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The relationship between fear of COVID-19 and intention to get vaccinated. The serial mediation roles of existential anxiety and conspiracy beliefs

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ABSTRACT

Today, we witness the progress toward global COVID-19 vaccinations organized by countries worldwide. Experts say a mass vaccination plan is the only effective antidote against the spread of SARS-COV-2. However, a part of the world population refuses vaccination. The present study aimed to understand the impact of some individual variables on the intention to get vaccinated. Through a serial mediation model, we tested the influence of fear of COVID-19 on the intention to get vaccinated and the serial mediating effect of existential anxiety and conspiracy beliefs. Via a cross-sectional design this research was conducted with the participation of 223 French adults (Female: 69.5%; Male: 30.5%; M_{age} = 30.26, SD = 13.24; range: 18–75 years) who responded to an online survey. The results showed a positive relationship between fear of COVID-19 and intention to get vaccinated; however, when this fear was associated with high levels of existential anxiety through conspiracy beliefs, the intention to get vaccinated decreased. Our findings were in line with Terror Management Health Model, which states that, in facing health threats, humans may strive to reduce their own perceived vulnerability not only by engaging in healthy behaviors but also denying or avoiding death anxiety, as anti-vaxxers do.

1. Introduction

For more than a year, the world's population has been battling what is now called the COVID-19 pandemic (World Health Organization, 2020). This pandemic is widespread globally, with a difference in incidence, causing over 3 million deaths (John Hopkins University, 2021). To cope with the pandemic's spread, governments have activated various control systems, which often have led to lockdowns with a meaningful impact on people's quality of life and their psychological health (Matranga et al., 2020). To date, the only fundamental effective tool to defeat the pandemic would appear to be a mass vaccination program (Graham, 2020). We are witnessing, in fact, a proliferation of news about the planning and implementation of mass vaccination campaigns. Two main reactions accompany this news. A part of the population seems to be inclined to get vaccinated as soon as possible. Therefore, they wait for the vaccine to be available. Another part is against the vaccine, justifying this choice with denials, conspiracy opinions (Bertin et al., 2020; Romer & Jamieson, 2020; Sallam et al., 2021), and showing no fear of the consequences of the COVID-19 infection (Hughes & Machan, 2021). Among other social and cultural factors, individual psychological differences may play an essential important role in influencing how people react to ongoing vaccine campaigns and, at a deeper level, how they cope with death anxiety elicited by the COVID-19 pandemic (Caci et al., 2020). In the present paper, we explore the predictive role of fear of COVID-19 on the intention to be vaccinated and the influence on this relationship of psychological variables related to individual differences as possible mediators, such as existential anxiety and conspiracy beliefs. Recent research shows that fear of COVID-19 is on the rise worldwide (Knipe et al., 2020) and that high levels of fear can be related to anxiety, distress, and depression (Satici et al., 2020), and in more severe cases, lead to suicide (Dsouza et al., 2020). In line with Rogers' (1975) protection motivation theory (PMT), individuals in the presence of a health risk are more involved in healthy behaviors. In a recent study, Reuken et al. (2020) highlighted that individuals with higher fear of COVID-19 tend to use personal protective equipment more often, wash their hands more frequently and prefer remote medical consultations. These protective behaviors would suggest individuals with high fear to be more likely to be vaccinated. In fact, in a recent work, Head et al. (2020) found a positive relationship between fear of COVID-19 and intention to get vaccinated. Hence, we hypothesize that:

H1. Fear of COVID-19 is positively related to the intention to get vaccinated.

In line with the Terror Management Health Model (TMHM, Courtney et al., 2020; Pyszczynski et al., 2021), an application of Terror Management Theory (TMT, Greenberg et al., 1986) to health behaviors and decisions, the fear of COVID-19 could be a trigger for existential death anxiety. Death anxiety is an innate condition of human existence that arises from the awareness of human vulnerability and the transience of existence (Pyszczynski et al., 2013; Tillich, 1952). When being aware of their own mortality, people activate, at a conscious or unconscious level, thought processes capable of managing and countering their existential anxiety accompanied by lack of meaning, sense of guilt, fear of social isolation, and loss of identity (Yalom, 1980). Assuming that coronavirus pandemic is an existential threat (Courtney et al., 2020) and hypothesizing that fear of COVID-19 is associated with death-related thoughts and anxiety (Kira et al., 2020), we affirm that:

H2. Fear of COVID-19 is positively related to existential anxiety.

According to the TMT, individuals need to control their existential anxiety (Greenberg et al., 1986), and this necessity is achieved thanks to an anxiety buffer system that, on the one hand, acts to boost self-esteem, on the other hand, gives meaning to life, developing a sense of dignity, security, and transcendence. Since existential anxiety is not always linked to concrete and daily events but rather to the metaphysical reflection of being in the world and its inevitable end (Tillich, 1952), TMT proposes a dual-process model to explain the mechanisms of anxiety buffer consisting of proximal and distal defenses, that work at a conscious and unconscious level, respectively (Pyszczynski et al., 1999). Applying both defenses, individuals cope with the fear of COVID-19 and their existential anxiety. Proximal defenses reduce the perceived exposure to a health threat and related death anxiety, by removing death-related thoughts from consciousness (Arndt & Goldenberg, 2017). To this end, some individuals may adopt healthy choices (Courtney et al., 2020), following the recommendations for avoiding Covid-19 or accepting to be vaccinated, while others may be driven to rationalize or consciously deny their own vulnerability, engaging in unhealthy choices or showing avoidance behaviors like turn off news report about COVID-19 death tolls (Menzies et al., 2020). Distal defenses, instead, are unconscious devices that reduce the accessibility of mortality awareness boosting the individual's worldview, i.e., the belief that she/he is a worthy contributor to a meaningful, significant, and permanent world (Pyszczynski et al., 1999, 2005). Distal defenses consist of maintaining high levels of self-esteem and strengthening one's cultural view of the world. The strengthening of one's cultural views of the world could come about through adherence to non-refutable ideas, and this would explain the relationships between existential anxiety and conspiracy beliefs (Newheiser et al., 2011), defined as the tendency of individuals to explain important events around the world by lots of secret and malevolent power groups (Goertzel, 1994). Likewise, conspiracy beliefs seem typical of unhappy or dissatisfied individuals who cannot make sense of life or feel they are not in control of their own lives (Goreis & Voracek, 2019). In order to counter the fear of death, they may also share non-refutable beliefs that, even if not directly linked to the dangerous stimulus, allow them to give meaning and signification to events (Larsen et al., 2020). When focusing on health issues, conspiracy theorists, due to their misinformation, reject medical recommendations or devices proposed to eradicate pandemics such as the vaccine. They adhere to what Goertzel (1994) calls monological belief systems, which provide an easy, automatic explanation for anything which goes against their ideology. In this regard, we hypothesize that:

H3. Existential anxiety is positively related to conspiracy beliefs.

According to the model proposed by Brotherton et al. (2013), conspiracy belief systems may be related to different issues, including the malfeasance of governments, secrets about extraterrestrials, malevolent

global conspiracies, control of information and health and wellness management systems. While addressing different issues, these five dimensions proposed by the authors are strongly correlated with each other, hypothesizing the existence of an individual tendency to embrace conspiracy beliefs. As specifically regards healthful and disease-preventing behaviors (Bogart & Thorburn, 2006) conspiratorial beliefs are negatively associated with the intention to get vaccinated or to receive medical treatment (Oliver & Wood, 2014). Therefore, our fourth hypothesis assumes that:

H4. Conspiracy beliefs are negatively related to intention to get vaccinated.

1.1. The present study

Starting from the above-mentioned theoretical premises and hypotheses, in the present study we test the serial mediation role of existential anxiety and conspiracy beliefs on attitudes toward vaccine uptake. As shown in Fig. 1, fear of COVID-19 (Ahorsu et al., 2020) is proposed as a potential antecedent of choice to be vaccinated; however, this fear could trigger through a serial mediation model (Hayes, 2018), high levels of existential anxiety (van Bruggen et al., 2017). When attempting to cope with existential anxiety, individuals may develop conspiracy theories (Brotherton et al., 2013) that would inevitably reduce the intention to get vaccinated. To conclude, on the one hand, the direct effect of fear of COVID-19 could positively influence the intention to be vaccinated; on the other hand, through the serial mediation effect of existential anxiety and conspiracy beliefs, we could see a paradoxically opposite effect. Therefore, our last hypothesis to test is that:

H5. Existential anxiety and conspiracy mediate the relationship between fear of COVID-19 and intention to get vaccinated.

2. Method

2.1. Participants and procedures

This research was carried out with 223 French spoken adults recruited on the most popular social networking sites such as Facebook and Instagram. This study's sample size was determined using a priori statistical power analysis (Faul et al., 2007) using the G-Power 3.1 software. Conservatively assuming a mean effect size f^2 of 0.15, with a power of 0.95, alpha of 0.05, and a maximum of 9 predictors, we calculated a minimum sample size of 166. The data was collected from January 1 to February 1, 2020, through an online survey. The survey link was shared on social networks inviting people to participate in the research and share their contacts. The only inclusion criterion was that they had not yet been vaccinated against COVID-19. The French law on biomedical research (Article L.1121-1-1 and Article R.1121-1 of the public health code) does not apply to this study; however, this research is in line with the American Psychological Association's ethical principles and code of conduct for research with human participants (APA, 2017). Participants were informed about the study's purpose (i.e., investigating the relationship between personality characteristics, COVID-19 fear, and intention to get vaccinated). No compensation was provided, and total anonymity was guaranteed. In our sample, 69.5% are women and the remaining 30.5% men aged between 18 and 75 years (M = 30.26, SD = 13.24). Regarding the educational level, 41.6% have a high school diploma, 19.4% have a first-level degree, 33.6% have a second-level degree, and the remaining 5.4% have a Ph.D.

2.2. Instruments

The survey was composed of three sections: the first contained information about the study's objectives, anonymity, and a consent form. The second part consisted of a series of socio-demographic questions.
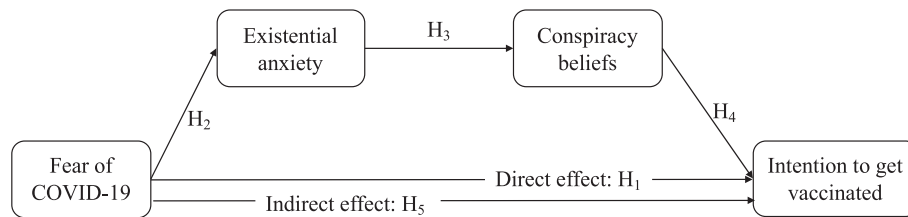
Fig. 1. Theoretical model.

The third part was composed of the following four instruments used in this study.

2.2.1. Fear of COVID-19

Fear of COVID-19 was assessed using the Fear of COVID-19 Scale (Ahorsu et al., 2020). The questionnaire consists of 7 items (e.g., *When watching news and stories about coronavirus-19 on social media, I become nervous or anxious*) which measure a state of a general fear of COVID-19. A 5-point Likert response scale with anchors from 1 "totally disagree" to 5 "totally agree" was used in the present study. High scores indicated high fear of COVID-19 (Cronbach's alpha = 0.85).

2.2.2. Existential anxiety

Existential anxiety was measured using the Existential Concern Questionnaire (van Bruggen et al., 2017). Composed of 22 items, it measures three dimensions of existential anxiety. Twelve items for General existential anxiety (Ex: *The question of whether life has meaning makes me anxious*), six items for Death anxiety (Ex: *It frightens me that at some point in time I will be dead*), and four items for Avoidance (Ex: *I try to forget that all my choices have consequences*). Also, for this scale, a 5-point Likert scale with anchors from 1 "totally disagree" to 5 "totally agree" was used. In line with the authors' suggestions, the global existential anxiety score (Cronbach's alpha = 0.91) was used in this study.

2.2.3. Conspiracy beliefs

Conspiracy beliefs were measured with the Conspiracy Beliefs Scale (Brotherton et al., 2013). This tool consists of 15 items that measured conspiracy beliefs organized into five factors represented by three items each: Government malfeasance (Ex: *The government is involved in the murder of innocent citizens and/or well-known public figures, and keeps this a secret*), Extraterrestrial cover-up (Ex: *The power held by heads of state is second to that of small unknown groups who really control world politics*), Malevolent global conspiracies (Ex: *Secret organizations communicate with extraterrestrials, but keep this fact from the public*), Personal wellbeing (Ex: *The spread of certain viruses and/or diseases is the result of the deliberate, concealed efforts of some organization*) and Control of information (Ex: *Groups of scientists manipulate, fabricate, or suppress evidence in order to deceive the public*). As already used in other studies (Georgiou et al., 2020), we obtained an overall score indicating the individual aptitude to rely on conspiracy beliefs (Cronbach's alpha = 0.92).

2.2.4. Intention to get vaccinated

Vaccination intent was measured with a one-item measure from Sherman et al. (2020). Participants were asked the following question: "When a coronavirus vaccination becomes available to you, how likely is it that you will have one?" The response rate was on an eleven-point scale with anchors from "extremely unlikely" (0) to "extremely likely" (10).

2.3. Statistical analysis

Data analyses were performed with the aid of the SPSS v.22 software. A series of descriptive statistics, mean, standard deviation, and correlation coefficients between the variables under study were calculated in the first instance. Subsequently, hypothesis testing was performing with

the aid of the Macro PROCESS (Hayes, 2018). A serial mediation model was tested using model 6. All variables were standardized before testing the model. The regression coefficients' significance was determined by calculating the 95% bootstrapping confidence intervals. According to Hayes (2018), regression coefficients are significant if the confidence interval does not include zero.

3. Results

3.1. Descriptive statistics

Table 1 shows means, standard deviations, and Pearson's zero-order correlations between the variables under study. Age correlates positively with existential anxiety ($r = -0.33, p < .01$). Younger participants affirmed to have higher levels of existential anxiety. Males seem to be more likely to get vaccinated ($r = 0.20, p < .01$). It is also interesting to note that educational level negatively correlates with existential anxiety ($r = -0.24$, p < .01), with conspiracy beliefs ($r = -0.30$, p < .01), and positively with the intention to get vaccinated ($r = 0.19$, p < .01). Fear of COVID-19 achieves a fairly low average score (M = 1.89, SD = 0.68) and positively correlates with existential anxiety ($r = 0.40$, p < .01) and with intention to get vaccinated ($r = 0.16$, p < .05). Existential anxiety gets a mean score (M = 1.89, SD = 0.68) slightly lower than the theoretical mean (3.00) and correlates positively with conspiracy beliefs ($r = 0.22$, p < .01). Conspiracy beliefs (M = 2.17, SD = 0.74) correlate negatively with the intention to get vaccinated ($r = -0.42$, p < .01). Finally, in our sample, 14.8% said it was improbable that they would get vaccinated. Only 19.7% said it is extremely likely that they get vaccinated.

3.2. Hypothesis testing

Table 2 shows the results of the serial mediation model tested using PROCESS macro model 6. In this model, age, gender, and educational level were included as covariates. In the first stage, fear of COVID-19 is positively associated (B = 0.42, $p < .001$) with existential anxiety, explaining 30% of variance. In the second stage, only existential anxiety (B = 0.20, p < .01), but not fear of COVID-19 (B = −0.04, p = n.s.) is positively associated with conspiracy beliefs, explaining 12% of the variance. In stage three, fear of COVID-19 is positively associated (B = 0.17, p < .05) with the intention to get vaccinated, while conspiracy beliefs are negatively associated (B = −0.41, p < .001) with the intention to get vaccinated, explaining 25% of variance. Table 3 shows the direct and total effects of fear of COVID-19 on the intention to get vaccinated and indirect effects of existential anxiety and conspiracy beliefs. The results show that both the total (B = 0.16, CI = [0.03, 0.28]) and direct effects (B = 0.17, CI = [0.04, 0.30]) are significant as the range of confidence of interval does not contain 0. Furthermore, there is only a significant indirect effect (B = −0.03, CI = [−0.07, −0.01]) of the serial mediation of existential anxiety and conspiracy beliefs.

4. Discussion

Our results suggest the existence of a serial mediation model with opposite direct and indirect effects on the intention to get vaccinated. Our data corroborate the first hypothesis that fear of COVID-19 was

Table 1

Means, standard deviations, Pearson's zero-order correlations, and Cronbach's alphas (in diagonal).

		Min–Max	Mean	SD	1	2	3	4	5	6
1	Age	18–75	30.26	13.24	–					
2	Gender (F = 1, M = 2)	–	–	–	0.37**	–				
3	Educational level	–	–	–	0.33**	0.07	–			
4	Fear of COVID-19	1–5	1.89	0.68	0.02	−0.05	0.05	(0.85)		
5	Existential Anxiety	1–5	2.51	0.72	−0.33**	−0.08	−0.24**	0.40**	(0.91)	
6	Conspiracy	1–5	2.17	0.74	−0.07	−0.03	−0.30**	0.03	0.22**	(0.92)
7	Intention to get vaccinated	0–10	5.42	3.50	0.10	0.20**	0.19**	0.16*	−0.02	−0.42**

Note: $N = 223$.
* $p < .05$.
** $p < .01$.

Table 2

Coefficient estimates for the regression model.

	Stage 1			Stage 2			Stage 3		
	Existential anxiety			Conspiracy beliefs			Intention to get vaccinated		
	B	ES	CI 95%	B	ES	CI 95%	B	ES	CI 95%
Constant	0.00	0.06	[−0.11, 0.11]	0.00	0.06	[−0.12, 0.12]	0.00	0.06	[−0.12, 0.12]
Fear of COVID-19	0.42***	0.06	[0.31, 0.53]	−0.04	0.07	[−0.18, 0.10]	0.17*	0.07	[0.04, 0.30]
Existential Anxiety				0.20**	0.08	[0.05, 0.35]	0.02	0.07	[−0.12, 0.16]
Conspiracy							−0.41***	0.06	[−0.53, −0.28]
Covariates									
Age	−0.31***	0.06	[−0.43, −0.18]	0.10	0.08	[−0.05, 0.25]	−0.02	0.07	[−0.16, 0.12]
Gender	0.07	0.06	[−0.16, 0.11]	−0.03	0.07	[−0.16, 0.11]	0.21**	0.06	[0.08, 0.33]
Educational level	−0.17**	0.06	[0.29, −0.05]	−0.28***	0.07	[−0.42, 0.15]	0.05	0.07	[−0.08, 0.18]
R^2	0.30			0.12			0.25		
F	23.9***			6.08***			11.75***		

Note: N = 223; CI = Bootstrapping Confidence Interval.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 3

Total and direct effects of fear of COVID-19 on intention to get vaccinated and indirect effects through existential anxiety and conspiracy beliefs.

	B	ES	CI 95%
Total effect	0.16	0.06	[0.03, 0.28][a]
Direct effect	0.17	0.07	[0.04, 0.30][a]
Indirect effects through:			
Existential anxiety	0.01	0.03	[−0.06, 0.06]
Conspiracy	0.02	0.03	[−0.04, 0.08]
Existential anxiety and conspiracy	−0.03	0.02	[−0.07, −0.01][a]

Note: N = 223; CI = Bootstrapping Confidence Interval.
[a] CI does not include zero.

positively related to the intention to get vaccinated. These findings could be explained by the dual-process of defense (Pyszczynski et al., 1999) incorporated in TMHM (Courtney et al., 2020). According to Pyszczynski et al. (2005), awareness of a death threat can be defused by activating proximal defenses to reduce the feeling of vulnerability. Thus, proximal defenses may lead people toward healthy choices such as engaging in healthy behaviors (Arndt et al., 2003) or getting vaccinated. Our second hypothesis stated that fear of COVID-19 was positively associated with existential anxiety. The results confirm this hypothesis. According to Fuchs (2013), individuals find themselves reflecting on their mortality in moments of danger, creating anxiety. As well, Tomaszek and Muchacka-Cymerman (2020) found a significant relationship between post-traumatic stress syndrome and existential anxiety during the COVID-19 pandemic. Our findings also suggest a positive relationship between existential anxiety and conspiracy beliefs (H3). This result can be explained in terms of distal defenses, unconscious defenses not directly and/or rationally linked with the dangerous stimulus (Pyszczynski et al., 1999). As TMT argues, to give irrefutable meaning to

events and obtain a sense of symbolic immortality, individuals tend to strengthen bonds with specific social groups (Fitri et al., 2020). Directing one's thoughts toward conspiracy theories to create stronger ties with conspiracy theory communities would reduce existential anxiety. Our fourth hypothesis that conspiracy beliefs were negatively associated with the intention to be vaccinated was confirmed: conspiratorial individuals refuse to undergo vaccination against COVID-19. This result is consistent with other studies. According to Lazarević et al. (2021), the tendency to believe in conspiracy theories is negatively associated with recommended healthy behaviors. Furthermore, conspiracy beliefs are negatively associated with vaccination attitudes (Bertin et al., 2020). Finally, our fifth hypothesis suggested a mediating effect of existential anxiety and conspiracy beliefs on the relationship between fear of COVID-19 and intention to get vaccinated. The results confirmed a serial mediation effect which is in line with the dual-process model of defense: when individuals experience a state of fear, they can face it with proximal defenses, directly and rationally oriented to eliminate the dangerous stimulus such as vaccination whereas, if existential anxiety activates distal defenses, irrational and unrealistic beliefs, such as conspiracy theories, may occur to support the individual in making sense of one's existential anxiety.

5. Limitation and future research

Results of the present research should be taken with caution for the following limitations. A cross-sectional design has been adopted in this work, which does not allow us to make cause-and-effect inferences. It would be interesting if future research could replicate the study with other methodologies. A second limit is our convenience sample which is not balanced by gender. According to Caci et al. (2019) convenience samples play a valuable role in social science research. Furthermore, males seem more positively oriented toward vaccination than females.

Our data collection method did not allow us to check this data. It is hoped in the future to replicate the work by balancing the male-female ratio.

6. Conclusion

In line with the TMHM, the present research explored different ways of facing anxiety caused by the COVID-19 pandemic. When people focus on the real risks of COVID-19 infection, their proximal defenses may entail rational choices such as the intention to vaccinate as soon as possible. However, at a deeper level, intense existential anxiety may involve distal defenses, which, to reduce health vulnerability awareness, lead some individuals to avoid their concerns about COVID-19 adhering to conspiracy theories and refusing to get vaccinated. Nevertheless, additional research is needed, including the role of personality traits and other individual variables which still received little attention from psychologists (Young et al., 2021), to better understand how existential anxiety affects health-related attitudes and health-promoting behaviors.

CRediT authorship contribution statement

Scrima: Conceptualization; Methodology; Data collection; Writing – original draft; Writing – review & editing.

Miceli: Conceptualization; Writing – original draft; Writing – review & editing.

Caci: Conceptualization; Translation; Writing – original draft; Writing – review & editing.

Cardaci: Conceptualization; Data Analysis; Writing – original draft; Writing – review & editing.

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