one conspiracy theory about the government, then they are more likely to accept the validity of other theories even if they are unrelated (Wood et al., 2012).

Research has found a connection between anti-vaccine conspiracy beliefs on an individual's vaccination intentions. Jolley & Douglas (2014) conducted two studies to investigate the influence of anti-vaccine conspiracy theories on views of vaccination. They found that participants who believed in anti-vaccine conspiracy beliefs had lower intentions to be vaccinated. Suggesting one reason why a person might reject the Covid-19 vaccine is the belief in anti-vaccine conspiracy theories.

Given that belief in anti-vaccine conspiracy deters a person's general intention to get vaccinated, it is likely that the same thing could be said for the Covid-19 vaccine. A recent study investigated the relationship between vaccine conspiracy theories and vaccination intentions for the Covid-19 vaccine (Bertin et al., 2022). The researchers looked at Covid-19 conspiracy beliefs, vaccine attitudes and the intention to be vaccinated against Covid-19. They found that conspiracy beliefs, as well as conspiracy mentality, negatively predicted participants intentions to be vaccinated against Covid-19 in the future. This suggests that those who believed in Covid-19 conspiracy theories were less likely to receive the Covid-19 vaccine.

Conspiracy Theories as a Barrier to Vaccination

It is evident that the Covid-19 pandemic poses a pressing problem to public health officials due to its high levels of contagion and its ability to spread easily. Therefore, preventative measures like masking, physical distancing and vaccination are the keys to bringing the pandemic to an official end. A study by Romer & Jamieson (2020) looked at how accepting conspiracy theories that were circulating in mainstream and social media early in the start of the pandemic would be negatively correlated to the uptake of preventative behaviors and eventual vaccination once it was possible (as at the time of the study it was not yet available). The researchers looked at 1,050 US adults in March 2020 and then a follow-up of the same participants in July 2020, and assessed the adoption of preventive behaviors, threat perceptions, belief about the safety of the vaccine, political ideology, and media exposure (Romer & Jamieson, 2020). They found that there were three Covid-19 conspiracy theories that remained stable across the two time periods, and they were inversely related to the threat perception of the pandemic, the likelihood of utilizing preventive actions, perceived safety of the vaccine and the intention to get vaccinated against Covid-19. Further, adopting preventive action was predicted by political ideology, so that those who were politically conservative were more likely to believe in vaccine conspiracy. There were several important implications of this study, but perhaps the most important is the need to confront Covid-19 conspiracy theories and vaccination misinformation to stop them from spreading further, which could subsequently increase

vaccination percentages. Effort should be concentrated on conservative media outlets that have helped facilitate the spread of Covid related conspiracy theories (Romer & Jamieson, 2020). If conspiracy theories are mis-proven, the chance of vaccine uptake could increase.

McCarthy et al. (2021), found similar results. They looked at the relationship between perceptions of the health threat that is posed by Covid-19 and trust in the government and anomie. They speculated that anomie may mediate the relationship between Covid-19 conspiracy theory beliefs and vaccine hesitancy; anomie is a state of mind in which an individual perceives that the moral fabric of society is declining. The researchers surveyed data from 779 Australian adults to examine the influence of three conspiracy theories on vaccine hesitancy which revealed two key findings. Their results showed that Covid-19 conspiracy theories seem to influence vaccine hesitancy through the increased perception of anomie and decreasing perceptions of the health threats posed by Covid-19. Second, they found that anomie and perception of the health threats that Covid-19 poses mediates the relationship between government conspiracy theories and vaccine hesitancy. Belief in government conspiracy theories leads a person to view the Covid-19 virus as less dangerous, as well as leading to an increase in anomie; both of which lead to vaccine hesitancy.

Finally in a study by Capasso et al. (2022) researchers looked at how conspiracy theory beliefs can reduce vaccination intention and by exploring the mediating roles of trust in both the government and science. There participants consisted of 822 unvaccinated Italian adults. The results showed that anti-vaccine conspiracy beliefs negatively influenced intention to get vaccinated both directly and indirectly through the mediating effects of trust in science and trust in the government. Individuals who endorsed conspiracy beliefs had a reduction of trust in the government, specifically their ability to handle the pandemic, as well as, in the science backing the Covid-19 vaccine's effectiveness.

The findings from McCarthy et al. (2021) and Capasso et al. (2022) illustrate the relationship that exists between belief in conspiracy theories and its negative relationship in intention to vaccinate. A mediating effect of trust in the government was found in both studies as

a reason that individuals were more likely to believe in conspiracy theories and trust the government less. Both studies suggest that belief in Covid-19 conspiracy theories can influence Covid-19 vaccine uptake.

Conspiracy Beliefs and Threat Perceptions of the Virus

In another study, Maftei and Holman (2021) looked at the willingness of participants to vaccinate against Covid-19. They specifically looked at the mediating role of conspiracy beliefs (CBs) on the relationship between threat perception (TP) and the willingness of participants to vaccinate against Covid-19, in two hundred and forty-seven adults from Romania ranging in age from 18 to 70 years old. Their results indicated that CBs partially mediated the relationship between TP and willingness to vaccinate. More specifically, higher TP levels and lower levels of CB were linked to higher levels of vaccination acceptance. This suggests that people who perceive the Covid-19 virus as more dangerous and had lower levels of believing conspiracy theories were more likely to be vaccinated, and less likely to believe Covid-19 conspiracy beliefs. The researchers found the opposite to be true when they looked at people with higher CBs who were associated with lower risk perception when it came to Covid-19. This shows that people who had higher levels of conspiracist beliefs viewed the virus as less threatening to their health, which deterred them from becoming vaccinated.

It is important to determine the roots that encourage vaccine hesitancy when it comes to Covid-19 to see what interventions are needed. Not surprisingly research suggests that one potential predictor of vaccine hesitancy is the belief in conspiracy theories related to vaccines.

Conspiracy Theories and Age

At present there is little research that has investigated the relationship that exists between general belief in conspiracy theories and age. There is however some preliminary research which investigates whether age is a factor in the likelihood of believing in Covid-19 conspiracy theories. A study by Vijaykumar et al. (2021), examined how age influences the belief in various types of Covid-19 misinformation. Through a mixed-design online experiment in the UK and Brazil with 1,454 participants, researchers first exposed adults to different levels of

misinformation about Covid-19 data (full misinformation, partial misinformation, or full truth about the therapeutic powers of garlic to cure COVID-19). Then they exposed participants to the correct information from the World Health Organization which showed the misinformation to be false. The researchers found stronger misinformation beliefs among younger adults between 18-54 than older adults who were 55 or older. This finding shows us that there is the need for health officials and agencies to focus more on correcting misinformation that may exist in the world of younger adults, as they are more likely to find validity in conspiracy theories.

Another study by Caycho-Rodriguez et al. (2022), looked at the variation of conspiracy beliefs regarding Covid-19 and the Covid vaccine. The participants consisted of 5,779 individuals living in eighteen different Latin American Countries. They investigated sociodemographic variables such as gender, age, and education level. The researchers found that women with less education, as well as individuals who receive their information about Covid-19 information from family and friends were more likely to be supportive of conspiracy beliefs. Interestingly the relationship between age and conspiracy beliefs varied by countries. In Argentina, Columbia, and Paraguay those older than 42 years agreed more often with conspiracy ideas, whereas in Cuba, Guatemala, Mexico, Uruguay, and Venezuela individuals falling between 23 to 42 years supported conspiracy beliefs the most. In Bolivia, Chile, Peru, and El Salvador those who were under 23 years old were the ones who agreed most strongly with conspiracy beliefs (Caycho-Rodriguez et al., 2022).

In a study by Buturoiu et al. (2021) researchers looked at the profiles of individuals who are more prone to believe in and spread Covid-19 conspiracy theories. They conducted a national survey using 945 Romanian individuals in April 2021. The researchers found that age did not play a significant role in the profile of the believers of Covid-19 conspiracy theories. Instead, both older and younger individuals regardless of the type of media (e.g., social media, radio) were susceptible to believing in conspiracy theories, as well as in, spreading them.

Taken together these studies show some contradictory results. Some studies have found that younger adults are more likely to believe conspiracy theories whereas other results show

older adults are more likely to believe conspiracy theories. Other studies found that age did not play a significant role in determining likelihood of believing in conspiracy theories. While the findings suggest that people of all ages may be vulnerable to conspiracy beliefs regarding Covid-19 different cultures may lead individuals of different ages to greater susceptibility than others. Therefore, it is crucial to gather more data regarding age and belief in conspiracy theories to design interventions specifically targeted to different groups to tackle the belief and spread of misinformation.

Purpose of Study & Gaps in the Literature

The purpose of the current study was to gain a better understanding of potential variables that make a person likely to vaccinate or not. This study specifically investigated several individual characteristics including age and gender, along with belief in male norms and vaccine conspiracy beliefs.

Since high vaccination rates are important to the success of bringing the pandemic to an end, the factors in understanding what makes people vaccine hesitant are critical to analyze and understand. Although past literature has examined the adherence to CDC preventative measures in relationship to age, gender, and psychological factors of male norms and conspiracist beliefs, actual vaccination status is understudied. Investigating these variables may provide valuable insight into the gender gap that exists in vaccination rates in the US. The first gap which exists is the discrepancy between reports of female vaccine hesitation and their actual vaccination status. Primary data collected prior to the formal vaccine rollout showed concern with low turnout rates amongst women, who had previously reported significantly more vaccine hesitancy than men, suggesting they would have lower levels of vaccination (Funk & Tyson, 2020). However, data from almost a year after the vaccine rolled out in 2021, showed that roughly 9.5 million more women than men had been vaccinated in the U.S (Funk & Tyson, 2020). Since then, this trend in vaccination rates has remained. One potential reason this gender gap may exist is because of the early concerns regarding women being vaccine hesitant there were more targeted efforts to promote vaccination for women. This may have led women to become less vaccine hesitant and

resulted in the male population being largely overlooked. However, there is significant evidence that focuses on how adherence to traditional masculine norms may lead to men to make riskier health decisions (DeSalvo et al., 2022). Therefore, leading them to perceive the Covid-19 virus as less problematic and reduce the need for vaccination.

Previous studies have shown that belief in both Covid-19 conspiracy theories, as well general conspiracy theories have an impact on vaccination hesitancy. Most of the previous studies have focused on conspiracy theories in general, not specifically vaccine conspiracy theories and their relation to Covid-19 vaccine status. There appears to date no study focusing on whether vaccine conspiracy theories influence Covid-19 vaccination uptake. Moreover, it is important given the mixed results on the effects of age as conspiracy beliefs to see if different age groups assess vaccine conspiracies differently.

With the information gathered from the current study the hope is that we can build upon previous literature to understand the ways in which different variables affect vaccine status. Further, the findings from this study may be used to improve vaccination rates by identifying and targeting the groups that seem to continue to have the greatest degree of vaccine hesitancy. This study's findings may be helpful in curbing the spread of the Covid-19 virus, given the serious health and psychological costs of the pandemic.

Study Hypotheses

Gender

H1: I hypothesized that men with high masculinity levels are less likely to be vaccinated against the Covid-19 virus.

H2: I hypothesized that women with high levels of masculinity are less likely to be vaccinated for the Covid-19 virus.

Age

H3: I predicted that 50-60-year-olds with high levels of masculinity are less likely to be vaccinated.

H4: I predicted that 20-30-year-olds people with high levels of masculinity are less likely to be vaccinated.

Gender & Age

H5: I predicted that 20-30-year-olds men and women with high levels of masculinity are less likely to be vaccinated.

H6: I predicted that 50-60-year-olds men and women with high levels of masculinity are less likely to be vaccinated.

Vaccine Conspiracist Beliefs

H7: I predicted that men who believe in vaccine conspiracies are less likely to be vaccinated.

H8: I predicted that women who believe in vaccine conspiracies are less likely to be vaccinated.

Vaccine Conspiracist Beliefs & Age

H9: I predicted that 20-30-year-olds who believe in vaccine conspiracy theories are less likely to be vaccinated.

H10: I predicted that 50-60-year-olds who believe in vaccine conspiracy theories are less likely to be vaccinated.

Method

Participants

Two age groups of participants were tested. The inclusion criteria was that participants fell within two specific age groups. The first group consisted of individuals between 20-30 (*M*= 25.14, *SD*=3.06) and the second age group consisted of individuals between 50-60 (*M* =55.72, *SD* =3.23) years old throughout the United States. In total there were three hundred and ninety-six participants. There were 198 participants in the 20-30 age group and 198 participants in the 50-60 age group. Participants were recruited using an online survey platform called Prime Panel. Several participants' data was excluded for the following reasons. There were originally 245 participants in the 20-30 age category; among them, 17 participants were excluded for failing to accept the informed consent, 15 participants were excluded for failing to be in the appropriate age category, and 15 participants were excluded for leaving 7 or more consecutive scale questions blank. The group of 50–60-year-olds originally had 257 participants, 15 were excluded for failing to accept the informed consent, 4 were excluded for failing to be in the appropriate age category, and 40 were excluded for failing to answer 7 or more consecutive scale questions.

Procedures

This study was approved by the Institutional Review Board (IRB) at Trinity College. The survey was created using an online platform called Qualtrics, which included an informed consent statement, demographic questions, as well as the five scales we used to measure our variables of interests. Two identical surveys were used: one for the 20–30-year-olds and one for the 50–60-year-olds. The surveys were then submitted to Prime Panel which is an online platform. Participants can voluntarily take surveys on Prime Panel for compensation given through the platform. Once we had received at least 200 participants in each category, we ended

the survey. The survey data collected from the two different surveys was then merged to make data analysis possible.

Measures

Informed Consent. The survey consisted of 36 demographic questions and 5 scales that were used to measure the variables we were investigating. Before answering these questions participants first received an informed consent form (See Appendix A) the informed consent included information about the criterion, procedure, purpose of the study, potential risks, confidentiality, and compensation information. Participants were then asked, “do you consent to participate in this study?” If they agreed, they could then begin answering survey questions. If they choose no, the study was concluded.

Survey Demographic Questions. Participants were asked 36 questions including age and gender, two variables of interest for my study (See Appendix B and Table 1). In some instances, a new question would appear based on a participant's previous response. For example, if a participant indicated they were in a relationship, a subsequent question would appear asking about the duration of this relationship.

Voluntary Vaccination: Vaccine status was assessed by asking participants if they were vaccinated against Covid-19 (vaccinated and boosted at least once or vaccinated but not boosted). Participants who reported that they were vaccinated were then asked if they were required to get the vaccine for work, school, or other reasons, and were finally asked if they would have gotten the vaccine if it was not required. Respondents who answered that they voluntarily got the vaccine or would have gotten the vaccine regardless of whether it was required were grouped into the voluntary vaccination category. Those who reported being unvaccinated or mandated but would not have gotten the vaccine if it was not required were placed in the second group (See Table 2).

Male Role Norms Scale (MRNS) – Revised Scale: Masculinity was measured using the MRNS scale which assesses respondents' agreement to 26 belief statements about the expected behavior that a man is to display (See Appendix C). The scale was developed by Thompson and Pleck (1986), but the items were originally derived from Brannon & Junni's (1984) scale, which looked at attitudes towards masculinity. The MRNS consists of 26 questions and three subscales which measure Male Status (α=.81), Toughness (α=.74), and Anti-Femininity (α=.76). Participants were asked to respond on a 7-point Likert scale, with a 1 meaning *very strongly disagree* and a 7 meaning *very strongly agree*. Two of the 26 questions were reversed scored. Higher scores on the MRNS scale indicate more traditional attitudes toward male gender norms.

Vaccine Conspiracy Beliefs Scale (VCBS): Vaccine Conspiracist thinking/beliefs was measured using the VCBS. The VCBS (α=0.93) consists of 7 questions (See Appendix D). According to Shapiro et al. (2016) there was only one survey scale that assessed vaccine conspiracy beliefs, developed by Jolley and Douglas (2014) to examine the efficacy of a conspiracy theory manipulation. To develop the VCBS, Shapiro et al. (2016), retained 6 of the 10 questions created by Jolly and Douglas (2014). The researchers then added an additional question (i.e., "the government is trying to cover up the link between vaccines and autism") due to its publicity in the media about this potential relationship. This is the version used in my study. Participants indicated how much they agree or disagree with one of the seven vaccine conspiracy belief statements on a 7-point Likert scale, with a 1 meaning *very strongly disagree* and a 7 meaning *very strongly agree.*

Results

Binary logistic regressions were conducted to test whether masculinity, and vaccine conspiracy beliefs were associated with the probability of being voluntarily vaccinated for age and gender cohorts.

Gender & Masculinity Levels

Logistic regression models were performed to test whether masculinity predicted voluntary vaccination status for males or females (see Figure 1). Masculinity was not associated with odds of voluntary vaccination amongst males, OR = 1.13, 95CI = [0.83, 1.045]. Masculinity was associated with odds of voluntary vaccination amongst females, OR=.071 95CI = [0.52, 0.97]. Among females as masculinity levels increased the likelihood of voluntary vaccination decreased.

Age & Masculinity

Logistic regression models were performed to test whether masculinity predicted voluntary vaccination status for 20-30-year-olds or 50-60-year-olds (see Figure 2). Masculinity was not associated with the odds of voluntary vaccination among 20-30-year-olds, OR = 1.01, 95CI = [0.99, 1.02]. Higher masculinity was associated with lower odds of voluntary vaccination among 50-60-year-olds, OR = .99, 95CI = [0.97, 1.00].

Gender & Age & Masculinity Levels

Logistic regression models were performed to test whether masculinity predicted voluntary vaccination status for each combination of age and gender.

Masculinity was not associated with odds of voluntary vaccination among 50-60-year-old men, OR = .99 95CI = [0.96, 1.008], or among 20-30-year-old men, OR = 1.03 95CI = [0.99, 1.06]. Masculinity was not associated with odds of voluntary vaccination among 50-60-year-old

women, OR = .99 95CI = [0.96, 1.06], or among 20-30-year-old women, OR = .98 95CI = [0.95, 1.00].

Vaccine Conspiracy Beliefs & Gender

Logistic regression models were performed to test whether vaccine conspiracy beliefs predicted voluntary vaccination status among males or females (see Figure 3). Vaccine conspiracist belief was associated with lower odds of voluntary vaccination amongst males, OR = .78 95CI = [0.63, 0.97] and females, OR = .58 95CI = [0.47, 0.73].

Vaccine Conspiracy Beliefs & Age

Logistic regression models were performed to test whether vaccine conspiracy beliefs predicted voluntary vaccination status among 20-30-year-olds or 50-60-year-olds (see Figure 4). Vaccine conspiracist beliefs were associated with lower odds of voluntary vaccination amongst 50-60-years-old, OR = .578 95CI = [0.46, 0.72] and 20-30-year-olds, OR = .796 95CI = [0.64, 0.98]

Discussion

The purpose of the present study was to gain a better understanding of potential factors which may deter a person from receiving the Covid-19 vaccination. This study specifically investigated how belief in vaccine conspiracy theories and adherence to traditional male norms, gender, and age predicted voluntary vaccination rates. Currently, there is little research that looks specifically at vaccine conspiracy theories and their impact on voluntary vaccination status. There are also very few research studies that have looked at voluntary vaccination as it relates to the psychological constructs of masculinity. In total, ten hypotheses were analyzed to gain a better understanding of how adherence to male norm roles and belief in vaccine conspiracy theories influenced the likelihood of voluntary vaccination. It was hypothesized that both males and females with high levels of masculinity would be less likely to be voluntarily vaccinated. Additionally, it was predicted that both 50-60-year-olds and 20-30-year-olds with high levels of masculinity would be less likely to be voluntarily vaccinated. It was also hypothesized that both males and females who believed in vaccine conspiracy theories were less likely to be voluntarily vaccinated. Lastly, it was hypothesized that 50-60-year-olds and 20-30-year-olds who believed in vaccine conspiracy theories were less likely to be voluntarily vaccinated.

Despite the prediction that masculinity would influence voluntary vaccination in both males and females, the results of this study only partially supported my hypotheses. Masculinity scores did not influence the likelihood of voluntary vaccination in males. Despite past literature which suggests that men are less likely to adopt positive health behaviors partly due to their adherence to masculine ideology (Mahalik et al., 2007; Oksuzyan et al., 2013), our results do not support prior research. We did not find a relationship between masculinity in males and the likelihood of voluntary vaccination. This could perhaps be due to a measurement error. There may be better ways to measure masculinity than the scale we used, since it could be outdated in terms of different behaviors associated with masculinity.

On the other hand, masculinity scores did predict voluntary vaccination in females. Females with low masculinity were more likely to be voluntarily vaccinated. This suggest that

females with less focus and adherence to traditional male norms predicts positive vaccination behaviors. Findings from Luo et al. (2022) showed that women are more likely to engage in preventive health measures and follow suggested methods to mitigate the spread of the virus. The findings for Luo e al. (2022) are congruent with my results. Perhaps, females with lower levels of masculinity are more likely to adhere to their stereotypical feminine health norms which promote voluntary vaccination within their cohort. Whereas women who adhere to traditional masculine norms might display similar characteristics as men. Specifically, they may have lower threat perception of the virus and do not feel the need to protect others because they do not adhere to their 'femmine' role.

I also hypothesized that masculinity scores would influence voluntary vaccination rates in both 50-60-year-olds and 20-30-year-olds. The results of this study only partially support my hypotheses. Masculinity scores did influence the likelihood of voluntary vaccination in 50-60-year-olds but not 20-30-year-olds. Lower masculinity scores in 50-60-year-olds lead to an increase in voluntary vaccination rates. My findings are congruent with findings from Herreen et al. (2021), where researchers looked at how aging influences the adherence to masculine norms. They found that strict conformity to masculine norms decreased significantly with age. Perhaps as people age, specifically men, they experience significant life changes such as death of close family and friends. These events can shift their priorities in life such as their attitudes towards health and self-care. Another possible explanation for why lower masculinity scores predicted higher voluntary vaccination rates in the older cohort is due to the Covid-19 virus' disproportionate health effects on older individuals than younger individuals. A study by Mueller et al. (2020) affirms that the severity and outcome of the Covid-19 virus depends on a patient's age. Specifically, adults over the age of 65 represent 80% of hospitalizations and have a much greater risk of death than those under 65. Therefore, for younger individuals contracting Covid-19 may present with only a mild cold, whereas in older individuals it could become life threatening. This could also account for the increase in voluntary vaccination in the older cohort due to outcome severity for the older population. Since older individuals are at higher risk of

severe symptoms of disease, fear of the virus and higher threat perception contribute to willingness to be vaccinated.

The lack of a relationship between masculinity scores in 20-30-year-olds could possibly stem from the way in which masculinity was measured. Our measure was created in 1986, and more contemporary evidence suggests that masculinity is changing and adapting to include more feminine traits. Therefore, the younger generation could be less likely to adhere to the same set of gender roles, stereotypes, and norms. Research by Bhatia et al. (2020), measured the changes in gender stereotypes over the course of the 20th century. Although their results found some gender bias, the strength of these biases has diminished over time. The researchers believe that this change in strength appears to be driven by changes in gender norms. Ultimately, women and men today are less constrained by perceptions of gender norms and stereotypes as they continue to change over time. Therefore, perhaps individuals in the 20-30-year-old group do not have the same belief about gender norms that the MRNS scale asked about, making it not an effective way to measure masculinity in younger individuals. Perhaps using a different more updated scale to measure masculinity would show different results. Particularly using the Conformity to Masculine Norms Inventory-46 created by Parent and Modardi (2009), might lead to different results.

In accordance with my hypothesis, the results showed that males and females who believe in vaccine conspiracy theories were less likely to be voluntarily vaccinated. The results support the findings by Capasso et al. (2022), which found that anti-vaccine conspiracy beliefs negatively influenced intention to get vaccinated. The results illustrated the negative impact that conspiracy beliefs have on trust in official sources of vaccine information, such as from the government and science (Capasso et al., 2022). While we do not have any measure for trust in the government or science in our study, it is reasonable to speculate that the individuals in our study with vaccine conspiracy beliefs also had distrust in either/or the government and science. Those who endorse vaccine conspiracy beliefs may be less trusting of both government claims and scientific findings. Hence, they are less likely to follow government suggestions (e.g.,

getting vaccinated) nor believe in scientific findings regarding the effectiveness of vaccination. Therefore, because of this distrust in the government and science and endorsement of vaccine conspiracy beliefs, this group is less likely to be voluntarily vaccinated.

Lastly, in line with our final hypothesis, the results showed that both 50-60-year-olds and 20-30-year-olds who believed in vaccine conspiracies were less likely to be voluntarily vaccinated. The results of this study are congruent with findings from Buturiou et al. (2021), which looked at the profiles of people who are more prone to both believe in vaccine conspiracy theories, as well as spread them. The researchers found that age differences did not play a role in predicting belief in conspiracy theories; instead, both younger and older people were susceptible to the belief of and the spreading of conspiracy theories. It is possible that individuals regardless of age differences are vulnerable to believe in vaccine conspiracy theories, which would subsequently impact their likelihood to be voluntarily vaccinated. Both age groups may be susceptible to false information in media that contributes to their belief in conspiracies.

Limitations

While our findings demonstrated the influence of masculinity and vaccine conspiracy beliefs on voluntary vaccination, future studies might try to clarify some of our findings. One limitation was that respondents were not required to answer every question asked on our survey scales, and in some instances left questions unanswered. Specifically, The Male Norm Role Scale, which had 26 items, had several missing responses. The presence of answered questions may have affected our results. One possible solution would be to find a shorter scale that measures masculinity or only use the specific subscale that most predicted adherence to traditional masculine ideology. Due to the length of the scale, respondents may have lost interest in the survey, which could have resulted in either rushed responses or skipped questions. By using a shorter scale, perhaps participants may be more apt to answer all survey scale questions leading to more conclusive results.

Another limitation of our study was the potential for personal reactivity also referred to as the social desirability bias. In the case of this study, it could occur if individuals altered their

responses to paint themselves in a more positive light, whether consciously or subconsciously. Given some of the questions, on the MRNS and VCBS scales, participants may not have answered questions truthfully. Instead, they may want to answer questions in a fashion that associates them with behaviors and characteristics that are more socially desirable. Although it is difficult to control for reactivity, it is important to be sure that questions are neutrally worded to reduce bias in respondents' answers. Another possible solution is to remind participants that survey responses are anonymous and cannot be traced back to them for them to answer truthfully.

Implications

One implication of our results is that individuals who believe in vaccine conspiracy theories are less likely to be voluntarily vaccinated when it comes to receiving the Covid-19 vaccine. Although this study looked specifically at Covid-19 vaccination rates, it is likely the same finding would be uncovered when looking at other controversial vaccines; those that believe in vaccine conspiracy theories are less likely to be voluntarily vaccinated and pose a serious health risk in the future if another pandemic occurs. This could lead to low uptake in vaccination, slowing the ability to reach herd immunization at an efficient rate. Given the problem of vaccine hesitancy due to vaccine conspiracist beliefs, public health officials need to put significant effort towards identifying conspiracy theories in social media and news outlet realms in their early stages to ensure they do not take hold in both the societal and political sphere and their negative influences on vaccination rates. Health officials can also work alongside social media platforms and other outlets to address misinformation and rectify it. There is also a need to increase the public's education regarding vaccine efficacy and reliability. By doing so, the hope is that people will become more willing to be voluntarily vaccinated, if they understand and believe the science that underlies the vaccine’s effectiveness.

Finally, given that individuals who believe in and adhere to traditional masculine ideology tendencies are less likely to be voluntarily vaccinated, public health campaigns should be tailored to specific populations who are vaccine hesitant, such as males, especially 20-30-

year-olds since they may be more likely to enforce masculine beliefs. These campaigns could frame vaccination in a way that would appeal to males of different ages by showing that vaccination is an act of strength and responsibility to protect family members.

Future Research

The results of my study show that belief in vaccine conspiracy theories predict vaccine decisiveness and hesitation regarding the Covid-19 vaccine. Therefore, it is critical for future public health research to investigate how to identify and target vaccine conspiracy theories and debunk them to ensure the circulation of accurate information especially during public health crises like the Covid-19 pandemic. By finding effective methods which can be used to combat the increased proliferation of misinformation and vaccine conspiracies during times of public health crisis, increased levels of vaccination could become the reality if similar situations occur in the future.

This study focused on participants in the United States who share a relatively similar view of the traditional masculine ideology. Future research should attempt to gain a better global perspective on the relationship between masculinity and vaccination status in other cultural or ethnic groups around the world. It is important to see if our results are compatible with other cultures' concepts of masculinity. Research could examine how belonging to different cultural or ethnic groups around the world may vary in both the way they define the masculine ideology and the health implications that may come along with the conformity to their definitions of femininity and masculinity.

Lastly, future research should focus on identifying individuals' motivation for vaccination. A significant number of individuals noted that they only received the vaccine because it was required, either because of their work or school, but otherwise they would not have received it. It is therefore important to identify the psychological factors which motivated those individuals who were vaccinated voluntarily not because of a mandate. Therefore, by researching what psychological factors are important and identifying them, these factors can be used as a motivational technique to increase vaccination uptake among hesitant populations.

More so, once these motivation factors are identified researchers can determine which motivation factors are most effective for certain socio-demographic groups.

Conclusion

The Covid-19 pandemic was a global concern which spread fear and uncertainty about the future throughout the entire world. Despite the development and distribution of an effective vaccine to combat the Covid-19 virus, vaccination rates remained low which made both herd immunity and mitigation of the virus hard to achieve. Only almost 4 years later did the WHO leaders express that sometime this year they will declare an end to the Covid-19 pandemic (KFF Health News). However, we are left to wonder how much faster the pandemic could have ended as well as how less detrimental an effect the pandemic could have had on the economy and public health services if vaccination rates were high and herd immunity had been reached sooner. The results of my study illustrate several factors that impact voluntary vaccination rates today. Knowing what factors impact vaccination could offer potential guidance and insight in the future to identify cohorts early which may display vaccination hesitancy and target them specifically to encourage vaccination. Although the Covid-19 pandemic was the most recent it was not the first pandemic, nor will it be the last. Therefore, it is critical that researchers take the opportunity to learn from the Covid-19 pandemic and continue to investigate factors which threaten vaccination.

References

Allcott, H., Boxell, L., Conway, J., Gentzkow, M., Thaler, M., & Yang, D. (2020). Polarization and public health: Partisan differences in social distancing during the coronavirus pandemic. *Journal of Public Economics, 191*, 1-10. https://doi.org/10.1016/j.jpubeco.2020.104254

American Psychological Association. *Answers to your questions about transgender people, gender identity, and gender expression.* 2011 [cited 2015 February 1]; Available from: http://www.apa.org/topics/lgbt/transgender.aspx.

American Psychological Association. (n.d.). Gender Role. In *APA dictionary of psychology*. Retrieved February 23, 2023, from https://dictionary.apa.org/gender-role

American Psychological Association. (n.d.). Gender Stereotype. In *APA dictionary of psychology*. Retrieved February 23, 2023, from https://dictionary.apa.org/gender-stereotype

Bertin, P., Nera, K., & Delouvée, S. (2020) Conspiracy Beliefs, Rejection of Vaccination, and Support for hydroxychloroquine: A Conceptual Replication-Extension in the COVID-19 Pandemic Context. *Front. Psychology,11*, 1-9. doi: 10.3389/fpsyg.2020.565128

Bish, A., Yardley, L., Nicoll, A., & Michie, S. (2011). Factors associated with uptake of vaccination against pandemic influenza: a systematic review. *Vaccine*, *29*(38), 1-8. https://doi.org/10.1016/j.vaccine.2011.06.107

Bhatia, N., & Bhatia, S. (2021). Changes in Gender Stereotypes Over Time: A Computational Analysis. *Psychology of Women Quarterly*, *45*(1), 106–125. https://doi.org/10.1177/0361684320977178

Buturoiu, R.; Udrea, G.; Oprea, D.-A.; Corbu, N. Who Believes in Conspiracy Theories about the COVID-19 Pandemic in Romania? An Analysis of Conspiracy Theories Believers' Profiles. *Societies* 2021, *11*, 138. https://doi.org/10.3390/soc11040138

Byford, J. (2011). *Conspiracy theories: A critical introduction*. Basingstoke, United Kingdom: Palgrave MacMillan.

Byrne, A., Barber, R. & Lim, C.H. (2021). Impact of the COVID-19 pandemic – a mental health service perspective. *Prog. Neurol. Psychiatry, 25*, 27-33. https://doi.org/10.1002/pnp.708

Capasso Miriam, Caso Daniela, Zimet Gregory D.The Mediating Roles of Attitude Toward COVID-19 Vaccination, Trust in Science and Trust in Government in the Relationship Between Anti-Vaccine Conspiracy Beliefs and Vaccination Intention.Frontiers in Psychology,13, 2022. DOI=10.3389/fpsyg.2022.936917

Caycho-Rodríguez, T., Ventura-León, J., Valencia, P. D., Vilca, L. W., Carbajal-León, C., Reyes-Bossio, M., White, M., Rojas-Jara, C., Polanco-Carrasco, R., Gallegos, M., Cervigni, M., Martino, P., Palacios, D. A., Moreta-Herrera, R., Samaniego-Pinho, A., Lobos Rivera, M. E., Buschiazzo Figares, A., Puerta-Cortés, D. X., Corrales-Reyes, I. E., Calderón, R., … Petzold, O. (2022). What Is the Support for Conspiracy Beliefs About COVID-19 Vaccines in Latin America? A Prospective Exploratory Study in 13 Countries. *Frontiers in psychology*, *13*, 1-14. https://doi.org/10.3389/fpsyg.2022.855713

Centers for Disease Control and Prevention (2023-03-28). Coronavirus Disease 2019 (COVID-19) - U.S. Vaccination Trends by Demographic Characteristics, National: Vaccination Status by Demographic Characteristics | People with at least one dose | People who are fully vaccinated | Female | Male, 10/19/2022. Sage Data. Sage Publishing Ltd. (Dataset). Dataset-ID: 005-072-001

Centers for Disease Control and Prevention. (2023, March 15). *CDC Museum Covid-19 Timeline*. Centers for Disease Control and Prevention. Retrieved March 29, 2023, from https://www.cdc.gov/museum/timeline/covid19.html

Commissioner, O. of the. (2021, May 23). *FDA approves first COVID-19 vaccine*. U.S. Food and Drug Administration. Retrieved March 29, 2023, from https://www.fda.gov/news-events/press-announcements/fda-approves-first-Covid-19 -vaccine John Hopkins

CoronaVirus Research Center. (2023, March 03). Vaccine Research & Development. https://coronavirus.jhu.edu/vaccines/timeline

DeSalvo, N., Lacasse, K., & Jackson, T. E. (2022). Gender norms shape perceived threat to self and others and mask wearing behavior in response to COVID-19. *Translational Issues in Psychological Science*, *8*(3), 311–322. https://doi.org/10.1037/tps0000328

Douglas, K.M., Uscinski, J.E., Sutton, R.M., Cichocka, A., Nefes, T., Ang, C.S. and Deravi, F. (2019). Understanding Conspiracy Theories. *Political Psychology*, *40*, 3-35. https://doi.org/10.1111/pops.12568

Eikenberry, S. E., Mancuso, M., Iboi, E., Phan, T., Eikenberry, K., Kuang, Y., Kostelich, E., & Gumel, A. B. (2020). To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic. *Infectious Disease Modelling*, *5*, 293–308. https://doi.org/10.1016/j.idm.2020.04.001

Elflein, J. (2021, February 25). *Reasons for not intending to get the COVID-19 vaccine among adults U.S. 2020*. Statista. Retrieved March 29, 2023, from https://www.statista.com/statistics/1211925/reasons-for-not-intending-to-get-covid-vaccination-among-us-adults/

Fitzpatrick, M., et al. "Two Years of U.S. COVID-19 Vaccines Have Prevented Millions of Hospitalizations and Deaths," *To the Point* (blog), Commonwealth Fund. https://doi.org/10.26099/whsf-fp90

Fleming, P. J., & Agnew-Brune, C. (2015). Current Trends in the study of Gender Norms and Health Behaviors. *Current opinion in psychology*, *5*, 72–77. https://doi.org/10.1016/j.copsyc.2015.05.001

Funk, C., & Tyson, A. (2020). Intent to get a Covid-19 Vaccine Rises to 60% as Confidence in Research and Development Process Increases. *Pew Research Center.*

Harrison, J., Chin, J. & Ficarrotto, T. (1992) Warning: Masculinity May Be Dangerous to Your Health. *Men's Lives*, 271-285.

Hildt-Ciupińska K, Pawłowska-Cyprysiak K. Positive Health Behaviors and Their Determinants Among Men Active on the Labor Market in Poland. *American Journal of Men's Health*. 2020;14(1). doi:10.1177/1557988319899236

Jolley, D., & Douglas, K.M. (2014) The Effects of Anti-Vaccine Conspiracy Theories on Vaccination Intentions. *PLoS ONE 9*(2), 1-9. https://doi.org/10.1371/journal.pone.0089177

Keeley, B. L. (1999). Of conspiracy theories. *Journal of Philosophy*, *96*, 109–126. https://doi.org/10.2139/ssrn.1084585

Luo, Y. F., Yang, S. C., Hung, S. C., & Chou, K. Y. (2022). Exploring the Impacts of Preventative Health Behaviors with Respect to COVID-19: An Altruistic Perspective. *International journal of environmental research and public health*, *19*(13), 7573. https://doi.org/10.3390/ijerph19137573

Lazarus, J.V., Wyka, K., White, T.M. *et al.* (2022). Revisiting COVID-19 vaccine hesitancy around the world using data from 23 countries in 2021. *Nature Communications*, *13*, 1-12. https://doi.org/10.1038/s41467-022-31441-x

MacDonald, N. E., & SAGE Working Group on Vaccine Hesitancy. (2015). Vaccine hesitancy: Definition, scope, and determinants. Vaccine, 33(34), 4161– 4164. https://doi.org/10.1016/j.vaccine.2015.04.036

Maftei, A., & Holman, A. C. (2021). SARS-CoV-2 Threat Perception and Willingness to Vaccinate: The Mediating Role of Conspiracy Beliefs. *Frontiers in psychology*, *12*, 1-6. https://doi.org/10.3389/fpsyg.2021.672634

Mahalik, J. R., Bianca, M. D., & Harris, M. P. (2022). Men's attitudes toward mask-wearing during COVID-19: Understanding the complexities of mask-ulinity. *Journal of health psychology*, *27*(5), 1187–1204. https://doi.org/10.1177/1359105321990793

Mahalik, J. R., Burns, S. M., & Syzdek, M. (2007). Masculinity and perceived normative health behaviors as predictors of men's health behaviors. *Social science & medicine*, *64*(11), 2201-2209. https://doi.org/10.1016/j.socscimed.2007.02.035

Mahalik, J. R., Levi-Minzi, M., & Walker, G. (2007). Masculinity and health behaviors in Australian men. *Psychology of Men & Masculinity, 8*(4), 240–249. https://doi.org/10.1037/15249220.8.4.240

McCarthy, M., Murphy, K., Sargeant, E., & Williamson, H. (2022). Examining the relationship between conspiracy theories and COVID-19 vaccine hesitancy: A mediating role for perceived health threats, trust, and anomie? *Anal Soc Issues Public Policy*, *22*, 106– 129. https://doi.org/10.1111/asap.12291

Mueller, A. L., McNamara, M. S., & Sinclair, D. A. (2020). Why does COVID-19 disproportionately affect older people?. Aging, 12(10), 9959–9981. https://doi.org/10.18632/aging.103344

Noone, J.H. & Stephens, C. (2008), Men, masculine identities, and health care utilization. *Sociology of Health & Illness, 30*, 711-725. https://doi.org/10.1111/j.1467-9566.2008.01095.x Oksuzyan, A., Juel, K., Vaupel, J. W., & Christensen, K. (2008). Men: good health and high mortality. Sex differences in health and aging. *Aging clinical and experimental research*, *20*(2), 91 102. https://doi.org/10.1007/BF03324754

Otterbring, T., & Festila, A. (2022). Pandemic prevention and personality psychology: Gender differences in preventive health behaviors during COVID-19 and the roles of agreeableness and conscientiousness. Journal of Safety Science and Resilience, 3(1), 87–91. https://doi.org/10.1016/j.jnlssr.2021.11.003

Parent, M. C., & Moradi, B. (2011). An abbreviated tool for assessing conformity to masculine norms: Psychometric properties of the Conformity to Masculine Norms Inventory-46. *Psychology of Men & Masculinity*, *12*(4), 339–353. https://doi.org/10.1037/a0021904

Pederson, E. L., & Vogel, D. L. (2007). Male gender role conflict and willingness to seek c ounseling: Testing a mediation model on college-aged men. *Journal of Counseling Psychology, 54*(4), 373–384. https://doi.org/10.1037/0022-0167.54.4.373

Pigden, C. (1995). Popper revisited, or what is wrong with conspiracy theories? *Philosophy of the Social Sciences*, *25*, 3–34. https://doi.org/10.1177/004839319502500101

PRB. (2001, September 1). *Around the globe, women outlive men*. Around the Globe, Women Outlive Men. Retrieved March 29, 2023, from https://www.prb.org/resources/around-the-globe-women-outlive-men/

Ratzan, S. C., Sommariva, S., & Rauh, L. (2020). Enhancing global health communication during a crisis: lessons from the COVID-19 pandemic. *Public health research & practice*, *30(2)*, 1-6. https://doi.org/10.17061/phrp3022010

Roccato, M., Pacilli, M.G., Orlando, G. *et al.* (2022). Masculinity, Perceived Vulnerability to COVID-19, and Adoption of Protective Behaviors. *Sexuality & Culture,* 26, 2171–2186. https://doi.org/10.1007/s12119-022-09991-5

Romer, D., & Jamieson, K. H. (2020). Conspiracy theories as barriers to controlling the spread of COVID-19 in the U.S. *Social science & medicine*, *263*, 1-6. https://doi.org/10.1016/j.socscimed.2020.113356

Sloan, C., Conner, M., & Gough, B. (2015). How does masculinity impact health? A quantitative study of masculinity and health behavior in a sample of UK men and women. *Psychology of Men & Masculinity*, *16*(2), 206–217. https://doi.org/10.1037/a0037261

Solís-Arce, J.S., Warren, S.S., Meriggi, N.F. *et al.* (2021). COVID-19 vaccine acceptance and hesitancy in low- and middle-income countries. *Nat Med, 27*, 1385–1394. https://doi.org/10.1038/s41591-021-01454-y

Spencer, R.A., Rehman, L. & Kirk, S.F. (2015). Understanding gender norms, nutrition, and physical activity in adolescent girls: a scoping review. *Int J Behav Nutr Phys Act, 12*(6), 1-10. https://doi.org/10.1186/s12966-015-0166-8

Tan, J., Yoshida, Y., Ma, KK. *et al.* Gender differences in health protective behaviours and its i mplications for COVID-19 pandemic in Taiwan: a population-based study. *BMC Public Health* 22, 1900 (2022). https://doi.org/10.1186/s12889-022-14288-1

Turnure, J. (2021). President Trump touts Covid-19 vaccine rollout, signs order to give Americans first access [Video]. KX News. https://www.kxnet.com/news/washington-

dc/president-trump-touts-covid-19-vaccine-rollout-signs-order-to-give-americans-first-access/amp/

Veronese, N., Saccaro, C., Demurtas, J., Smith, L., Dominguez, L. J., Maggi, S., & Barbagallo, M. (2021). Prevalence of unwillingness and uncertainty to vaccinate against COVID-19 in older people: A systematic review and meta-analysis. *Aging research reviews*, *72*, 1-9. https://doi.org/10.1016/j.arr.2021.101489

Vijaykumar, S., Jin, Y., Rogerson, D. *et al.* How shades of truth and age affect responses to COVID-19 (Mis)information: randomized survey experiment among WhatsApp users in UK and Brazil. *Humanit Soc Sci Commun* 8, 88 (2021). https://doi.org/10.1057/s41599-021-00752-7

Waldron, I. (1997). Changing gender roles and gender differences in health behavior. *Handbook of health behavior research, 1,* 303–328.

World Health Organization. (2022, May 17). *Statement for healthcare professionals: How COVID-19 vaccines are regulated for safety and effectiveness (revised March 2022)*. World Health Organization. Retrieved March 29, 2023, from https://www.who.int/news/item/17-05-2022-statement-for-healthcare-professionals-how-Covid-19 -vaccines-are-regulated-for-safety-and-effectiveness

World Health Organization. (n.d.). *Statement on the fourteenth meeting of the International Health Regulations (2005) emergency committee regarding the coronavirus disease (COVID-19) pandemic*. World Health Organization. Retrieved March 29, 2023, from https://www.who.int/news/item/30-01-2023-statement-on-the-fourteenth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(Covid-19)-pandemic

World Health Organization . (2022, April 18). *Vaccine development, testing, and regulation*. History of Vaccines RSS. Retrieved March 29, 2023, from https://historyofvaccines.org/vaccines-101/how-are-vaccines-made/vaccine-development-testing-and-regulation

Wood, M. J., Douglas, K. M., & Sutton, R. M. (2012). Dead and alive: Beliefs in contradictory conspiracy theories. *Social Psychological and Personality Science*, *3*(6), 767–773. https://doi.org/10.1177/1948550611434786

Zarulli, V., Barthold, J. A., Oksuzyan, A., Lindahl-Jacobsen, R., Christensen, K., & Vaupel, J. W. (2018). Women live longer than men even during severe famines and epidemics. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(4), 832–840. https://doi.org/10.1073/pnas.1701535115

Zintel, S., Flock, C., Arbogast, A.L., Forster, A., Wagner, C., & Siverding, M. (2022). Gender differences in the intention to get vaccinated against COVID-19: a systematic review and meta-analysis. *J Public Health (Berl.),* 1-23.https://doi.org/10.1007/s10389-021-01677-w

Zwolinsky S., Raine G., Robertson S. (2016). Prevalence, co-occurrence, and clustering of lifestyle risk factors among UK men. *Journal of Men's Health*, 12(2), 15–24.

Tables

Table 1.
Demographic Characteristics of Respondents

Baseline Characteristics	Frequency	Percentage
Age Group		
20-30 years old	198	50.00
50-60 years old	198	50.00
Gender		
Male	183	46.21
Female	211	53.28
Non-Binary/Transgender/Refused	2	0.51
Race		
White	244	61.52
Asian	10	2.53
Black/African American	75	18.94
Hispanic/Latino	48	12.12
Other/Multiple Races	17	4.29
Prefer not to say	2	0.5
Educational Attainment		

Less Than High School	13	3.28
High School Diploma/Equivalent	135	34.09
Some College; No Degree	117	29.55
Associate degree	54	13.65
Bachelor's degree or more	77	19.44
Marital Status		
Married	97	24.49
Single	175	44.19
In a Relationship not Married	54	13.64
Divorced/separated	52	13.13
Widowed	11	2.79
Prefer not to say	7	1.77
Religious Affiliation		
Christian	240	60.61
Non-Christian Religions	30	7.58
Agnostic/Atheist	32	8.08
Not Religious	93	23.48
Prefer not to say	1	0.25

Political Orientation

Very Liberal	49	12.37
Liberal	60	15.15
Moderate	186	46.97
Conservative	61	15.40
Very Conservative	38	9.60
Prefer not to say	2	0.51

Table 2.
Vaccination Status by Age and Gender

	Voluntarily Vaccinated or Mandated but Would Have Gotten Vaccine		**Unvaccinated or Mandated and Would Not Have Gotten Vaccine**	
Age/Gender	Frequency	Percentage	Frequency	Percentage
50–60-Year-Old Males	48	56.5	37	43.5
50–60-Year-Old Females	69	61.1	43	38.1
20-30-Year-Old Males	58	59.2	40	40.8
20-30-Year-Old Females	45	45.9	53	54.1

Figures

Figure 1

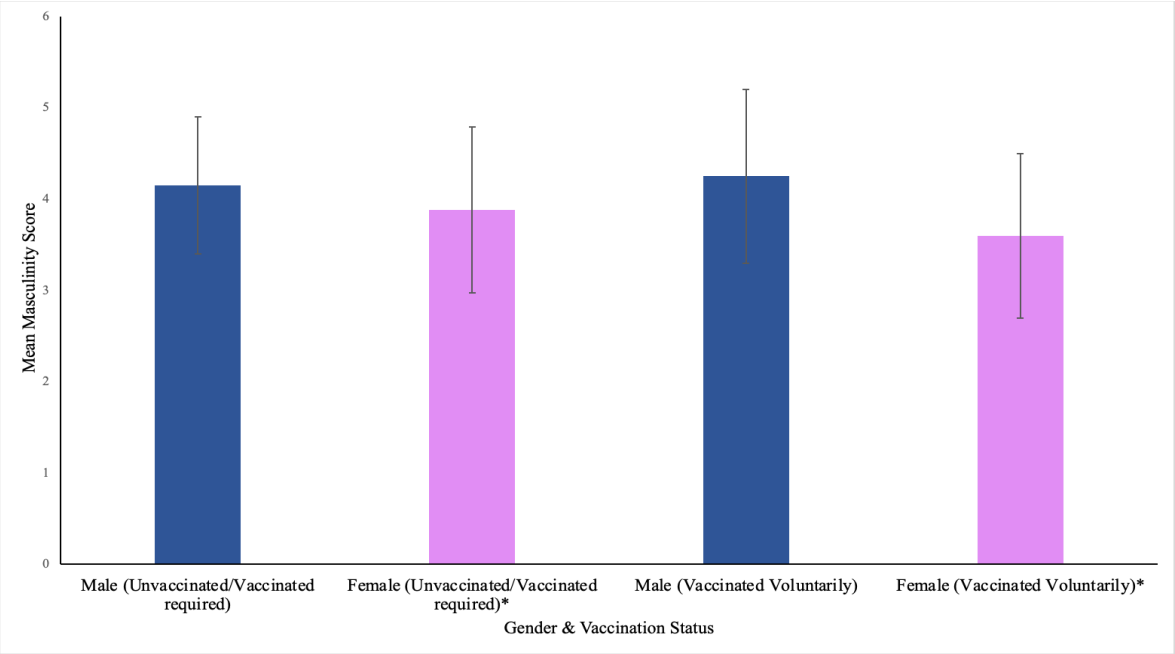


Figure 2

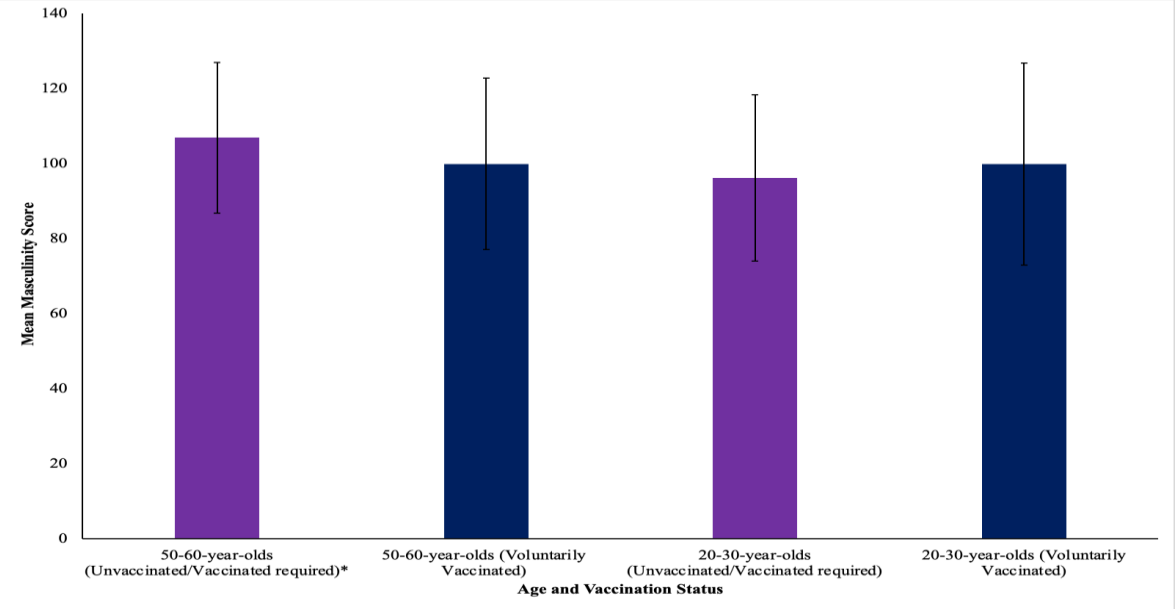


Figure 3

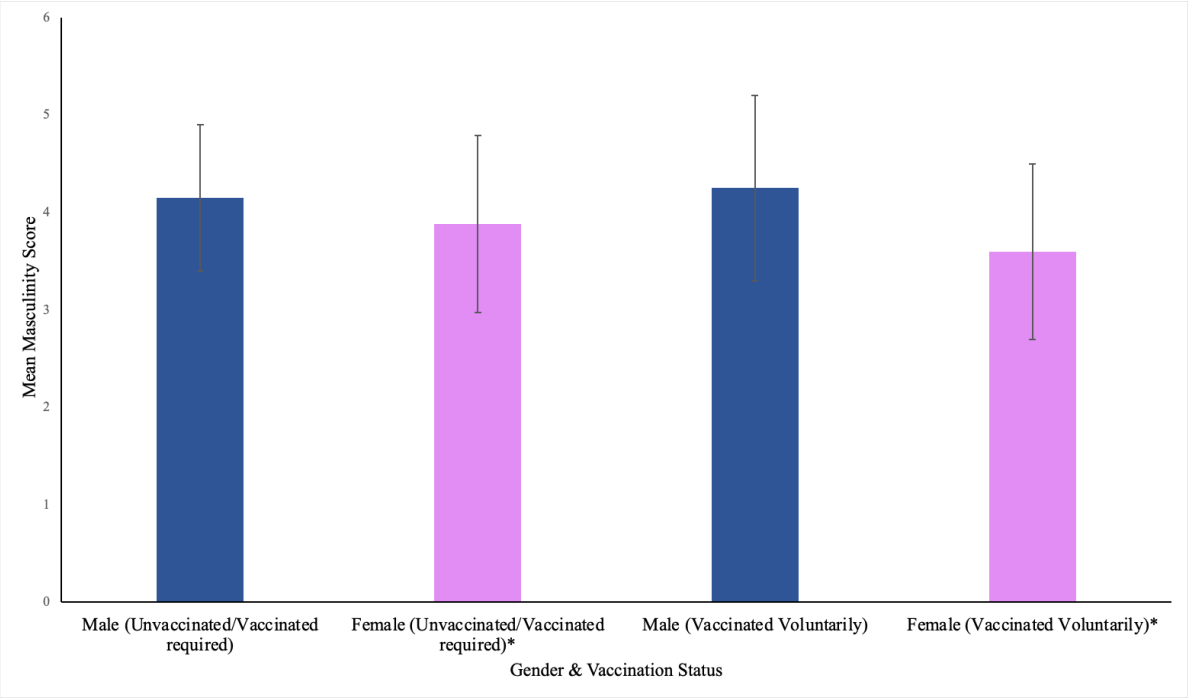
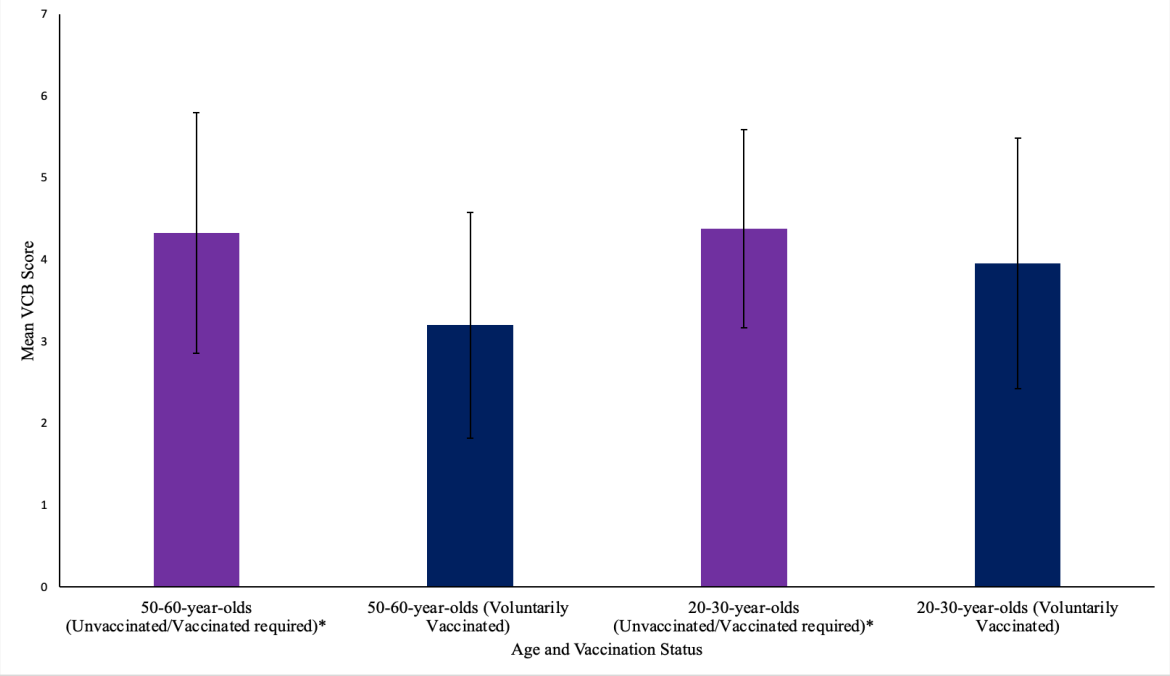


Figure 4



Appendices

Appendix A

Request to Participate in Research

We invite you to participate in a web-based survey about your Covid-19 vaccination status. Approximately 400 (200 males and 200 females) adults in the United States will take part in this study. You DO NOT need to be vaccinated to participate in this study. To complete the survey, however, you must meet the following criterion:

(1) Be at least 18 years of age

Purpose of this Research

This study is designed to better understand the reasons why a person may or may not be vaccinated for Covid-19.

Procedure

This study involves completing a one-time, web-based survey. It should take 20-25 minutes. You will be asked a series of general demographic questions about yourself, and then some specific questions about the Covid-19 virus and vaccine. The last section includes five brief scales that we will use to measure some of our variables.

Risks or Discomfort

Because this survey is anonymous, the risks involved in completing it are minimal. Although we inquire about your and your family's health status there is no way for your responses to be linked back to your specific identity. If you are uncomfortable answering any of the questions, you may choose not to answer that question.

Confidentiality

All information obtained in this survey will be treated confidentially. The survey is completely anonymous, meaning no identifiable information will be attached to your survey responses. Information from the survey will be kept on password-protected computers and only the research team will have access to these records to preserve confidentiality. Records will be kept in our laboratory for a minimum of 3 years.

Compensation

Upon completion of the study, you will receive compensation in the amount you have agreed to with the platform (prime panel) through which you entered this survey.

Voluntary Participation

The decision to complete this survey is voluntary. You may refuse to answer any question asked in the survey. Even if you begin the online survey, you may stop at any time by closing your web browser. Please note, however, if your survey is not almost entirely complete, you will not be compensated.

Questions/Concerns

If you have any questions about your rights as a research participant please contact the IRB Administrator at Trinity College (irb@trincoll.edu).

If you have any questions or concerns about the survey, please contact:

Co-Principle Investigator Molly Menounos at molly.menounos@trincoll.edu or Victoria Furlan at victoria.furlan@trincoll.edu or Research Supervisor Dina Anselmi, Ph.D. (faculty at Trinity College, CT) at dina.anselmi@trincoll.edu or Dan Douglas (faculty at Trinity College at Trinity College, CT) at daniel.douglas@trincoll.edu

By clicking "yes" below, you are indicating you are 18 years of age and that you consent to participate in this study. Please print out a copy of this consent form for your records.

- Yes
- No

Appendix B

Demographic Questions

Age

1. How old are you? (In years) _____

Gender

2. What do you identify as? (Drop-down menu)
    a. Male
    b. Female
    c. Nonbinary
    d. Transgender
    e. Other (Please specify) _____
    f. Prefer not to say

Race/Ethnicity

3. Check the box(es) of the racial group(s) that best describes you:
    a. American Indian/Alaskan Native
    b. Asian or Asian American
    c. Black or African American
    d. Caucasian (white)
    e. Middle Eastern
    f. Native Hawaiian or Pacific Islander
    g. Other (Please specify) _____
    h. Prefer not to say
4. Check the box of the ethnicity that best describes you
    a. Hispanic or Latino
    b. Not Hispanic or Latino

Geographic Location

5. Which region of the United States do you currently reside in?
    a. Northeast (Maine, New Hampshire, Vermont, New York, Connecticut, Massachusetts, Rhode Island, New Jersey, Pennsylvania)
    b. South (Maryland, Delaware, West Virginia, Virginia, District of Columbia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Arkansas, Mississippi, Louisiana, Oklahoma, Texas)
    c. Midwest (North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Illinois, Indiana, Ohio, Michigan, Wisconsin)
    d. West (Montana, Wyoming, Colorado, New Mexico, Arizona, Nevada, Utah, Idaho, Washington, Oregon, California, Hawaii, Alaska)

Relationship Status

6. What is your current relationship status?
    a. Single
    b. In a relationship but not married
    c. Married
    d. Divorced or separated
    e. Widowed
7. If you are presently in a relationship or married how long have you been in this relationship?
    a. Less than a year
    b. 1-3 years
    c. 3-8 years
    d. 8 years or more
8. If you are not in a relationship now but were in an earlier period, how long were in that relationship?
    a. Less than a year

b. 1-3 years
c. 3-8 years
d. 8 years or more

Political ideology/orientation

9. How would you describe your political views on social issues?
    a. Very liberal
    b. Liberal
    c. Moderate
    d. Conservative
    e. Very conservative
10. How would you describe your political views on economic issues?
    a. Very liberal
    b. Liberal
    c. Moderate
    d. Conservative
    e. Very conservative
11. How would you describe your overall political orientation?
    a. Very liberal
    b. Liberal
    c. Moderate
    d. Conservative
    e. Very conservative

Religious Ideology

12. What is your religious background?
    a. Agnostic
    b. Atheist
    c. Buddhist
    d. Christian (sub-question)
        Catholic
        Eastern Rite Catholic
        Protestant (please specify)_____
        Non Denominational
    e. Hindu
    f. Jewish
    g. Muslim
    h. Other, please specify
    i. Not religious
13. How religious are you currently?
    a. Not religious
    b. Slightly religious

c. Moderately religious
d. Very religious

Household/Earned Income

14. What is your family's household income?
    a. Less than 35,000 per year
    b. $35,000-$75,000
    c. $75,001-$150,000
    d. More than $150,000

Educational Level

15. What is the highest level of education you've completed?
    a. Less than High School
    b. High School Diploma or Equivalent
    c. Some College, No Degree
    d. Associate degree
    e. Bachelor's Degree
    f. More than a bachelor's degree (e.g., Master's, JD, PhD)

Vaccine Status

16. What is your Covid-19 vaccination status?
    a. Not vaccinated
    b. Vaccinated, but not boosted
    c. Vaccinated and boosted at least once
17. Were you required to get the Covid-19 vaccine for work or another reason?
    a. Yes

    If so, why were you required to get the vaccine? _____

    b. No
18. If you answered "Yes" to the previous question, would you have gotten the Covid-19 vaccine if it wasn't required?
    a. Yes
    b. No
    c. Unsure

Vaccination status of partner/spouse

19. What is your partner/spouse's Covid-19 vaccination status?
    a. Not vaccinated
    b. Vaccinated, but not boosted
    c. Vaccinated and boosted at least once
    d. I don't have a partner/spouse

Health Status

20. Do you have any preexisting health complications that influenced your decision to get the Covid-19 vaccine?
    a. Yes

What is the health issue(s)_____

b. No
c. Unsure

21. If you responded “yes” to the last question, how did it influence your decision to get vaccinated?
    a. It made me get vaccinated
    b. It made me not get vaccinated
    c. N/A

Health status of partner/spouse or family members

22. Does your partner/spouse or family member(s) have any preexisting health complications?
    a. Yes

    What is the health issue(s)_____

    b. No
23. If you answered “yes” to the previous question, how did it influence your decision to get vaccinated?
    a. It made me get vaccinated
    b. It made me not get vaccinated
    c. Unsure

Appendix C

Male Norm Role Scale (MRNS)

Rate how much you agree with each statement on a 1-7 scale. 1 Being very strongly disagree and 7 very strongly agree.

1. Success in his work has to be a man's central goal in this life.
2. The best way for a young man to get the respect of other people is to get a job, take it seriously, and do it well.
3. A man owes it to his family to work at the best paying job he can get.
4. A man should generally work overtime to make more money whenever he has the chance.
5. A man always deserves the respect of his wife and children.
6. It is essential for a man to always have the respect and admiration of everyone who knows him.
7. A man should never back down in the face of trouble.
8. I always like a man who's totally sure of himself.
9. A man should always think everything out coolly and logically and have rational reasons for everything he does.
10. A man should always try to project an air of confidence even if he really doesn't feel confident inside.

11. A man must stand on his own two feet and never depend on other people to help him do things.
12. When a man is feeling a little pain, he should try not to let it show very much.
13. Nobody respects a man very much who frequently talks about his worries, fears, and problems.
14. A good motto for a man would be "When the going gets tough, the tough get going."
15. I think a young man should try to become physically tough, even if he's not big.
16. Fists are sometimes the only way to get out of a bad situation.
17. A real man enjoys a bit of danger now and then.
18. In some kinds of situations, a man should be ready to use his fists, even if his wife or his girlfriend would object.
19. A man should always refuse to get into a fight, even if there seems to be no way to avoid it.
20. It bothers me when a man does something that I consider "feminine."
21. A man whose hobbies are cooking, sewing, and going to the ballet probably wouldn't appeal to me.
22. It is a bit embarrassing for a man to have a job that is usually filled by a woman.
23. Unless he was really desperate, I would probably advise a man to keep looking rather than accept a job as a secretary.
24. If I heard about a man who was a hairdresser and a gourmet cook, I might wonder how masculine he was.
25. I think it's extremely good for a boy to be taught to cook, sew, clean, the house, and take care of younger children.
26. I might find it a little silly or embarrassing if a male friend of mine cried over a sad love scene in a movie.

Appendix D

Vaccine Conspiracy Beliefs Scale

Rate how much you agree with each statement on a 1-7 scale. 1= Being very strongly disagree and 7 = being very strongly agree.

1. Vaccine safety data is often fabricated.
2. Immunizing children is harmful, and this fact is covered up.
3. Pharmaceutical companies cover up the dangers of vaccines.
4. People are deceived about vaccine efficacy.
5. Vaccine efficacy data is often fabricated.
6. People are deceived about vaccine safety.
7. The government is trying to cover up the link between vaccines and autism.