THE INFLUENCE OF PERSONALITY ON COMPLIANCE WITH COVID-19 PUBLIC HEALTH PROTECTION MEASURES: THE ROLE OF PROSOCIAL BEHAVIOR

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Abstract

The COVID-19 pandemic has affected the lives of people worldwide. Governments struggled to persuade citizens to obey ongoing lockdowns and social restrictions to fight the transmission of the virus. The purpose of this paper is to investigate the impact of prosocial behavior during COVID-19 and big-five personality traits on compliance with health-protective behavior against COVID-19. To examine possible predictors an online questionnaire was delivered to undergraduate students at a public university of Athens during the second phase of the pandemic (November 2020). A mediation analysis was performed to test the relationships among variables. The sample consisted of 239 business school students and the results revealed that two of the big-five personality traits of young adults, conscientiousness, and neuroticism, can be linked with a positive attitude to following heath precautions and recommendations while conscientiousness and agreeableness are predictors of young adults' prosociality behavior to cope with the COVID-19 pandemic. Finally, the results indicated that there is not any effect of young adults' personality traits on health recommendation through the mediation of prosociality. The results will contribute to the recent literature (Campos-Mercade, Meier, Schneider, & Wengström, 2021; Miles, Andiappan, Upenieks, & Orfanidis, 2021) on the factors influencing prosocial decision-making regarding the pandemic.

Keywords: COVID-19 Pandemic, Prosociality, Big Five Personality Traits, Health Behavior, Health Protection Measures, Behavioral Compliance

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1. INTRODUCTION

The recent outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing the COVID-19 pandemic of acute respiratory disease (coronavirus disease 2019) has major implications for human health and public health systems worldwide (Hu, Guo, Zhou, & Shi, 2021) and has affected every aspect of individual, family, work and modern social life in multiple ways since it first

started in late 2019 till now (Bavel et al., 2020; Campos-Mercade et al., 2021). In this global health emergency context, taking protection measures and implementing constraints on population movement to rapidly slow the spread of the virus in the population has been of priority in almost all countries worldwide (Han et al., 2020; Maqbool & Khan, 2020). According to UNESCO, UNICEF, and World Bank (2021), in the first year of the pandemic, at least 186 countries worldwide applied measures for social distancing while 82 of them instituted partial or full lockdowns. However, although these measures might have a positive impact on the prevention of virus transmission, they also had important inferences on every social and economic aspect of human lives (Han et al., 2020).

The main challenge that governments faced worldwide was to develop highly effective communication policies to persuade the public on adopting a wide range of health protection behavior styles, such as social distancing, staying indoors, voluntary quarantine (self-quarantine), personal protective equipment, face masking, cleaning and disinfecting, frequent hand washing and other mandatory measures, such as isolation, quarantines, school and workplace closures (Güner, Hasanoğlu, & Aktaş, 2020). Particularly, social distancing and face masking have become a part of daily life and at the same time a basic and important tool for protecting ourselves and others around us. Making people easily cope with all the stressful long-lasting measures is not an easy process though. Maqbool and Khan (2020) in their recent study regarding the barriers to implementing public health and social measures to prevent COVID-19, identified a number of obstacles in this process, including but not limited to the following: lack of safety and administrative commitment from the public, lack of proper communication between health advisors and the public, deprived safety culture, lack of support at the community level, absence of resources for implementing public health, social measures and public stigmatization.

Recent studies on the topic are focusing on the relationship between personality-prosocial behavior and compliance with health recommendations and measures to prevent the spread of COVID-19 (Abdelrahman, 2022; Aschwanden et al., 2021; Bavel et al., 2020; Campos-Mercade et al., 2021; de Francisco Carvalho, Pianowski, & Gonçalves, 2020; Clark, Davila, Regis, & Kraus, 2020; Dinić & Bodroža, 2021; Valenti & Faraci, 2021). As demonstrated in the literature, prosocial behavior traits and skills seem to be essential in developing such health protection patterns in multiple ways (Campos-Mercade et al., 2021; Miles et al., 2021). In particular, it is suggested that individuals with high prosocial skills are more likely to cooperate when asked to follow strict health or other guidelines and measures (Campos-Mercade et al., 2021).

The focus of this research is to investigate certain personality characteristics as an important factor that could contribute to this tremendously difficult task of adopting health compliance behavior in a period of the public health crisis. An effort is made to examine the big-five personality traits — conscientiousness, neuroticism, openness, extroversion, and agreeableness — and prosociality as possible strong predictors in compliance with public health recommendations and measures during the COVID-19 pandemic. Especially, because socializing and interface communication are the core of human nature, it is easy to understand how challenging it would be for people to adopt such measures without drawing a negative reaction.

For the research, an online survey was delivered to undergraduate students at a public university of Athens during the second phase of the pandemic (November 2020). The study took into consideration the COVID-19 health recommendations and measures implemented by the Greek government which were published by the Greek National Public Health Organization. Using mediation analysis, the study examines the impact of young adults' personality traits and prosocial behavior on compliance with COVID-19 public health protection measures. In particular, the current study investigates three possible relationships: 1) the big-five personality traits as predictors of health-protective behavior against COVID-19, 2) the link between the big-five personality traits and prosocial behavior — the behavior of helping others effectively during the COVID-19 period, and finally 3) the indirect effect of personality traits on health recommendation through the mediation of prosociality. The results indicate that prosocial behavior and personality traits indeed affect the way young people adopt health recommendations in a period of crisis.

The rest of this research paper is structured as follows. Section 2 reviews the relevant literature on prosocial behavior, big-five personality traits, and the links between personal behavior, prosociality, and health recommendations, while Section 3 describes the methodology adapted in the current study. Section 4 presents the results of the study, Section 5 discusses the findings and finally, Section 6 refers to the conclusions of the study suggesting recommendations for future research.

2. LITERATURE REVIEW

Many research studies have examined the relationship between personality and prosocial behavior from many different perspectives. The evidence suggests that personality can play an important role in prosocial behavior (Leng, Guo, Ma, Zhang, & Sun, 2020) and foresee a variety of social behavior patterns (Hampson, 2012; Specht, Egloff, & Schmukle, 2011). As Shah and Rizvi (2016) proposed, "the manner in which one acts or behaves in response to environment, person or stimulus that is external or internal, covert or overt and voluntary or involuntary is the behavior of an individual" (p. 161). Prosocial behavior is described as voluntary actions to help others even if they are not actually related to them, however, only certain personality traits seem to be responsible for triggering that kind of social behavior, such as agreeableness and extroversion (Caprara, Alessandri, & Eisenberg, 2012).

With the emergence of COVID-19, recent studies have focused on the relationship between personality-prosocial behavior and compliance with health recommendations and measures to prevent the spread of COVID-19 (Abdelrahman, 2022; Abdullah, Hamsan, & Ma'rof, 2020; Blagov, 2021; Bogg & Milad, 2020; de Francisco Carvalho et al., 2020; Clark et al., 2020; Rammstedt, Lechner, &

Weiß, 2022; Zajenkowski, Jonason, Leniarska, & Kozakiewicz, 2020; Zettler et al., 2022). The study of Campos-Mercade et al. (2021) suggested that to fight the spread of the infectious disease of COVID-19 it is essential for the citizens to display socially responsible behavior which resembles prosocial behavior. The literature review aims to identify possible links between these two factors, personality-prosocial behavior and compliance with health measures focusing on the big-five personality traits — conscientiousness, neuroticism, openness, extroversion, and agreeableness — and draw several hypotheses that will be tested through the research data collected from the current research study.

2.1. Conscientiousness and compliance with health measures

Considering the fact that people scoring high in conscientiousness would rarely get themselves exposed to risky situations (Götz, Gvirtz, Galinsky, & Jachimowicz, 2021), a first assumption is made that high conscientious people would likely be more open to listening to and following (public) health recommendations and guidelines. As COVID-19 is a highly contagious and dangerous disease, people all over the world are being asked to apply many precautions in their daily life and work routines which are not always easy to be followed long term. Highly conscientious people have a physical tendency in protecting themselves and others against dangers, being strict with safety measures and it seems that are usually very loyal to organizational behavior patterns (de Francisco Carvalho et al., 2020; Götz et al., 2021; Zajenkowski et al., 2020). It has been found, also, that these people are very easy-going when situations require compliance with rules and guidelines (de Francisco Carvalho et al., 2020; Clark et al., 2020; Götz et al., 2021). All COVID-19 psychological studies so far have shown that people scoring high in consciousness may even exaggerate their compliance behavior with institutional and government rules when it comes to protecting themselves from getting infected by this new coronavirus disease (Blagov, 2021; Rammstedt et al., 2022). Recent studies, also, indicated that highly conscientious people are more likely to engage in health promotion behavior in general and may easily keep up the habit of social distancing and frequent hand-washing as a main anti-COVID-19 routine than people with lower scores in this personality trait (Abdelrahman, 2022; de Francisco Carvalho et al., 2020; Clark et al., 2020). From the above literature review, the first hypothesis of this study has been drawn:

H1: There is a positive relationship between consciousness and compliance with health recommendations and measures.

2.2. Neuroticism and compliance with health measures

Recent studies point out that highly neurotic people are sensitive to risk-taking and tend to avoid threatening conditions and as a result, severe health warning signs may easily motivate them into a different routine and behavior (Clark, D'Ambrosio, Onur, & Zhu, 2022; Zajenkowski et al., 2020; Blagov, 2021). As neurotic people seem to be more worried about the COVID-19 pandemic, they are more likely to adopt antivirus behavior patterns suggested by the authorities to feel more secure and safe during the health crisis (Zajenkowski et al., 2020). Especially for elderly people the tendency to be more cautious and careful against diseases becomes bigger for neurotic personalities (Clark et al., 2022). Further studies regarding people's behavior in the COVID-19 era also indicate that obedience in hygiene routine, social distancing, and other antivirus daily precaution patterns are more frequently met in neurotic people, as these people are in general more preoccupied with their health condition, particularly the chance of getting the virus (Abdelrahman, 2022; Zettler et al., 2022). Taking all of these into consideration, the second hypothesis arises from the assumption that there is a positive relationship between extraversion and compliance with health recommendations and measures:

H2: There is a positive relationship between neuroticism and compliance with health recommendations and measures.

2.3. Openness to experience and compliance with health measures

Being open to experience would mean being more curious about experimenting and willing to take risks that disregard traditional rules (Götz et al., 2021). As an outcome of their curiosity, people that are open to experience could follow risky behaviors more easily and get involved in unknown activities concerning health matters and diseases (Götz et al., 2021). Nevertheless, some studies suggest that this personality trait may well lead to the exact opposite behavioral direction, being more willing to adopt new and strange daily routines, e.g., specific hygiene or social distancing during the COVID-19 pandemic, as a new experience (Clark et al., 2022; Rammstedt et al., 2022) and even reinforce a better cognitive balance in excessive risk-taking actions (Blagov, 2021). Building upon this assumption, new health recommendations to avoid coronavirus disease, like wearing a mask as a precaution measure against the virus would also possibly be an easily accepted routine for an open-minded person. However, current studies in the field still question the positive impact of openness to experience in compliance with health recommendations (Rammstedt et al., 2022). As a result, there are not any significant indicators to support the positive relationship between openness and compliance with antivirus health restrictions and recommendations. In our study, there is an effort to examine this controversial personal behavior mode by formulating the following hypothesis:

H3: There is a negative relationship between openness to experience and compliance with health recommendations and measures.

2.4. Extroversion and compliance with health measures

Being an extrovert means getting yourself more exposed to risky situations regarding your health (Götz et al., 2021). Coronavirus is a disease that prefers extroversion, which means that people getting together in crowded places, hugging, and kissing each other are more likely to get the virus.

That is, staying safe from the virus, means being mostly alone and socially distant from others and this is something that normally extrovert people are not expected to adopt easily by changing their behavior due to the effects of the pandemic (Blagov, 2021; Han, 2021; Rammstedt et al., 2022). It is, also, interesting that this personality trait seems to be the only one that is not compatible with adopting healthy habits and routines against the virus among elderly people (Clark et al., 2022). There are also research studies, even before the COVID-19 pandemic, indicating that there is a stable trend of extroversion being negatively correlated with compliance with all kinds of restrictions, in contrast with the other three traits — conscientiousness, agreeableness, and openness (de Francisco Carvalho et al., 2020; Han, 2021). As extroverts are strongly motivated and deeply satisfied through the mechanism of social networking and interaction with other people, this results in rejecting or even violating restriction messages and authorities' recommendations of social distancing and isolation against the virus (Han, 2021; Nofal, Cacciotti, & Lee, 2020). On the other hand, except for social distancing, there are other antivirus health measures, such as mask wearing and hand hygiene recommendations, that extroverts seem more willing to adopt (de Francisco Carvalho et al., 2020; Wright & Fancourt, 2021). Nevertheless, there are not any significant correlations in the literature to support a positive correlation between traits of extroversion and compliance with rules adoption (Bogg & Milad, 2020). Therefore, since extroversion does not predict complying with antivirus health restrictions and recommendations the fourth hypothesis of the study is as follows:

H4: There is a negative relationship between extraversion and compliance with health recommendations and measures.

2.5. Agreeableness and compliance with health measures

Agreeableness stands for being caring, empathetic, helpful, and protective to others (Zajenkowski et al., 2020). According to Blagov (2021), people scoring high in this personality trait seem to be more cooperative and willing to adopt certain health routines concerning all aspects of life in terms of the common good (e.g., smoking habits, sexual relationships, exercising, using alcohol, etc.). Agreeable people are also more avoidant of risks concerning their health (Götz et al., 2021). In the recent study by Rammstedt et al. (2022), it was found that agreeable people are more ready to trust and adopt what is presented in the media about COVID-19 as well as measures and health habits recommended or imposed by the authorities. Evidence also suggests that agreeableness traits help people be more flexible in adopting health precaution behavior (Clark et al., 2020) and thus prevent them from being easily infected by the virus (Rammstedt et al., 2022). Yet, as this trait involves taking an active part in social events, interacting with other people, and volunteering, it is negatively correlated with implementing social distancing practices (Abdelrahman, 2022).

Additionally, agreeable people seem to be more willing to sacrifice their personal wellness and comfort when it comes to serving others, thus they are more open to adopting and following restrictions to a greater extent than extroverts, open and neurotic people (Zajenkowski et al., 2020). However, in their recent research study, Bogg and Milad (2020) did not find any significant correlation between agreeableness and rules adoption. To examine the relationship between agreeableness and compliance with containment measures and health precautions in the current study, the following hypothesis has been formulated:

H5: There is a positive relationship between agreeableness and compliance with health recommendations and measures.

2.6. Conscientiousness and prosociality

According to Caspi, Roberts, and Shiner (2005), being conscientious means being able to set ethical boundaries for yourself and adequately calibrate your actions, leading to moral and responsible behavior. Afolabi's (2013) research study focusing on consciousness traits in 358 Nigerian students found a major link between prosocial behavior and conscientiousness. Additionally, Kanacri et al. (2014) support the positive relationship between conscientious personality traits and prosocial behavior, while the study of Abdullah et al. (2020) emphasizes the idea that highly conscientious people think of prosocial behavior as a significant way of serving the common good in society. Thus, conscientiousness is expected to be positively correlated to prosociality formulating the following hypothesis:

H6: There is a positive relationship between conscientiousness and prosociality behavior.

2.7. Neuroticism and prosociality

The trait of neuroticism is better explained as focusing more on oneself than others' needs, which is a significant quality of prosocial behavior. Relevant studies in the field have indicated that neurotic people do not get easily involved in prosocial actions (Abdullah et al., 2020), and, in fact, neuroticism is the only big-five trait negatively correlated with prosocial behavior (Tariq & Naqvi, 2020; Xie, Chen, Lei, Xing, & Zhang, 2016). Empathy is not a core skill of the neurotics, as their interest is mostly targeting themselves and their worries rather than other peoples' needs. Meanwhile, an increase in neuroticism limits the prosocial behavior of undergraduates while recent studies show that neurotic undergraduates had low levels of prosocial behavior (Abdullah et al., 2020; Chaparro & Grusec, 2016; Guo, Sun, & Li, 2018). Moreover, these findings about neurotic people are confirmed when it comes to other kinds of positive behavior (Guo et al., 2018). As a result, neuroticism is expected to be negatively correlated to prosociality, formulating the following hypothesis in the current study:

H7: There is a negative relationship between neuroticism and prosociality behavior.

2.8. Openness to experience and prosociality

Recent studies have indicated that openness is significantly related to prosocial behavior (Kline, Bankert, Levitan, & Kraft, 2019). Openness to

experience describes a person's degree of mental and experiential life through creativity, inventiveness, originality, and inclination for innovation and diversity (Afolabi, 2013; Tariq & Naqvi, 2020). In Afolabi's (2013) study openness was found to be positively associated with moral courage and help-giving while moral identity is directly and strongly associated with prosocial behavior (Ferguson, Zhao, O'Carroll, & Smillie, 2019; Leng et al., 2020). In their study, Leng et al. (2020) found that openness may facilitate costless prosociality suggesting that open-minded individuals are better at thinking from the perspective of others and act accordingly, satisfying other people's needs while Guo et al. (2018) support that openness is associated with involvement in community and prosocial behavior. Additionally, Carlo, Okun, Knight, and de Guzman's (2005) findings highlighted a low but positive correlation between openness and volunteering. These findings are supported by Abdullah et al. (2020), demonstrating that individuals who hold openness tend to participate in new actions related to prosocial behaviors such as volunteering which is some kind of a new experience that contributes to self-realization. Meanwhile, openness between ages 13 and 21 predicted a higher probability of belonging to the prosocial group while undergraduates tend to be more actively involved in prosocial behavior activities (Kanacri et al., 2014). According to the above research findings, the following eighth hypothesis of this study has been drawn:

H8: There is a positive relationship between openness to experience and prosociality behavior.

2.9. Extroversion and prosociality

Extroverts are social types in general, they like to find themselves involved in social interactions and events and they usually see things mostly in a positive way, as this works as a reinforcement for them (Coutinho, Sampaio, Ferreira, Soares, & Gonçalves, 2013). Extroversion and agreeableness are thought to be two of the core qualities of prosocial behavior, as being prosocial means that you need to be social in the first place (Istiani & Muetia, 2016). The strong connection between extroversion and prosociality is also mentioned in the current study by Abdullah et al. (2020). Other studies focusing on the ways of enhancing volunteerism suggested that this requires prosocial qualities and social personality characteristics (Kanacri et al., 2014) which can be achieved through optimizing agreeableness and extroversion qualities (Afolabi, 2013; Caprara et al., 2012; Carlo et al., 2005). Based on the above findings the next hypothesis is formulated:

H9: There is a positive relationship between extroversion and prosociality behavior.

2.10. Agreeableness and prosociality

Studies have shown that the trait of agreeableness is highly associated with good performance in cooperation and prosociality actions which involve being available to help, being altruistic, and cooperative with others (Clark et al., 2022; Coutinho et al., 2013; DeYoung, Quilty, & Peterson, 2007; Kline et al., 2019). Indeed, agreeableness is constantly found to be positively related to prosociality in the majority of big-five studies in the literature (Campos-Mercade et al., 2021; Dinić & Bodroža, 2021). Studies focusing on students with personality qualities of agreeableness indicated that those students are more willing to set aside themselves and contribute to others' problems by showing empathy and offering comfort (Abdullah et al., 2020; Caprara et al., 2012; Hilbig, Glöckner, & Zettler, 2014). Moreover, other studies have shown that both agreeable people and people with prosocial behavior seem to be sharing a high sense of responsibility (Coutinho et al., 2013; Kline et al., 2019). To reflect on the above findings, the following hypothesis has been formulated:

H10: There is a positive relationship between agreeableness and prosociality behavior.

2.11. Prosociality and compliance with health measures

Bavel et al. (2020) suggest that the social and behavioral characteristics of a person are important factors in combatting the COVID-19 pandemic. As they argue, this is mainly because individuals will have to act selflessly and sacrifice personal resources, e.g., spend more time isolated, and engage in fewer social interactions with others (Bavel et al., 2020). At the same time, widespread cooperation of the population (e.g., with mandated restrictions) would be essential to prevent the dissemination of the coronavirus. Therefore, both moral decision-making (Turiel, 2014) and cooperation (Simpson & Willer, 2015) fall under the umbrella of prosociality that could have an impact on compliance with health recommendations and measures.

Van de Groep, Zanolie, Green, Sweijen, and Crone (2020) suggest that the COVID-19 pandemic has resulted in people adopting certain assets of prosocial behavior, rather quite differentiated than the usual, which needs to be examined further. Tunçgenç et al. (2021) advocated that the closeness of the bond with others and considering the vulnerability of one's close circle, that is the need to protect close family and friends from getting infected by the virus, would strongly encourage people to engage in health protection behaviors more easily even if they do not approve them. Recent research studies also outline that public health messages have more appealing effects on public health behavior change, when their content is more pro-socially orientated, boosting people's willingness to self-isolate (Heffner, Vives, & FeldmanHall, 2021).

When in people's decisions the prosocial element is embedded, it means that they consider others' well-being (Moore, 2015). There are many factors that interact with prosocial decision-making, such as social factors, genetic factors and personality, and previous history of prosocial actions (Penner, as cited in Sleesman & Conlon, 2017). The study of Kappes et al. (2018) examined the effects of impact uncertainty using potential decision-making when there is an infectious disease threat. The prevention of the spread of disease involves health behaviors with social consequences such as getting vaccinated, mask-wearing, and social distancing, measures that are also recommended for the COVID-19 pandemic.

Impact uncertainty is when some persons' decisions influence others, they may lack of knowledge how their decision outcomes could be harmful to others' welfare, and this may enhance their prosocial intention. The possibility of others' suffering is made salient when there is the repetition of the worst-case scenario, and this factor influences their decision model to act more prosocially in a way to minimize the potential harm to others. As Campos-Mercade et al. (2021) suggested individuals with prosocial behavior are more likely to follow health recommendations such as social distance and face masks.

The COVID-19 pandemic has many dimensions. One of them is how to respond to the threat of personal harm and death. The COVID-19 pandemic not only enhances the threat to personal health status but also activates mortality-related risk perceptions, which are less salient in times of great uncertainness (Syropoulos & Markowitz, 2021). The study of Syropoulos and Markowitz (2021) proposed that uncertainty and mortality salience of the COVID-19 pandemic gave force to a more applicable to the real world prosociality behavior towards health measures such as social distancing, wearing masks, and getting informed in order to prevent the spread of the virus.

To prevent the spread of the COVID-19 infectious disease, it is essential for the citizens to display socially responsible behavior which resembles prosocial behavior (Campos-Mercade et al., 2021). People's health behaviors toward COVID-19 might likely have a potential impact on others' health. It is therefore important to assess the prosocial motives of people, especially the youngest ones. As demonstrated in recent research studies, prosocial behavior traits and skills seem to be vital in developing such health protection patterns, so people with high prosocial skills are more likely to cooperate when asked to follow strict health measures or other guidelines (Campos-Mercade et al., 2021). Therefore, the eleventh hypothesis of the current research study is formulated as follows:

H11: There is a positive relationship between prosociality and compliance with health recommendations and measures.

2.12. Relationship between personality traits, prosociality and compliance with health measures

The big-five personality model's traits have also been examined in several studies concerning other variables along with prosociality as a mediator factor (Guo et al., 2018; Hardy & Carlo, 2005; Pursell, Laursen, Rubin, Booth-LaForce, & Rose-Krasnor, 2008). In Carlo et al.'s (2005) research study, prosociality motives were found to act as mediators in the traits of agreeableness, extraversion, and volunteering. According to Pursell et al. (2008), prosociality seems to play a significant role in being agreeable, conscientious, and thus less aggressive in girls, while low aggression was significantly related to prosociality when agreeableness was a major trait. In a recent study by Koffi (2020), prosociality, moral reasoning, and the tendency to help others, in general, were constantly predicted by all big-five personality traits. However, there is no research evidence of the mediating role of prosociality regarding the big five personality traits and health compliance measures. This study will make an effort to examine the indirect relationship of personality traits of young adults towards compliance with health recommendations and measures using the mediator factor of prosociality. Thus, the last hypothesis of the current research study is the following:

H12: There is an indirect effect of personality traits on health recommendations and measures through the mediation of prosociality.

3. RESEARCH METHODOLOGY

Adopting the quantitative approach and using an online survey, the current research was carried out during the second phase of the COVID-19 pandemic (November 2020). After determining the purpose of this research and formulating its twelve hypotheses, a 35-item questionnaire was instructed using two types of a five-point Likert scale (1 — strongly disagree and 5 — strongly agree; 1 — never and 5 — very often) to investigate the relationships between the different variables and confirm or reject the hypotheses of the study. The study was undertaken in one of the largest Greek public universities in terms of student numbers. The total sample of the survey consisted of 239 respondents from a business class of 556 students.

For this study, we used a short version of the big-five personality trait questionnaire factors (15 items using a Likert scale of 1 — strongly disagree and 5 — strongly agree), an instrument previously tested and validated in other studies.

Measures relevant to compliance with health recommendations and measures were adopted from the recent study of Syropoulos and Markowitz (2021) as follows. Following COVID-19 health recommendations — personal behaviors during COVID-19 (7 items using Likert scale of 1 — never and 5 — very often).

If you think about your daily habits in the last month, how often:

- you acted following the social distancing protocols proposed by the Centers for Disease Control and Prevention (CDC);
- you avoided public spaces unless it was necessary for me to go out;
- you avoided close contact with others unless you had to;
- you washed your hands after going to a public space or physically interacting with someone;
- you covered your mouth whenever you coughed and sneezed;
- you covered your face (e.g., with a mask) when you went out in public;
- you cleaned and disinfected surfaces whenever they were dirty.

Prosocial tendencies were measured using 14 items (Likert scale of 1 — strongly disagree and 5 — strongly agree) of Altruism Subscale Questionnaire developed by Carlo et al. (2005), adjusted by van de Groep et al. (2020) to match the current pandemic situation. Participants were asked to answer the following statements about their attitude towards life:

1. I think that one of the best things about helping others is that it makes me look good.

2. I believe that helping others works best when I get some benefit.

3. One of the best things about helping others is that it makes me look good.

4. I feel that if I help someone, they should help me in the future.

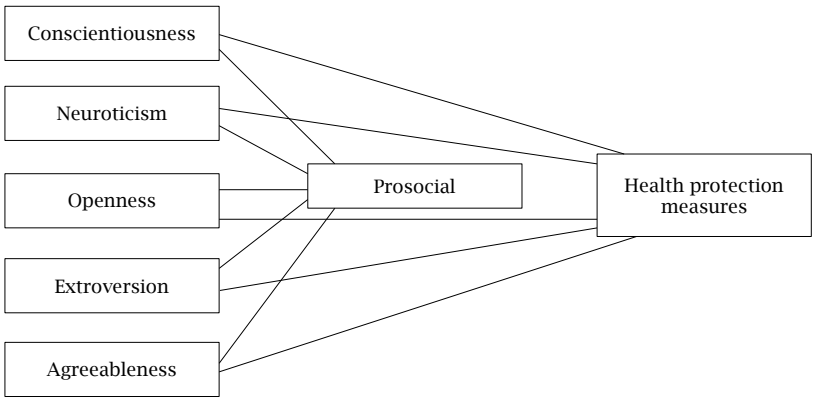
5. I believe I should receive more rewards for the time and energy I spend helping others.

To test our hypotheses, we examined the direct effect of the big five personality traits on health recommendations compliance, and prosociality, the direct effect of prosociality on health recommendations compliance and the indirect effect of personality traits through prosociality on health recommendations compliance. For the data analysis, we used the 3rd generation statistical Jamovi program.

Figure 1 illustrates the path model diagram used to examine the relations among the variables. The path diagram was produced using the free Jamovi-R-based software (under the AGPL3 license) with the dependent variable "compliance with health recommendations", and independent variables the big five personality traits (conscientiousness, neuroticism, openness, extroversion, and agreeableness). Prosociality was put factor as a mediator.

We could use alternatively the structural equation modeling (SEM) to draw findings of the research. In that case, statistical analysis using IBM SPSS Amos or SmartPLS would be a useful alternative for conducting SEM and path analyses.

Figure 1. Model diagram



4. RESULTS AND FINDINGS

Table 1 shows the results of the path model exported from the Jamovi program. As mentioned before, the path model consists of the impact of the multiple independent variables of personality traits (conscientiousness, neuroticism, openness, extroversion, and agreeableness) and one mediator (prosociality) on compliance with health recommendations (dependent variable).

Table 1. Indirect, direct, and total effects

				95% C.I. (a)				
Type	*Effect*	*Estimate*	*SE*	*Lower*	*Upper*	*β*	*z*	*p*
Indirect	Openness ⇒ Prosocial ⇒ Health recom.	-0.002	0.005	-0.011	0.007	-0.002	-0.439	0.661
	Conscientiousness ⇒ Prosocial ⇒ Health recom.	-0.014	0.014	-0.041	0.013	-0.014	-1.034	0.301
	Extraversion ⇒ Prosocial ⇒ Health recom.	0.003	0.005	-0.007	0.013	0.004	0.626	0.531
	Agreeableness ⇒ Prosocial ⇒ Health recom.	-0.012	0.012	-0.036	0.012	-0.011	-1.000	0.317
	Neuroticism ⇒ Prosocial ⇒ Health recom.	-0.006	0.007	-0.020	0.007	-0.007	-0.913	0.361
Component	Openness ⇒ Prosocial	-0.034	0.071	-0.173	0.105	-0.031	-0.478	0.632
	Prosocial ⇒ Health recom.	0.059	0.054	-0.046	0.164	0.070	1.101	0.271
	Conscientiousness ⇒ Prosocial	-0.242	0.081	-0.401	-0.084	-0.199	-3.001	0.003
	Extraversion ⇒ Prosocial	0.052	0.069	-0.082	0.187	0.051	0.761	0.447
	Agreeableness ⇒ Prosocial	-0.204	0.086	-0.372	-0.036	-0.154	-2.386	0.017
	Neuroticism ⇒ Prosocial	-0.109	0.067	-0.239	0.022	-0.104	-1.635	0.102
Direct	Openness ⇒ Health recom.	0.075	0.059	-0.040	0.190	0.081	1.277	0.202
	Conscientiousness ⇒ Health recom.	0.280	0.068	0.146	0.414	0.271	4.105	< 0.001
	Extraversion ⇒ Health recom.	-0.009	0.057	-0.121	0.103	-0.010	-0.159	0.874
	Agreeableness ⇒ Health recom.	0.119	0.072	-0.022	0.260	0.106	1.657	0.098
	Neuroticism ⇒ Health recom.	0.154	0.055	0.045	0.263	0.174	2.771	0.006
Total	Openness ⇒ Health recom.	0.073	0.059	-0.043	0.189	0.079	1.238	0.216
	Conscientiousness ⇒ Health recom.	0.266	0.067	0.134	0.398	0.257	3.949	< 0.001
	Extraversion ⇒ Health recom.	-0.006	0.057	-0.118	0.106	-0.007	-0.104	0.917
	Agreeableness ⇒ Health recom.	0.107	0.071	-0.033	0.247	0.095	1.500	0.134
	Neuroticism ⇒ Health recom.	0.147	0.055	0.039	0.256	0.167	2.658	0.008

In the above table, the direct effects demonstrate the relationship of the dependent variable *compliance with health recommendations* with the independent variables personality traits (*conscientiousness, neuroticism, openness, extroversion*, and *agreeableness*) and *prosociality*. The total effects indicate the relationship between the dependent variable *compliance with health recommendations and*

measures and the independent variables of personality traits (*conscientiousness, neuroticism, openness, extroversion*, and *agreeableness*).

For the examination of the first five hypotheses (*H1*, *H2*, *H3*, *H4*, and *H5*) to test the impact of the direct relationship between personality traits and compliance with health recommendations, the total effects would be taken into consideration. The results indicate that two of the big five personality traits of young adults, conscientiousness and neuroticism, have a positive impact ($p < 0.05$) on compliance with health measures, and thus *H1* and *H2* are supported.

The table of the components shows the direct relationship between the variables of the big five personality traits and prosociality behavior (openness ⇒ prosocial, conscientiousness ⇒ prosocial, extraversion ⇒ prosocial, agreeableness ⇒ prosocial, neuroticism ⇒ prosocial) as well as the direct relationship between the prosociality variable and compliance with health recommendations and measures (prosocial ⇒ health recommendations). The result of the analysis indicates a positive and statistically significant impact of two big five personality traits, conscientiousness and agreeableness on prosociality behavior ($p < 0.01$), and thus *H6* and *H10* are supported. Finally, regarding the indirect effects, the results of the research study revealed that there is not any effect of young adults' personality traits on health recommendation through the mediation of prosociality and consequently, *H12* of the current research study is rejected. However, what is interesting to note, is that the personality trait of conscientiousness has a positive impact both on prosociality behavior and on compliance with health recommendations and measures.

5. DISCUSSION

This research study sought to explore whether the personality and prosocial behavior relationship is applicable to the adoption of government health recommendations and measures in a heath period of crisis. Are there personality characteristics that could make people easily cope with all the stressful and long-lasting measures of the COVID-19 pandemic? And if there are, does prosocial behavior contribute to this tremendously difficult task?

The current study investigated three possible relationships: 1) the big-five personality traits as predictors of health-protective behavior against COVID-19, 2) the link between the big five personality traits and prosocial behavior — the behavior of helping others effectively during the COVID-19 period, and finally 3) the indirect effect of personality traits on health recommendations through the mediation of prosociality from a sample of 239 Greek university students during the second phase of the pandemic (November 2020).

Invoking the big five taxonomy, the review of the recent literature reveals certain personality traits, especially of young people, that might enhance the development of health protection patterns during the COVID-19 pandemic, such as conscientiousness, neuroticism, and agreeableness (Abdelrahman, 2022; Aschwanden et al., 2021; Blagov, 2021; de Francisco Carvalho et al., 2020; Clark et al., 2022; Götz et al., 2021; Rammstedt et al., 2022; Zajenkowski et al., 2020; Zettler et al., 2022). The results of the current study are, indeed, supportive of the literature indicating that two of the big five personality traits of young adults, conscientiousness and neuroticism, can be linked with a positive attitude to following heath precautions and recommendations and are more likely to comply with health measures (social distancing and other prevention measures) to cope with the COVID-19 pandemic.

To combat the spread of the infectious disease of COVID-19, it is also essential to assess the prosocial motives of young people regarding their personal traits and social behavior. The review of the literature suggests that certain personality traits, such as conscientiousness, openness to experience, extroversion, and agreeableness, are predictors of prosocial behavior (Afolabi, 2013; Caprara et al., 2012; Caspi et al., 2005; Coutinho et al., 2013; Drouvelis & Georgantzis, 2019; Guo et al., 2018; Istiani & Muetia, 2016; Kanacri et al., 2014; Tsaknis & Sahinidis, 2020). Based on the previous research we investigated whether these personality traits could be positively associated with prosociality relating to health behavior within the context of the COVID-19 pandemic. Especially, agreeableness and conscientiousness seem to be personality traits positively associated with prosocial behavior, which usually predict prosociality actions (Abdullah et al., 2020; Shiner & Masten, 2002; Tariq & Naqvi, 2020). The result of the analysis in our study indicated a positive and statistically significant impact of the above two big five personality traits, conscientiousness and agreeableness, on young adults' prosociality behavior that supports the existing literature. This means that young people scoring high in these personality traits — conscientiousness and agreeableness — are more likely to adopt prosocial and responsible behavior, cooperating with others, volunteering, being available to help, and be willing to adopt certain health routines as a way of serving the common good during a period of a health crisis such as the COVID-19 pandemic.

The research findings indicated that the personality trait of conscientiousness has a positive impact both on prosociality behavior and on compliance with health recommendations and measures. Other studies conducted during the COVID-19 have also mentioned that this personality trait has a positive impact on entrepreneurial intention (Tsaknis, Xanthopoulou, Patitsa, & Sahinidis, 2022), economic and market uncertainty (Christopoulos, Kalantonis, Katsampoxakis, & Vergos, 2021), and the strongest association with overall students' satisfaction with synchronous online academic learning (SOAL) (Patitsa, Sahinidis, Tsaknis, & Giannakouli, 2021; Sahinidis & Tsaknis, 2021).

The findings of the study suggest that prosocial and health behavioral characteristics of people are important factors in dealing with the COVID-19 pandemic and have been supportive of the recent research studies on the field (Bavel et al., 2020; Heffner et al., 2021; van de Groep et al., 2020). Additionally, recent research studies indicate that individuals with prosocial behavior are more likely to follow health recommendations and cooperate when asked to follow strict health

measures or other guidelines such as social distancing and wearing face masks (Campos-Mercade et al., 2021; Syropoulos & Markowitz, 2021). However, our study did not reveal any significant direct link between young adults' prosociality and compliance with health recommendations and measures. Additionally, the results show that there is not any indirect effect of young adults' personality traits on health recommendations through the mediation of prosociality. Consequently, whether prosociality can act as a mediator factor in the relationship between personality traits and compliance with health recommendations and measures remains an open question for future research.

This is not to say that people with high prosocial skills are less likely to follow health recommendations (face-masking, social distancing, etc.) but rather to consider that there are other factors that influence their prosocial decision-making and attitude towards the pandemic. The COVID-19 pandemic activated mortality-related risk perceptions and social behaviors different than usual (Syropoulos & Markowitz, 2021), and personality traits and prosocial behavior need to be examined in a different context than before. It is therefore important to further investigate the multi-dimensional relationship between prosociality and personal behavior towards the pandemic as well as the compliance with health precautions and measures, considering many different factors that might influence these links.

6. CONCLUSION

Personal traits, prosociality, and the COVID-19 pandemic is a crucial topic of research during the current period of a worldwide health crisis. Many different aspects of personal traits along with a variety of prosociality factors can influence the way people comply with government and public health recommendations and measures to combat the COVID-19 pandemic. This research study examined the direct impact of personality traits and prosociality on compliance with health recommendations and measures and the relationship between young adults' personality behavior and prosociality in the context of the pandemic. The findings revealed that two of the big five personality traits of young adults, conscientiousness and neuroticism, can be linked with a positive attitude to comply with heath precautions and recommendations while conscientiousness and agreeableness have emerged as predictors of young adults' prosociality behavior to cope with the COVID-19 pandemic.

Additionally, the study sought to explore whether prosociality can act as a mediator factor in the relationship between personality traits and compliance with public health protection measures. In previous studies, big five personality traits have been studied regarding prosociality as a mediator in its specific traits, focusing on how prosociality and different factors are related however till now there is no research evidence of the mediating role of prosociality regarding specific big five traits and health compliance measures. The results show that there is not any effect of young adults' personality traits on health recommendations through the mediation of prosociality. Nevertheless, the research evidence is limited to assessing this indirect link between personality traits and compliance with government and public health precautions.

Furthermore, the current study has also further limitations, as it does not include other variables that could possibly have an important impact on the research analysis, such as demographic factors (sex, age, working experience), discipline-based factors (students from other fields of study) and cultural factors (other ethnic origin) which are related to specific policies in different countries and cultures. It would be, therefore, essential, that the findings of the study are validated in different contexts in future research studies considering other factors, that may influence the relationship between personality traits, prosociality, and the COVID-19 pandemic. Additionally, ideally, a multiple-comparison correction should be performed to check for the probability of false positives.

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