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Social distancing is the right thing to do: Dark Triad behavioral correlates in the COVID-19 quarantine

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ABSTRACT

The COVID-19 outbreak has recently reached the status of a global pandemic. People should abide by governmental rules to avoid spreading contagion. These rules could be associated with the concept of "social distancing", namely avoiding contact with others. In such an unprecedented situation, social gathering and display of affection should be considered potentially harmful, while isolation is deemed altruistic. The distinction between prosocial and antisocial behavior is suddenly ambiguous, and research is needed to understand citizens' behavior during the pandemic, in order to adapt public health communication to multiple kinds of recipients. 465 participants filled in an online questionnaire on their experience and behavior during the first weeks of the quarantine, and on antisocial personality (Dark Triad Dirty Dozen). Results showed that machiavellianism and psychopathy are negatively correlated with adoption of healthy behaviors and positively associated with the tendency to continue living one's own life "as nothing happened". Also, sex differences relates to healthy or antisocial behaviors, significantly mediated by machiavellianism. It is possible that non-conforming to recommendations is not influenced by aggression, but by individuals persevering in their activities independently of the quarantine, consistently with machiavellianism. Discussion deals with suggestions for effective communication of good practices in the pandemic.

1. Introduction

The present article is being written at home. Due to the COVID-19 outbreak, the Italian government, consistently with other emergency policies across the globe, decided for extensive lockdown of public businesses and crowded places, and delivered stay-at-home orders to the people. At present, Italian citizens are allowed to come out of their homes just for buying necessary goods, proven job-related reasons or urgent needs that should be justified to the police.

This is related to the concept of "social distancing", namely reducing contact with others to a minimum in order to avoid the risk of contagion. While this concept exists in epidemiological research as a policy to be adopted at the society level to control influenza diseases, and its efficacy was demonstrated by observational and simulation studies (Glass et al., 2006; Halloran et al., 2008; Kelso et al., 2009), it recently became a topic of public opinion discourse. For example, the Washington Post published an article featuring a simulation (featuring the fictional disease "simulitis") to attempt explaining to the public how social distancing and limited isolation could help fighting the pandemic (https://www.washingtonpost.com/graphics/2020/world/corona-simulator/). Since about a month, social distancing is an hashtag trending on the main social media, for example with around 450.000 conversations on twitter a week in April.

The effort to stay away from others' personal space and the minimization of in-person encounters is proving detrimental for people who are isolating from their dear ones; the quarantine has been found associated with negative effects on well-being and health (e.g., persistent negative emotions such as boredom, anger and fear, anxiety connected to work and financial loss, and post-traumatic stress symptoms; Arnaboldi et al., 2017), possibly long-lasting (Brooks et al., 2020). While it is possible to predict the positive effects of social distancing on the pandemic, it is difficult at the moment to prefigure its secondary effects on the population's quality of social relationships, well-being and mental health in the long-term. Anthropologists are criticizing the way social distancing is being presented by politicians and the media, namely as an individualized effort that leads to "radical asociality" (Long, 2020).

Besides the urgency to understand the psychological effects of the quarantine, isolation and social distancing (e.g., Curigliano et al., 2020), it may be even more important to analyze how much citizens are

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actually abiding by the regulations and enacting social distancing for the common good or not. Such understanding would be helpful to adapt public health communication to multiple kinds of recipients and possibly augment the public's responsiveness and collaboration within the emergency situation as well as in similar situations in the future.

Personality tendencies may play a role in decision making: we could predict that individuals high in so-called antisocial personality traits may abide by regulations to avoid punishment and legal actions, while others may do it to preserve their own and others' safety. Yet, the COVID-19 quarantine is creating a unique situation for the expression of prosocial or antisocial attitudes, in that isolation and asociality have suddenly become altruistic and socially-desirable conducts. It is interesting to observe whether socially aversive personalities are complying with isolation and social distancing or, on the contrary, they are avoiding such behaviors and instead engaging in antisocial conducts within the specific context of the COVID-19 emergency and the quarantine.

1.1. The Dark Triad of personality

The “Dark Triad” is a well-known configuration of the most socially aversive, yet non-pathological, personality tendencies (Furnham et al., 2013; Jakobwitz & Egan, 2006; Paulhus & Williams, 2002). The so-called dark traits originally emerged within the HEXACO model of personality (Ashton & Lee, 2007) as sub-traits of the Honesty-Humility factor. Later, Paulhus and Williams (2002) coined the term and promoted the research on these traits as an autonomous constellation. The triad is composed by Machiavellianism, Narcissism, and Psychopathy. Machiavellianism refers to cold, manipulative individuals who tend to abuse or neglect others in favor of their own gain; Narcissism refers to grandiose, entitled, dominant personalities possibly showing aggressive attitudes when it comes to preserve the self-image; Psychopathy features high impulsivity and thrill seeking accompanied by anxiety and low empathy. Research shows that the dark traits have specificity and independency (Jones & Weiser, 2014; Ramos-Villagrasa et al., 2020), yet they could also be referred to a core, antisocial and manipulative unique trait (Kajonius et al., 2016; Moshagen et al., 2018). In essence, the Dark Triad is associated with an unconventional and antisocial morality, and with a higher probability of engaging in manipulative and controversial behavior towards others. However, the original Dark Triad theory is inherently sub-clinical, which means that it captures personality traits that are not considered psychopathological (Paulhus et al., 2018; Paulhus & Williams, 2002). From a theoretical viewpoint, the Dark Triad has been studied from a traditional, trait-based personality approach, which tends to emphasize its dysfunctional aspects. Differently, evolutionary psychology approaches adopt a more tempered view of the Dark Triad (Jonason et al., 2012), by recognizing its evolutionary function as a life-history strategy. Life-History theory (Wilson, 1975) sustains that people design their own life path according to environmental restrictions. For example, when growing up within a risky, unpredictable environment associated with a low life expectancy, individuals would tend to prefer short-term mating strategies and opportunities to produce more offspring, but investing less in each of them, and would be more likely to engage in egoistic and antisocial behavior to procure resources to survive (“fast” life history strategy). According to this approach, the Dark Triad would be a form of fast life strategy in itself, emerging by environmental contexts perceived as unpredictable and promoting antisocial behavior as a resource against those challenging life contexts (Gladden et al., 2009; Jonason et al., 2012; McDonald et al., 2012). While recent research has highlighted that the leadership/authority, fearless dominance and calculation facets of the dark traits could be associated with “slow” life history strategies as well (Billet & Fekken, 2020; Jonason et al., 2017; McDonald et al., 2012), this approach has allowed researcher to better understand the functional role of dark traits in guiding behavior. Indeed, dark traits could be associated with some advantages in everyday life, that could be read in the light of life history theory. For example, high scores in the Dark Triad have been found related to successful short-term mating strategy (Baughman et al., 2014; Jonason et al., 2009), which would support the tendency (typically higher in males) to look for multiple sexual partners. Indeed, sex differences are relevant when considering the dark traits, given that most literature report high Dark Triad levels especially in males (Muris et al., 2017; Jonason & Davis, 2018).

Literature found important associations between the dark traits and health-related behavior, most of them with unhealthy consequences; for example, narcissism is related to scarcely healthy conducts and lifestyle, because of the sense of omnipotence that characterizes such trait, while psychopathy is associated with low life expectancy (Jonason et al., 2015). All dark traits are associated with risky behaviors, for example in sexual health, as well as with miscarriages in women (Jonason & Lavertu, 2017). Notable results emerge also when controlling for other personality traits and demographic variables, with psychopathy predicting injuries and substance use, and machiavellianism predicting high blood pressure, a risk factor for cardiovascular diseases (Hudek-Knežević et al., 2016). Yet, Dark traits may also exert a positive influence in some health areas, for example machiavellianism negatively predicts cancer and back pain (Hudek-Knežević et al., 2016). Indirectly, as found in the study by Spurk and colleagues (Spurk et al., 2016), machiavellianism and narcissism are associated with career outcomes in some professional fields (e.g., salary, achievement of leadership positions), so they may be indirectly related to positive aspects in quality of life.

Besides health, the dark traits are generally considered maladaptive and are certainly associated with delinquency and aggressive behaviors, especially psychopathy and machiavellianism, and with antisocial behavior and difficulty in relationships (Muris et al., 2017). For this reason it is important to investigate dark traits in relation with the COVID-19 outbreak as a health emergency, but also with the (anti)social phenomena of quarantine and social distancing. In order words, in the current situation social behavior (e.g., isolation and distancing) is significantly overlapped with health behavior or the conducts to avoid oneself and others' contagion. Public health communication should be able to reach an audience complex and multiple in terms of individual tendencies, and for this reason it should be able to understand how given messages could be received by personalities potentially averse to modifying their everyday life for common good reasons.

1.2. Sex differences

Sex differences may be relevant to understand behavior and adherence to quarantine regulations. Recent studies reported that, in China hardest-hit areas during COVID-19 outbreak, women reported higher alterations in cognition and mood (Liu et al., 2020). Consistently, more preoccupation with health risks and safety issues during the outbreak in women has been confirmed by studies on social media communication (Thelwall & Thelwall, 2020), although it is known that men tend to share emotions less online (Muscanell & Guadagno, 2012; Triberti et al., 2017). Women also tend to abide by rules and laws more than men (Benson & Harbinson, 2020), are more concerned with side-effects of health interventions or changes in lifestyle (Masiero et al., 2015) and are more prosocial and empathic (or at least socially-expected to be; Jonason et al., 2020; Ickes et al., 2000; Toussaint & Webb, 2005). For these reasons, it is possible that sex will influence individuals in their tendency to adopt healthy and prosocial conducts. Finally, as previously said, sex differences are relevant in the Dark Triad of personality, typically manifesting in males to a stronger extent (Muris et al., 2017; Jonason & Davis, 2018); for these reasons, we will investigate the role of sex differences in the behavioral responses to the quarantine experience, taking into consideration the role played by dark traits of personality.

The general aim of this study is to investigate the relationship between Dark Triad traits and behaviors of Italian participants during the

COVID-19 outbreak and the quarantine.

More specifically, to determine:

a) the possible relationship between sex, dark traits, and behaviors;
b) whether dark traits can mediate the relationship between sex and healthy behaviors.

Since literature shows that Dark Triad is associated with an unconventional and antisocial morality, and with a higher probability of engaging in manipulative and controversial behavior towards others, we expected that participants high in dark traits will be more inclined to adopt "bad" behaviors during the quarantine. Consistently, we expected that people with higher scores in dark traits will be less inclined to abide by the Italian Health Ministry's rules and to adopt healthy/safety behaviors during the quarantine.

Additionally, since women tend to abide by rules and laws more than men and are more prosocial and empathic, we expected that sex will influence individuals in their tendency to adopt healthy and prosocial conducts and that women will be less inclined to adopt "bad" behaviors.

2. Method

2.1. Participants

In March 2020, during the COVID-19 pandemic outbreak, 465 Italian quarantined participants not infected by COVID-19 were surveyed. Seventy percent were female (n = 328; male: n = 137; no participants have chosen the options "other" or "prefer not to say"), with ages ranging from 18 to 99 years old (M_{age} = 39.59, SD = 15.87). The majority of them were well-educated (Master degree or post-university degree 48.6%) and were in a relationship or engaged (65.4%). All the participants were in Italy during quarantine and were allowed to come out of their homes just for buying necessary goods, proven job-related reasons or urgent needs that should be justified to the police (Table 1 reports details on the sample).

2.2. Procedure and instruments

The survey was conducted in March 2020 during the COVID-19 outbreak. Italian participants were invited to complete an online survey. All participants were informed that all the responses would remain strictly confidential and anonymity was protected. Participants were invited to complete the Italian version of the *Dark Triad Dirty Dozen* (Jonason & Webster, 2010; Schimmenti et al., 2019). This is a 12-items scale that assesses individual differences in dark traits: *Machiavellianism* (4 items, e.g., "I tend to manipulate others to get my way"), *Psychopathy* (4 items, e.g., "I tend to lack remorse"), and *Narcissism* (4 items, e.g., "I tend to want others to admire me"). Participants were asked how much they agreed with statements on each of the dark traits through a 5-point Likert scale (from 0 [not at all] to 4 [very much]). Higher average scores indicate higher levels of dark traits. Several studies have been conducted to assess the validity of this scale, providing support for the structural properties (e.g., Jonason & Luévano, 2013; Webster & Jonason, 2013). In this study, the scale revealed a Cronbach's alpha coefficients equal to 0.85 for *Machiavellianism*, 0.64 for *Psychopathy*, and 0.83 for *Narcissism*, suggesting that the subscales performed reliably.

Participants' behaviors during home quarantine were also assessed through a 16-items ad-hoc questionnaire based on the COVID-19 guidelines by the Italian Ministry of Health (e.g., Italian Ministry of Health, 2020). Participants were invited to indicate if they were willing to adopt in the preceding two-weeks the preventive behaviors towards COVID-19 infection through a 5-point Likert scale (from 1 [Never] to 5 [Always]). The questionnaire includes items such as *"I paid attention to cover my mouth and nose when sneezing"*, "*I reduced social interactions"*, and "*I avoided contact with people suffering from acute respiratory infections"*.

Items were subjected to an exploratory factor analysis: The initial matrix of correlations showed adequate factorizability (KMO test = 0.807; Bartlett's Test of Sphericity: $X^2(120) = 1218.890$, $p < .01$) and a parallel Monte Carlo simulation analysis revealed a two-factor structure solution. This solution explained the 31.92% of the total variance. Loadings of items after an oblique rotation (Varimax) are reported in Table 2. Factor 1, namely *Healthy behaviors*, accounted for 20.77% of the variance was defined by eleven items such as "*I washed my hands frequently"* and "*I reduced exits from home to those strictly necessary"* and describe positive behavioral tendencies to keep yourself safe during the quarantine. Factor 2, namely "*Bad" behaviors,* accounted for 11.15% of the variance was defined by five items such as "*I propagated alarming news even if I wasn't sure they were true"* and "*I avoided contact with people with oriental somatic traits"* and describe negative behaviors taken by people during the quarantine (Table 2). Alpha coefficients were 0.73 for the first factor (*Healthy behaviors*) and 0.50 for the second factor (*"Bad" behaviors*).

Table 1
Sociodemographic characteristics of respondents.

	Total sample	
	n	%
Gender		
Female	328	70.5
Male	137	29.5
Education		
Primary school	3	0.6
Secondary school	27	5.8
High school	209	44.9
Master degree	158	34.0
Post-University degree	68	14.6
Status		
Single	119	25.6
In a relationship	151	32.5
Engaged	153	32.9
Divorced or separated	29	6.2
Employment		
Students or working students	129	27.8
Unemployed	26	5.6
Part-time employed	45	9.7
Full-time employed	182	39.1

2.3. Data analysis

Consistent with our aims, analyses were performed in two steps.

First, Pearson's correlations analyses were run in order to explore the relationship between each of the dark traits and behaviors in the sample. We also tested for sex differences: We conducted a *t-test* and Analysis of Variance (ANOVA) to explore the differences between male and female on dark traits and behaviors.

Additionally, we conducted mediation analyses for the sex differences in behaviors during quarantine using dark traits as mediators. Analyses were run using *SPSS* (version 20.0.0) and using the *PROCESS* procedure developed for *SPSS* (Hayes v3.4) in order to run bootstrapping technique (Preacher & Hayes, 2008) to reveal any possible mediational effect.

3. Results

Correlations revealed significant relationships between the dark traits and behaviors during COVID-19 quarantine (Table 3). The dark traits were each associated negatively with the positive behaviors during the quarantine (*Machiavellianism*: $r = -0.207$, $p < .01$; *Psychopathy:* $r = -0.166$, $p < .01$; *Narcissism:* $r = -0.121$, $p < .01$).

Table 2
Factor Loadings > .35 are in boldface.

	Healthy behaviors	"Bad" behaviors
I washed my hands frequently	**0.653**	−0.013
I avoided contact with people suffering from acute respiratory infections	**0.467**	0.134
I did not touch my eyes, nose, and mouth with my hands	**0.401**	0.003
I paid attention to cover my mouth and nose when sneezing	**0.596**	−0.148
I cleaned my house or my workplace with disinfectants based on chlorine or alcohol or other disinfectants	**0.506**	0.130
I avoided contact with people with oriental somatic traits	0.179	**0.643**
I purposely avoided ordering parcels from China or products made in China.	0.195	**0.605**
I avoided prolonged contact with pets	−0.008	**0.463**
I have tried to have food supplies at home so that I can hold out for several days without going out	**0.443**	0.173
I have continued my life normally, without special precautions	**−0.443**	0.095
I propagated alarming news even if I wasn't sure they were true	−0.206	**0.515**
I actively avoided people who coughed, sneezed or who for some reason seemed potentially infected	**0.569**	0.253
I have made an effort to stay away from other people	**0.679**	−0.043
I have been more aggressive towards strangers	−0.086	**0.613**
I reduced exits from home to those strictly necessary	**0.550**	−0.098
I reduced social interactions	**0.533**	−0.037

Specifically, machiavellian people are less oriented to adopt behaviors that guarantee hygiene and personal or others' care during the COVID-19 such as washing hands ($r = -0.141$, $p < .01$), do not touching the eyes, nose, and mouth ($r = -0.133$, $p < .01$) or cover the mouth during a sneeze ($r = -0.253$, $p < .01$). Additionally, machiavellian people are less oriented to reduce their social interaction ($r = -0.119$, $p < .01$), avoid contact with people ($r = -.210$, $p = .01$), even in cases where people suffer from acute respiratory infections ($r = -.150$, $p < .01$), continuing to live their lives normally without taking special precautions ($r = 0.140$, $p < .01$) .

Similarly, people with psychopathic traits are less oriented to adopt behaviors that promote hygiene and personal care such as washing hands ($r = -0.138$, $p < .01$) or clean and disinfect their house ($r = -0.119$, $p < .01$). Despite the pandemic, psychopathic people tend to live their lives normally without taking special precautions ($r - 0.203$, $p < .01$), without avoiding potentially infected people ($r = -0.094$, $p < .05$), and without covering your mouth during a sneeze ($r = -0.136$, $p < .01$).

Additionally, narcissistic people are less oriented towards adopting personal hygiene behaviors, such as cleaning home surfaces with disinfectants ($r = -0.098$, $p < .05$), covering their mouth during a sneeze ($r = -0.116$, $p < .05$), or avoid touching the eyes, nose and mouth with hands ($r = -0.151$, $p < .01$). Similar to the other traits included in the Dark Triad, narcissistic people tend to live their normal lives, as if nothing was happening ($r - 0.112$, $p < .05$).

On the contrary, it seems that dark traits are not related to the negative and potentially aggressive behaviors during the quarantine. Although, all the traits included in the triad seem to be positively related to the tendency to spread alarming news even if they are not sure about their truthfulness (*Machiavellianism*: $r = 0.202$, $p < .01$; *Psychopathy*: $r = 0.125$, $p < .01$; *Narcissism*: $r = 0.129$, $p < .01$).

In order to conduct mediation analysis, we explored sex differences in dark traits. Data highlighted that men scored higher than women on *Machiavellianism, Psychopathy,* and *Narcissism* (*Machiavellianism*: $t(222.79) = -3.122$, $p < .01$; *Psychopathy*: $t(200.60) = -5.332$, $p < .01$; *Narcissism*: $t(463) = -3.266$, $p < .01$). Additionally, women are more inclined to adopt healthy behaviors in quarantine than men ($t(463) = 5.125$, $p < .01$), but no differences emerged for "bad" behaviors (Table 4).

We conducted mediation analyses to test any possible mediation effect by dark traits in the relationship of sex differences and healthy and "bad" behaviors. Dark traits were used as mediators in the analysis and significant mediation occurs if the 95% bias-corrected confidence intervals for the indirect effect do not include the zero (Hayes & Scharkow, 2013). All the results were obtained based on 5000 bootstrapped samples.

Table 3
Pearson's correlations between dark traits and participants' behaviors during quarantine.

		Machiavellianism	Psychopathy	Narcissism
	Healthy behaviors	−0.207**	−0.166**	−0.121**
	"Bad" behaviors	0.067	0.017	0.038
Healthy behaviors	*I cleaned my house or my workplace with disinfectants based on chlorine or alcohol or other disinfectants*	−0.040	−0.119*	−0.098*
	I washed my hands frequently	−0.141**	−0.138**	−0.076
	I paid attention to cover my mouth and nose when sneezing	−0.253**	−0.136**	−0.116*
	I actively avoided people who coughed, sneezed or who for some reason seemed potentially infected	−0.082	−0.094*	−0.016
	I have made an effort to stay away from other people	−0.210**	−0.085	−0.072
	I reduced exits from home to those strictly necessary	−0.076	−0.046	−0.015
	I avoided contact with people suffering from acute respiratory infections	−0.150**	−0.087	−0.035
	I reduced social interactions	−0.119**	−0.080	−0.073
	I have tried to have food supplies at home so that I can hold out for several days without going out	0.021	−0.026	0.020
	I did not touch my eyes, nose and mouth with my hands	−0.133**	0.004	−0.151**
	I have continued my life normally, without special precautions (R)	−0.140**	−0.203**	−0.112*
"Bad" behaviors	*I avoided contact with people with oriental somatic traits*	0.009	−0.010	−0.002
	I have been more aggressive towards strangers	0.118*	0.013	0.077
	I purposely avoided ordering parcels from China or products made in China	−0.034	−0.008	−0.007
	I avoided prolonged contact with pets	0.018	−0.010	−0.012
	I propagated alarming news even if I wasn't sure they were true	0.202**	0.125**	0.129**

(R) = item reversed.
** $p < .01$.
* $p < .05$.

Table 4
Sex differences and descriptive statistics for behaviors during COVID-19 and Dark Triad traits.

	Mean (SD)			
	Men	Women	Overall	*t*(df)
Healthy behaviors	3.87(0.57)	4.15(0.59)	4.06(1.64)	5.125(463)**
"Bad" behaviors	1.64(0.68)	1.62(0.68)	1.64(0.67)	−0.266(463)
Machiavellianism	0.86(0.75)	0.63(0.64)	0.70(0.68)	−3.12(222.79)**
Psychopathy	1.11(0.80)	0.71(0.59)	0.82(0.69)	−5.33(200.60)**
Narcissism	1.59(0.81)	1.30(0.90)	1.38(0.88)	−3.27(463)**

** $p < .01$.

The path (direct effect) from participants' gender to *Machiavellianism* (β = 0.227, s.e. = 0.068, $t = 3.331$, $p < .01$, 95%CI [0.093;0.361]), *Psychopathy* (β = 0.406, s.e. = 0.067, $t = 6.024$, $p < .01$, 95%CI [0.274;0.539]), and *Narcissism* (β = 0.291, s.e. = 0.089, $t = 3.266$, $p < .01$, 95%CI [0.116;0.466]) is positive and significant.

The path from participants' gender to healthy behavior is statistically significant and negative ($b = -0.227$, s.e. = 0.055, $t = -4.172$, $p < .01$, 95% CI [−0.335; −0.120]), indicating that females are more likely to adopt healthy behaviors during the quarantine than males. The direct effect of *Machiavellianism* on healthy behavior is negative and statistically significant ($b = -0.132$, s.e. = 0.044, $t = -2.975$, $p < .01$, 95% CI [−0.219;−0.045]), suggesting that people who scored higher in *Machiavellianism* are more likely to avoid positive behaviors during the COVID-19 quarantine. Whereas, the direct effect of *Psychopathy* and *Narcissism* on healthy behaviors is not statistically significant ($b = -0.042$, s.e. = 0.038, $t = -1.099$, $p = .273$, 95% CI [−0.117; 0.033]; $b = 0.009$, s.e. = 0.033, $t = 0.277$, $p = .782$, 95% CI [−0.055;0.074], respectively). Data suggested that sex differences in healthy behaviors ($R^2 = 0.09$, $p < .01$) was partially mediated by *Machiavellianism* (Indirect Effect = −0.030, s.e. = 0.015, 95%CI [−0.064, −0.006]; Table 5; Fig. 1).

However, the path from participants' gender to "bad" behavior is not statistically significant ($b = 0.004$, s.e. = 0.072, $t = 0.058$, $p = .954$, 95% CI [−0.138;0.146]). In the same line, the direct effect of *Machiavellianism* ($b = 0.061$, s.e. = 0.059, $t = 1.045$, $p = .296$, 95% CI [−0.054;0.177]), *Psychopathy* ($b = -0.003$, s.e. = 0.051, $t = -0.059$, $p = .953$, 95% CI [−0.102;0.096]), and *Narcissism* ($b = 0.005$, s.e. = 0.044, $t = 0.119$, $p = .905$, 95% CI [−0.08;0.091]) on "bad" behaviors is not statistically significant.

Data suggested that sex differences in "bad" behaviors ($R^2 = 0.00$, $p = .748$) was not partially mediated by *Dark Triad* (Total Indirect Effect = 0.014, s.e. = 0.021, 95%CI [−0.027; 0.057]; Table 6; Fig. 2).

4. Discussion

The Dark Triad traits are generally considered maladaptive and frequently associated with antisocial behavior (Moor and Anderson, 2019), difficulty in relationships (Muris et al., 2017), aggressive behavior and delinquency attitudes. Exploring how the Dark Triad traits are related to healthy/"bad" behaviors during the COVID-19 pandemic could be very useful to learn more about how people live during Italian pandemic outbreak, and also to provide information for effective public health communication and citizen engagement.

Table 5
Bootstrapped indirect effects of condition on healthy behaviors via sex of participants at specific dark traits.

	Effect (β)	SE	95%CI
TOTAL	−0.04	0.02	−0.09; −0.01
Machiavellianism	−0.03	0.02	−0.06; −0.01
Psychopathy	−0.02	0.02	−0.05; 0.01
Narcissism	0.00	0.01	−0.02; 0.02

Note. 5000 bootstrapping sample.

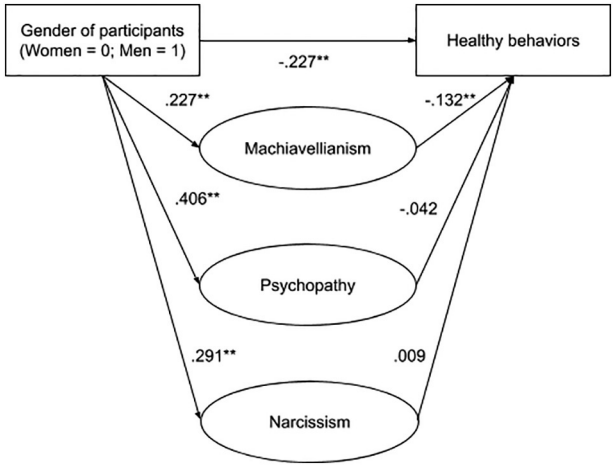

Fig. 1. Partial mediation of sex differences in healthy behaviors.

Table 6
Bootstrapped indirect effects of condition on "bad" behaviors via sex of participants at specific dark traits.

	Effect (β)	SE	95%CI
TOTAL	0.01	0.02	−0.03; 0.06
Machiavellianism	0.01	0.02	−0.01; 0.05
Psychopathy	−0.00	0.02	−0.04; 0.04
Narcissism	0.00	0.01	−0.03; 0.03

Note. 5000 bootstrapping sample.

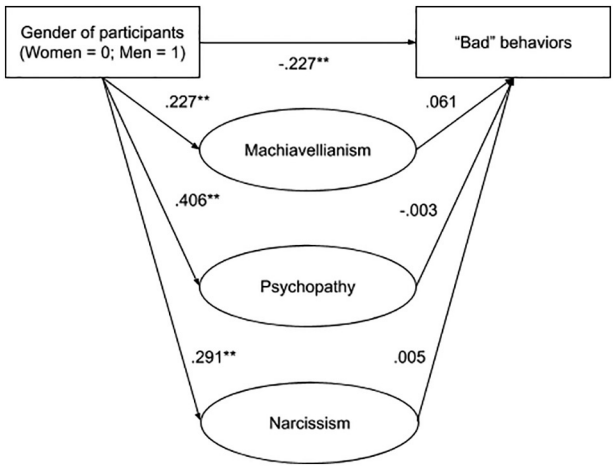

Fig. 2. Partial mediation of sex differences in "bad" behaviors.

Data highlighted that Dark Triad traits are negatively related to healthy behaviors included in the Italian Ministry of Health's COVID-19 guidelines, while no significant relations emerged between dark traits and a main subscale related to "bad" behaviors. This suggests that the Dark Triad is partially related to avoidance of prosocial behaviors, while it does not play a role (at least not in a consistent way) in the adoption of inherently aggressive or antisocial conducts within the specific context of the quarantine.

People high in dark traits are often prone to avoid precautions, tend to live their life as nothing happened, and spread alarming news. Machiavellianism is negatively related to personal care and social distancing. On the one side, machiavellian people are less likely to avoid behavior related to hygiene, such as washing their hands or not

touching their noses. On the other side, they are not inclined to avoid sick people or to reduce social interactions. Possibly, correlations between dark traits and single items show some pattern of interest, such as machiavellianism people tend to maintain social interactions, and to avoid precautions related to social distancing.

Dark traits negatively predict engagement in good behaviors, specifically in terms of machiavellianism and psychopathy. When attempting a mediation model, sex appears as a significant predictor with mediation by machiavellianism alone. While it should be taken into consideration that explained variance is modest (9%), the result is interesting. First, females may be generally more keen to abide by regulations for safety and prosociality, such as adopting social distancing. With machiavellianism acting as a mediator, it is possible to state that disrespect of social distancing and scarce adoption of healthy behaviors are not related to aggression or antisocial attitudes per se (which would imply a stronger involvement of the other dark traits, especially psychopathy), but to individuals' tendency to pursue their own goals and activities which are perceived more important than others' safety. Indeed, machiavellian persons show little concern for others and the environment because that would hinder them in their attempts to ruthlessly pursue personal gains (Zettler et al., 2011). This is consistent with correlations results, which show how machiavellian people tend to not modify social relationships so much in the context of the quarantine, because people high in this dark trait depend on others to manipulate for their own profit.

As argued above, the global pandemic and the quarantine are a unique context for the behavioral expression of some personality traits. Originally, as first we expected that dark traits could contribute to predict harmful, inherently aggressive behaviors in the specific context of the quarantine (the “bad” behaviors, e.g., becoming more aggressive towards strangers; actively avoiding people and objects from oriental countries; etc.), but this did not emerge. With the exception of spreading alarming, possibly fake news on the disease, that correlated with all the dark traits, results showed that the Dark Triad seems not to play a role in inherently aggressive behaviors as described by the COVID-19 guidelines by the Italian Ministry of Health. On the contrary, in accordance with the second hypothesis, machiavellianism played a role in the avoidance of healthy behaviors (Miguel et al., 2020; Nowak et al., 2020). It is possible that such a relationship does not regard the aggressive/antisocial aspect of this dark trait, but rather the manipulation aspect and the tendency to prioritize one's own personal goals and activities.

5. Limitations and future research

As a limitation, this study had a cross-sectional design so one should be cautious in hypothesizing causal relationships. Moreover, people may lie and/or adopt a defensive stance when responding to questionnaires, because of potentially sensitive topics and personality tendencies such as those analyzed here (Baughman et al., 2014; Fantini et al., 2017). Future research may employ less explicit measurement of behaviors and quasi-experimental design to fully capture the influence of personality on healthy conduct in the emergency situation. Moreover, when adopting similar cross-sectional approaches, future studies may include the measurement of other personality traits. For example, conscientiousness and agreeableness from the Big Five model (John & Srivastava, 1999), which tend to be negatively associated with the Dark Triad (Paulhus & Williams, 2002), or trait aggression, may contribute to explain both low adoption of healthy behaviors and high engagement in “bad” behaviors.

Another limitation of the present study regards the fact that the questionnaire used for healthy/“bad” behaviors was not validated. Although it was only a recollection of behaviors based on governmental guidelines, future studies may validate more solid tools to analyze people's conduct in the specific context of the pandemic and quarantine policies at national level. Another limitation regards the results inherent to sex: while no participants identified themselves as non-female or male, the results may not be representative of non-binary persons. Finally, since results from the present study show that inherently aggressive or antisocial conducts within the quarantine context are not significantly determined by personality factors (at least not in terms of the Dark Triad), future research may explore the role of contingency factors as possible contributors in such risky conducts. For example perceived risk (Monzani et al., 2020), or membership within anti-governmental groups as well as exposure to fake news and conspiracy theories may influence aggressive behaviors. This would be consistent with recent research (Reny & Barreto, 2020) that showed that anti-Asian attitudes during the pandemic were associated with concern about the virus, xenophobic behaviors and policy preferences.

6. Practical and theoretical implications

Results from the present study are relevant for policy-making and public health communication during the health emergency. Public health communication should take into account that citizens are characterized by personality tendencies that sometimes could jeopardize the effectiveness of messages. It is possible that, in order to promote behavioral change in people that are still pursuing their own goals and activities and putting others at risk as a consequence, messages would be more effective when emphasizing how regulations do not necessarily limit one's own personal agency. In other words, when designing public messages and campaigns to sensitize people on the importance to adopt healthy behaviors (e.g., wearing the mask, sanitizing hands frequently, avoiding physical contact and social gatherings, etc.), governments should consider that recipients high in dark traits will not be motivated by others' safety. In other words, communication of healthy and safety behaviors centered on prosociality may not always be effective. A more powerful communication would also emphasize that to actively combat the virus could improve one's ability to obtain his or her own objectives, e.g., improve work productivity, augment the quality of social ties, returning to normality as soon as possible). Such a communication strategy may be appealing to individuals who tend to devalue others' happiness and safety, while being effective in promoting the adoption of healthy behaviors within the variety of personality disposition in the global population.

CRediT authorship contribution statement

Stefano Triberti: Conceptualization, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Ilaria Durosini:** Investigation, Methodology, Data curation, Formal analysis, Writing - original draft, Writing - review & editing. **Gabriella Pravettoni:** Investigation, Writing - review & editing, Supervision.

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