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Who complies with prevention guidelines during the fourth wave of COVID-19 in Italy? An empirical study

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ABSTRACT

During the SARS-CoV-2 disease 2019 (COVID-19) pandemic in Italy, different protective measures were taken to reduce the spread of the virus and ensure long-term public health. These include, amongst others (vaccination campaigns), a variety of prevention guidelines such as washing hands, social distancing, and wearing masks. Notably, although such prevention guidelines represent one of the primary weapons to control the virus, people's willingness toward them highly varied during the fourth wave of COVID-19 in Italy. This challenging scenario brings to consider which factors and how they affect citizens' adherence to protective behaviours during the pandemic. The present research aimed to deepen the association between fear of COVID-19 and compliance with prevention guidelines, also addressing the moderating role of personality as captured by the Dark Triad. The study was carried out with 205 participants via an online cross-sectional design. Results revealed a positive association between fear of COVID-19 and compliance with prevention guidelines. Additionally, only psychopathy and narcissism moderated this link, weakening the impact of fear on compliance. These findings yielded theoretical implications about the role of malevolent personalities on the functional impact of fear in public adherence to healthy and preventive practices. Limits and future research directions were discussed.

1. Introduction

The outbreak of the SARS-CoV-2 disease 2019 (COVID-19) caused troubling physical and mental health consequences, bringing national health authorities and governments across the globe to launch control systems to cope with the spread of the virus. Specifically, warning citizens about the dangerousness of COVID-19 as well as promoting vaccines and prevention guidelines (washing hands frequently, using hand sanitiser with at least 60 % alcohol, social distancing, wearing masks, and disinfecting surfaces) represented the primary interventions to control the infection and ensure people's long-term health (Krupić et al., 2021). Unfortunately, the high mutation frequency of the virus and its great transmissibility and pathogenicity, with severe forms of the disease, triggered different epidemiologic scenarios over time. For instance, in Italy, four key pandemic moments can be acknowledged (Marcellusi et al., 2022): the first wave of infections (February–April 2020) with 205,463 total cases, 27,967 deaths, and 75,945 healings; the second wave (September–December 2020), involving 1,837,952 total cases, 38,676 deaths, and 1,639,819 healings; the third wave (February–May 2021), in which the number of total cases, deaths, and healings

were 1,395,575, 2129, and 1,639,819 respectively, and the fourth wave (November 2021–January 2022), which involved an intensification of infections with 5,954,569 total cases, 12,670 deaths, and 3,543,563 healings (Italian Ministry of Health).

Although prevention guidelines played a pivotal role in limiting people's exposure to being infected and protecting others from being infected, during the fourth wave of COVID-19, people's engagement with prevention behaviours highly varied amongst Italian people (Profeti, 2022). For instance, some studies on previous waves of COVID-19 found that females, older people with higher education, and individuals being informed about the nature of the virus seemed to be more compliant with prevention guidelines (Duradoni et al., 2021; Elgendy & Abdelrahim, 2021). Additionally, other studies revealed that past infections and vaccinations might decrease the adherence to additional prevention behaviours (Iyengar et al., 2022; Kaim & Saban, 2022). Nevertheless, beyond such influences, there is general agreement that psychological factors represent the primary determinants of people's willingness to prevention behaviours during global public health disasters (Scrima et al., 2022). Specifically, prior research showed that personality substantially affects emotion, determining a significant

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variation in people's emotional experience, which, in turn, provides meaningful behavioural changes (Steel et al., 2008). Consistently, the present study aimed to deepen the association between fear of COVID-19 and people's compliance with COVID-19-related prevention guidelines during the fourth wave of the COVID-19 pandemic in Italy, also addressing the moderating role of personality as captured by the Dark Triad (DT).

2. Literature review

The Protection Motivation Theory (PMT; Rogers, 1975) posits that people's motivation to comply with health prevention practices represents a function of appraisals of the threat and individual's ability to cope with such a threat by recommendations. According to this perspective, fear - an intensive negative emotion characterised by extreme levels of emotive avoidance of threatening stimuli - depicts one of the primary motivators for protective behaviours (Luo et al., 2021), affecting how individuals intuitively evaluate the threats they are exposed to (Kabasakal et al., 2021). In particular, whereas intense and unregulated fear promotes clinical phobia, social anxiety disorder, and depression, its optimal and functional level maximises people's behavioural change in terms of adaptation, as well as mental and physical health (Jian et al., 2020). Notably, during sudden global public health disasters such as the COVID-19 pandemic, people experience themselves more vulnerable due to the uncertainty about the severity of the virus as well as the availability and efficacy of treatments (Rana et al., 2020). Such a feeling increases levels of fear, which, in turn, reinforces compliance with preventive actions (Luo et al., 2021). Although evidence confirmed the PMT perspective, showing fear as one of the primary predictors of behavioural changes during the earlier waves of COVID-19 in terms of adherence to vaccines (Reuken et al., 2020; Scrima et al., 2022) and prevention guidelines (Harper et al., 2021), no studies have addressed the role of the functional levels of fear during the latest wave of the virus to date. In particular, focusing on the fourth wave of COVID-19 allows for detecting the impact of fear on adherence to prevention guidelines after the development and rollout of safe and efficient vaccines (Caserotti et al., 2021). Notably, given that the infection of COVID-19 can occur during the process of vaccination and following it, maintaining vigilance by prevention behaviours (i.e., wearing masks, washing hands, and social distancing) becomes essential for moving toward the resumption of life pre-pandemic (Kaim et al., 2021). However, research suggested that people might show a false sense of protection and safety resulting from the vaccination campaigns, which could delay the long-term management of the COVID-19 pandemic (Iyengar et al., 2022; Kaim et al., 2021). Particularly, vaccinated people, feeling safer because of the vaccine, could underestimate the risk associated with COVID-19, decreasing their adherence to additional prevention behaviours. Therefore, the first aim of the current research was to deepen the association between fear and compliance with prevention guidelines during the fourth wave of COVID-19 in Italy. The latter represents a specific phase of the pandemic in which the Italian immunisation plan allowed the vaccination of about 79 % of Italians (47,332,846 people) with at least two doses (Marcellusi et al., 2022). Based on previous research (Harper et al., 2021; Reuken et al., 2020; Scrima et al., 2022), the first hypothesis of the current study was formulated as follows:

H1. Fear of COVID-19 is positively associated with people's compliance with COVID-19 prevention guidelines.

Personality represents a hard-core and relatively stable variable with biological roots (DeYoung, 2010). It includes social (norms, values, roles, and authority) and intrapsychic factors determining, causing, and explaining people's behaviours (Dwairy, 2002). In the past decades, the psychology of personality has been overwhelmed by the Big Five dimensions. However, an emergent stream of research explored a constellation of subclinical and malevolent taxonomy, namely the DT,

which defined three theoretically distinctive yet interconnected socially aversive personality traits: psychopathy, Machiavellianism, and narcissism (Paulhus & Williams, 2002). Psychopathy entails interpersonal manipulation, callous emotionality, erratic lifestyle, and antisocial behaviours. Machiavellianism involves cynical behaviours, callousness, disagreeableness, manipulateness, pragmatism, and a lack of moral standards and emotional bonds. Narcissism implies feelings of grandiosity, arrogance, need for admiration, and fragile self-esteem, which leads to overall emotional instability.

The lack of emotional competencies associated with the DT might affect the relationship between emotion and everyday life behaviours, hampering the functional and adaptive nature of emotional states (Walker et al., 2022). In particular, such emotional deficits could be triggered by how people with high DT experience and regulate their emotions (Walker et al., 2022). Indeed, people scoring high in the DT tend to show low empathy, superficial emotions, inappropriate emotional responses, and a lack of remorse, guilt, and regret (Lyons & Brockman, 2017; Wai & Tiliopoulos, 2012; Walker et al., 2022). According to the affect as information approach (Clore & Palmer, 2009), positing that people routinely use their emotions as compelling information for judgments and decisions, the lack of emotional competencies shown by individuals with high DT could lead to misinterpretation of the informative and adaptive value of affective states (i.e., fear). Such a misinterpretation could encourage underestimating the entity of the threat (i.e., the dangerousness of COVID-19), promoting high risk behaviours. Notably, although people with high DT were found to be involved in risk behaviours associated with health, such as drug use and unprotected sex (Malesza & Kaczmarek, 2021), so far, no studies addressed the involvement of DT in the functional role of emotion in motivating public adherence to healthy (or unhealthy) practices during a global public health disaster such as COVID-19 pandemic.

Therefore, based on the lack of emotional competencies shown by individuals scoring high in the DT, as well as their disposition toward high-risk behaviours for health (Malesza & Kaczmarek, 2021; Walker et al., 2022), there are reasons to expect the DT might dampen the optimal and functional level of fear of COVID-19, weakening the compliance with prevention guidelines. Consequently, the last three hypotheses of this study were advanced as follows:

H2. Psychopathy moderates the positive association between fear of COVID-19 and compliance with prevention guidelines, weakening the functional nature of fear as a motivator for protective behaviours against COVID-19;

H3. Narcissism moderates the positive association between fear of COVID-19 and compliance with prevention guidelines, weakening the functional nature of fear as a motivator for protective behaviours against COVID-19;

H4. Machiavellianism moderates the positive association between fear of COVID-19 and compliance with prevention guidelines, weakening the functional nature of fear as a motivator for protective behaviours against COVID-19.

3. Method

3.1. Participants and procedure

Data were collected during the fourth wave of COVID-19 from November 2021 to January 2022 via an online survey. Two hundred twenty-five individuals started the online survey, 14 did not carry out the questionnaires (6.23 %), 6 partially completed them (2.66 %), and 205 filled in the survey (91.11 %). Therefore, 20 cases were discarded from the dataset, resulting in a final sample of 205 Italian adults from 18 to 68 years old (mean_{age} = 30.89 years; SD_{age} = 12.94 years) whose 103 (50.2 %) were female and the remaining 102 (49.8 %) were male. No missing data were found considering the final sample.

The current study evaluated the minimum required sample by an a-priori sample size analysis using G*Power 3.1.9.7 software (Faul et al., 2007). Specifically, given that no prior research directly investigated the interaction between fear of COVID-19 and the DT to date, the default parameters were employed, in line with the recommendation of Faul et al. (2009). This procedure was adopted in previous research performing mediation and moderation analyses (Qasim et al., 2021; Scrima et al., 2022). Conservatively, the parameters employed were: test family: "F test analysis", statistical test: "Linear multiple regression: fixed model, R^2 deviation from zero", type of analysis: "A priori: Compute required sample size – given α , power and effect size", α err prob. = 0.05, power ($1-\beta$ err prob) = 0.95, mean effect size $f^2 = 0.15$ (medium effect), and a maximum number of predictors = 9. The G*Power software revealed that the recommended minimum sample size was $N = 166$. The research sample of 205 met and exceeded the required sample size. Additionally, according to Memon et al.'s (2020) guidelines, a post hoc power analysis was computed in order to evaluate the power obtained from the collected data. The power values reached 1.00, satisfying the recommended cut-off value of 0.80 (Cohen, 1992). Therefore, based on the a-priori and post hoc analyses, the research sample of 205 was appropriate to test the advanced moderating models.

Participants were recruited through different social media (Facebook, Instagram, and WhatsApp) and word-of-mouth. Before starting the survey, subjects were informed about the purpose of the study through an online informed consent page and then were asked to participate. The survey consisted of a first part about demographics and COVID-19-related information, and a second, in which participants had to fill in the self-report questionnaires. All 205 participants responded correctly to two attention check questions used in the survey. No rewards were provided for participating in this study, and total anonymity was guaranteed.

3.2. Measures¹

1. The Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2020) consists of 7 items along a 5-point Likert-type response scale (1 = strongly disagree; 5 = strongly agree). The authors reported that the FCV-19S shows good reliability as well as good construct and concurrent validities (Ahorsu et al., 2020). All scores were aggregated into one mean score. In this research, the internal consistency reliability was $\alpha = 0.87$; $\omega = 0.87$.
2. The Compliance with COVID-19 prevention guidelines Scale (CCV-19PG; Plohl & Musil, 2021) consists of 11 items reflecting preventive behaviours suggested by the World Health Organisation, Centre for Disease Control and Prevention. The authors reported acceptable reliability for the CCV-19PG (Plohl & Musil, 2021). All scores were aggregated into one mean score. In this study, the internal consistency reliability was $\alpha = 0.92$; $\omega = 0.93$.
3. Dark Triad Dirty Dozen (DTDD; Schimmenti et al., 2019) is a brief self-report measure for DT, consisting of 12 items along a 5-points Likert-type response scale (0 = not at all; 4 = very much). Previous research showed acceptable reliability for the DTDD (Nowak et al., 2020). In this research, the internal consistency reliability was: Machiavellianism ($\alpha = 0.91$; $\omega = 0.91$); psychopathy ($\alpha = 0.83$; $\omega = 0.83$); narcissism ($\alpha = 0.86$; $\omega = 0.86$).
4. *Confounding variables.* Age, gender (0 = female; 1 = male), years of education, self-reported personal knowledge about the virus (ranged from 1 = very low to 5 = very high), past COVID-19 infection (1 = infected; 0 = non-infected), and vaccination (not-vaccinated = 0; vaccinated with at least one dose = 1) were considered as confounders, given their potential influence on individuals' compliance with prevention guidelines.

¹ The online survey included additional measures which were omitted according to the aim of the current research.

3.3. Statistical analysis

Data were analysed by SPSS Statistics version 24 for Windows (IBM Corporation, Armonk, New York, USA). Descriptive statistics were used to analyse the demographic features of the sample, whilst bivariate correlations were computed for preliminary analysis. The moderating role of the DT was tested by the PROCESS macro for SPSS (version 3.5; Hayes, 2017). The significance of the moderating effect was analysed using 5000 resample of bootstrapped estimates with 95 % bias-corrected confidence intervals - CIs (Preacher & Hayes, 2008). The 95 % CIs must not cross zero to satisfy the criteria of moderation (Preacher & Hayes, 2008). All significance was set to $p < 0.05$.

4. Results

Data were tested for normality and analysis showed that the variables of interest were not normally distributed (Kolmogorov-Smirnov Test: $Z_{\text{Fear of COVID-19}} = 0.00$, sig; $Z_{\text{Compliance with Prevention Guidelines}} = 0.00$, sig; $Z_{\text{Psychopathy}} = 0.00$, sig; $Z_{\text{Narcissism}} = 0.00$, sig; $Z_{\text{Machiavellianism}} = 0.00$, sig). Furthermore, the z test was performed on the variable of interest to check for potential univariate outliers, considering the range between -4.0 and $+4.0$ z -scores as the reference values for samples larger than 100 (Mertler & Vannatta, 2005; Zhong et al., 2022). No univariate outliers were identified in the dataset. In order to verify the common method bias (CMB), Harman's single-factor test (Podsakoff et al., 2012) was used. Therefore, the variance explained by a single-factor exploratory model was computed, including all variables of the study. The single-factor explained 27.60 % of the variance, revealing that the data showed no CMB problems (test critical threshold ≥ 50 %). Table 1 reports means, standard deviations and preliminary Spearman's correlational analysis. Based on correlations, three moderation analyses were performed using fear of COVID-19 as the focal predictor, compliance with prevention guidelines as the outcome, and the DT traits as the moderators, whereas no confounding variables were entered as covariates (see Fig. 1). Results showed that psychopathy moderated the association between fear of COVID-19 and compliance with prevention guidelines ($B = 0.15$, $SE = 0.06$, $t = 2.62$, $CI\ 95\ \% = [0.039, 0.277]$) at low ($B = 0.21$, $SE = 0.06$, $t = 3.02$, $CI\ 95\ \% = [0.073, 0.347]$), middle ($B = 0.35$, $SE = 0.05$, $t = 6.05$, $CI\ 95\ \% = [0.236, 0.465]$), and high ($B = 0.51$, $SE = 0.09$, $t = 5.49$, $CI\ 95\ \% = [0.327, 0.693]$) levels (Fig. 2A), weakening the effect of fear. Similarly, narcissism moderated the fear-compliance link ($B = 0.16$, $SE = 0.04$, $t = 3.71$, $CI\ 95\ \% = [0.079, 0.258]$) at low ($B = 0.12$, $SE = 0.06$, $t = 2.00$, $CI\ 95\ \% = [0.002, 0.255]$), middle ($B = 0.31$, $SE = 0.05$, $t = 6.09$, $CI\ 95\ \% = [0.213, 0.417]$), and high ($B = 0.50$, $SE = 0.07$, $t = 6.33$, $CI\ 95\ \% = [0.346, 0.659]$) levels (Fig. 2B). No moderating effect of Machiavellianism was found ($B = 0.05$, $SE = 0.05$, $t = 0.97$, $CI\ 95\ \% = [-0.053, 0.158]$). Table 2 summarises the results of the three moderating models advanced in this study.

5. Discussion

The current research aimed to deepen the association between fear of COVID-19 and compliance with prevention guidelines during the fourth wave of the COVID-19 pandemic in Italy. As advanced in H1, results showed that fear was positively associated with compliance with prevention guidelines, suggesting people's fear of COVID-19 is a significant motivator for healthy practices and prevention behaviours. These findings align with previous research showing that fear promotes adherence to health behaviours during the COVID-19 pandemic, such as getting vaccinated, wearing masks, washing hands, and preferring remote medical consultations (Harper et al., 2021; Reuken et al., 2020; Scrima et al., 2022).

Moreover, the study aimed to address the moderating role of the DT, hypothesising that all DT personalities might dampen the functional degree of fear of COVID-19, weakening the compliance with prevention

Table 1
Means, standard deviations, and inter-correlations amongst all variables.

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Fear of COVID-19	2.26	1.00	1										
2. Compliance with prevention guidelines	4.17	0.93	0.45**	1									
3. Psychopathy	0.89	1.00	-0.33**	-0.39**	1								
4. Narcissism	1.25	1.11	-0.32**	-0.56**	0.38**	1							
5. Machiavellianism	0.61	1.04	-0.29**	-0.55**	0.46**	0.57**	1						
6. Age	30.89	12.94	-0.13	0.02	-0.06	0.04	-0.05	1					
7. Gender			-0.22**	-0.12	0.19**	0.20**	0.26**	0.02	1				
8. Education	14.32	2.63	-0.06	-0.04	-0.18**	0.16*	-0.02	0.17*	-0.16*	1			
9. Knowledge of COVID-19	3.18	0.72	0.03	0.07	-0.12	-0.15*	-0.23**	0.07	-0.13	0.09	1		
10. Past COVID-19 infection			0.00	0.00	0.00	-0.06	-0.06	0.07	-0.14*	0.00	0.06	1	
11. Vaccination			0.11	0.04	0.00	0.06	0.03	-0.06	0.02	-0.05	-0.14*	-0.22**	1

Note. *N* = 205, gender (0 = F; 1 = M), past COVID-19 infection (0 = non infected; 1 = previously infected), and vaccination (0 = non-vaccinated; 1 = vaccinated) were dummy coded.

* *p* < 0.05 (two tailed).

** *p* < 0.01 (two tailed).

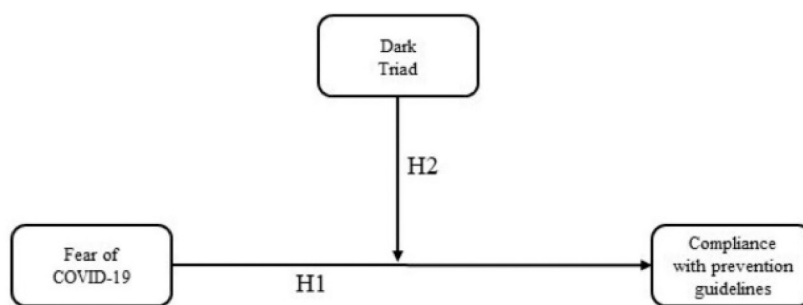


Fig. 1. The theoretical moderating model hypothesised in the current research.

Note. H1 = Fear of COVID-19 is positively associated with people's compliance with COVID-19 preventions guidelines (unconditional effect); H2 = The Dark Triad (psychopathy, narcissism, and Machiavellianism) moderates the positive association between fear of COVID-19 and compliance with preventions guidelines (moderation effect).

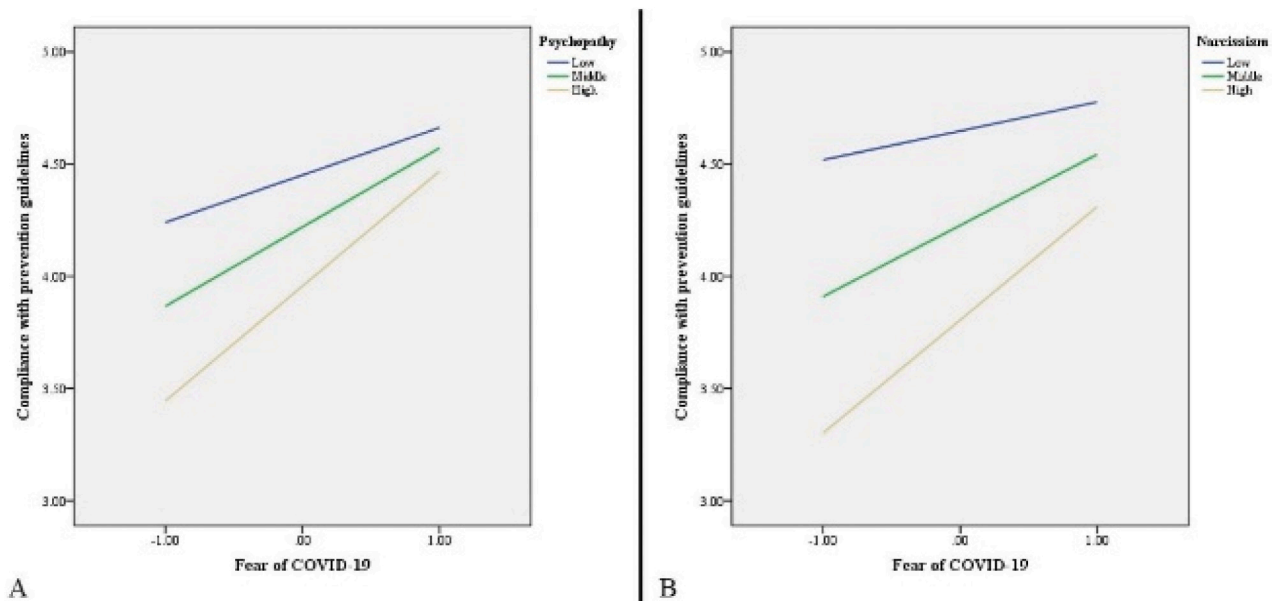


Fig. 2. The moderating effect of psychopathy (A) and narcissism (B) on the association between fear of COVID-19 and compliance with prevention guidelines.

guidelines (H2-H4). Results revealed that psychopathy and narcissism moderated the association between fear and compliance with prevention guidelines, whereas no moderating effect of Machiavellianism was found. These findings confirmed H2 and H3 and rejected H4. Specifically, results suggested that even though the DT relies on a lack of emotional competencies and a high disposition toward risk behaviours for health, it is not fully involved in weakening the functional effect of

fear on prevention behaviours. The explanation of the moderating effect of psychopathy could rely on the difficulties in emotion regulation, which results in impulsivity and the superficiality in experiencing emotional states shown by people with high psychopathy (Casey et al., 2013). This scenario could determine a deficiency of emotionality (Patrick et al., 2005), dampening the role of fear as a motivator for healthy practices and adherence to prevention guidelines. Additionally,

Table 2
Coefficients for the moderating models.

	B	SE	t	LLCI	ULCI
Fear of COVID-19	0.35	0.05	6.05	0.236	0.465
Psychopathy	-0.26	0.06	-4.33	-0.379	-0.142
Fear of COVID-19 × psychopathy	0.15	0.06	2.62	0.039	0.277
$R^2 = 0.33$					
$F(3, 201) = 33.84^{***}$					
Fear of COVID-19	0.31	0.05	6.09	0.213	0.417
Narcissism	-0.37	0.04	-8.13	-0.471	-0.287
Fear of COVID-19 × narcissism	0.16	0.04	3.71	0.079	0.258
$R^2 = 0.46$					
$F(3, 201) = 57.46^{***}$					
Fear of COVID-19	0.27	0.05	5.39	0.175	0.377
Machiavellianism	-0.45	0.05	-7.77	-0.568	-0.338
Fear of COVID-19 × Machiavellianism	0.05	0.05	0.97	-0.053	0.158
$R^2 = 0.47$					
$F(3, 201) = 61.10^{***}$					

Note. $N = 205$. SE = Standard Error, LLCI = Lower Limit of the 95 % Confidence Interval, ULCI = Upper Limit of the 95 % Confidence Interval.

*** $p < 0.001$.

like psychopathy, narcissism is closely associated with a deficit in emotion regulation (in terms of personal relevance about the nature, intensity, duration, and expression of emotions) and emotional instability (Walker et al., 2022), which could bring to misinterpretations of fear, weakening its adaptative functionality. Notably, the inconsistency of the moderating role of Machiavellianism could mainly rely on the suppressive emotional mechanisms adopted by Machiavellians. In particular, even though people with high Machiavellianism tend to experience intense negative emotions, lose control quickly, and show serious difficulty dealing with stress (Monaghan et al., 2016), they are mainly focused on the strategic consequences of events regardless of their emotional states. This implies that people with high Machiavellianism tend not to allow emotions to distract them, even in emotionally stressful situations such as the COVID-19 pandemic (Szijarto & Bereczkei, 2015; Walker et al., 2022).

The current research yielded some relevant theoretical implications. First, it confirmed and extended the evidence on the role of fear as one of the main factors involved in people's compliance with healthy prevention guidelines during an impactful and rapid societal change such as the COVID-19 pandemic. Second, this study supported the moderating role of the DT in the association between fear and compliance with prevention guidelines and provided a better understanding of the contribution of personality in affecting people's emotional experience and healthy behavioural changes. Specifically, the study demonstrated that only psychopathy and narcissism play a moderating effect, revealing that the DT is partially involved in people's disposition toward prevention behaviours due to the emotional suppressive strategies adopted by Machiavellians.

Despite these implications, the current research showed a few limitations worth mentioning. First, this study adopted a cross-sectional survey design. Specifically, cross-sectional surveys can only address the simultaneous associations amongst variables and do not allow making cause and effect inferences. Therefore, future research should confirm the results of the current research with a longitudinal survey design. Second, DT was assessed using the DTDD, a brief questionnaire allowing only a unidimensional evaluation of psychopathy, Machiavellianism, and narcissism. Future research should consider a more granular approach, addressing different facets of the DT personalities, including primary and secondary psychopathy as well as grandiose and vulnerable narcissism. Furthermore, the moderating role of personality should also be explored through different personality taxonomies, including the HEXACO and the Light Triad.

CRediT authorship contribution statement

Marco Giancola: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Project administration.

Data availability

Data will be made available on request.

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