Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Positivity explains how COVID-19 perceived risk increases death distress and reduces happiness

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ABSTRACT

The novel coronavirus (COVID-19) pandemic has produced an unprecedented impact on all aspects of life, including mental outcomes like death distress. This study examined the mediating effect of positivity on the association between COVID-19 related perceived risk, death distress, and happiness. Participants were 3109 Turkish adults (Mean $_{age}$ = 38.64 ± 10.40) who completed online measures of perceived risk, positivity, death distress, and happiness during the pandemic. Results showed that perceived risk had a significant direct effect on positivity, death distress, and happiness. Positivity had a significant direct effect on death distress and happiness. Mediation analysis indicated that positivity mediated the effect of perceived risk on death distress and happiness. Results suggest that positivity is an important aspect of developing strength-based preventions and interventions aiming to reduce psychological distress and improve happiness.

1. Introduction

With its rapid spread, the novel coronavirus 2019 (COVID-19) pandemic has a high death rate and causes substantial fear, panic, psychosis, anxiety, trauma, and suicidal ideation around the globe (World Health Organization [WHO], 2020). As of August 7, 2020, about 19,193,600 cases have been confirmed and over 716,700 deaths across 188 countries or territories (Center for Systems Science and Engineering, 2020). In Turkey, the first confirmed COVID-19 case was announced on March 11, 2020 and as of August 7, 2020 there have been more than 238,400 confirmed cases and 5.800 deaths with a basic reproduction number (R0 or R-naught) of between 0.72 and 1.56 and pneumonia rate of 8.3% (Republic of Turkey Ministry of Health, 2020). There is an urgent need to understand the possible psychosocial impact of the COVID-19 pandemic and determine factors that can reduce its impact on people's psychological health.

Due to being a highly contagious disease, COVID-19 has enforced authorities to take a wide range of restrictive measures such as social distancing, avoiding crowded public places, travel restriction, imposing quarantine of all arrivals in the country (Yıldırım, Geçer, & Akgül, 2020). As many other countries, Turkish government has also taken many measures for the prevention and control of the pandemic including testing, tracing, isolation, and restricting the movement of people across the country. While the implementations of these virus prevention and control measures have been effective to protect people against COVID-19, the risks of a second wave and a new peak of infections may cause uncertainties among people around the world. The consequences of COVID-19 including disruption in daily life, risk of infection, sense of confinement, inadequate supplies, fear, and anxiety associated with the virus can lead to detrimental effects at individuals and societal levels (Ahorsu et al., 2020; Arslan, Yıldırım, Tanhan, Buluş, & Allen, 2020).

The fast escalation of the COVID-19 has caused people to perceive themselves under the risk of infections across the globe. The conception of risk is multifaceted, complex, and context-related phenomenon (Slovic, 1987). Potential infection to life-threatening diseases determines individuals' responses to diseases which are associated with the likelihood, severity, controllability, vulnerability, and the number of deaths rose as a result of the infection (Short, 1984). Some studies showed that perceived risk, fear, and vulnerability are related to engagement in preventive behaviours against COVID-19 (Yıldırım et al., 2020).

Excessive risk can be detrimental for mental health (Yıldırım et al., 2020), despite its adaptive aspect in terms of motivating individuals to engage in health-protective behaviours (Brewer et al., 2007). The excessive risk of COVID-19 not only causes the risk of death but also can cause unbearable psychological problems (Ahorsu et al., 2020; Xiao, 2020). Research has revealed that perceived risk has significant

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associations with health conditions, distress, and life satisfaction (Zhang, Wang, Rauch, & Wei, 2020), sleep disturbances, anxiety, and stress (Casagrande, Favieri, Tambelli, & Forte, 2020), suicidal thought, suicide attempts, or actual suicide (Jahan, Araf, Griffiths, Gozal, & Mamun, 2020), coping strategies (Gerhold, 2020), preventive behaviours toward COVID-19 (Yıldırım et al., 2020), worry and disruption of daily life (Kwok et al., 2020).

Recently published studies have reported a high prevalence of mental health problems on different populations during the COVID-19 pandemic. For example, the prevalence rates of mental health problems in Italy ranged between 8.27% (insomnia) and 49.38% (post-traumatic stress disorders, PTSD), with severe depression (24.73%), anxiety (19.80%), and perceived stress (21.90%) being prominent reported mental health outcomes among healthcare workers (Rossi et al., 2020). These rates were relatively higher than those reported before the pandemic. For example, the prevalence rates of PTSD among healthcare workers operating in an emergency department in Italy have been reported to be approximately 21.4% (Carmassi et al., 2018). In another study with over 1200 general population in China, researchers reported that more than half of participants suffered from psychological distress, anxiety, depression, and stress at moderate to severe levels (Wang et al., 2020). A survey on general population in the UK demonstrated excessive concerns about the effect of social isolation on wellbeing including increased depression, anxiety, stress, and other negative emotions (The Academy of Medical Sciences, 2020). Other studies have also reported experience of various mental health difficulties such as depression, fear, anxiety, boredom, worry, sadness, sense of being trapped, feelings of insecurity, loneliness, and helplessness during the pandemic (Xiao, 2020).

The devastating impact of COVID-19 on mental health can be much severe than expected. Mental health suffering related to COVID-19 can cause suicidal behaviours such as suicidal ideation, suicide attempts, and actual suicide (Mamun & Griffiths, 2020). In Bangladesh and India, two suicide cases have been recently reported due to depression, anxiety, panic, social isolation, stigma, and, other COVID-19 related issues (Goyal, Chauhan, Chhikara, Gupta, & Singh, 2020; Mamun & Griffiths, 2020). Pandemic-specific stressors such as fear of contracting COVID-19, social and financial issues can lead to psychological problems such as helplessness, loneliness, sadness, and worry which may in turn increase risk factors for suicidal behaviours (Mamun & Griffiths, 2020). Death distress can also be a potential contributing factor in committing suicide (Lee, Jobe, Mathis, & Gibbons, 2020).

The expectancy of death reveals different emotions and cognitions which are largely negative in nature (Abdel-Khalek, 2004). Death distress embodies negative attitudes toward death and comprises death anxiety, death depression, and death obsession. Death anxiety refers to negative emotional reactions, and awareness of death attitudes such as fear, grief, unease, and discontent of dying. Death depression refers to occurrence of negative emotions such as sadness, loneliness, hopelessness associated with one's own death, death of significant others, and general meaning of death. Death obsession reflects rumination, persistent ideas, or repetitive thoughts centred on death of own and significant others (Abdel-Khalek, 1998; Mohammadzadeh, Ashouri, Vahedi, & Asgharipour, 2018). Despite being correlated, the three dimensions are empirically distinct concepts (Lester, 2003). People with high levels of death distress tend to experience more mental health problems or psychopathology such as distress/impairment, depression, anxiety, and stress (Bodner, Shrira, Bergman, & Cohen-Fridel, 2015; Menzies, Sharpe, & Dar-Nimrod, 2019), which may trigger risk of death or engagement in suicidal behaviours. Death distress is also associated with obsession (Abdel-Khalek, 2004), religiosity (Mohammadzadeh & Oraki, 2018), satisfaction and resilience (Wen, 2010).

The negative emotions emerged during COVID-19, which can result in suicidal behaviours, can be preventable (Mamun & Griffiths, 2020). Psychological resources and strengths can help individuals to cope with stressors effectively. As such, positivity can act as an important psychological strength that can protect temporal and permanent COVID-19 related tragedies. Positivity is conceptualised as a dispositional self-evaluative tendency to view one's life, and future with a positive outlook while restrains negativity (Caprara et al., 2012). Positivity is a trait-like disposition that equips people to effectively cope with challenges and weaknesses (Caprara, Alessandri, & Caprara, 2018) and contributes to people's growth, development, and success (McGrath, 2004). People with high positivity evaluate their lives as worth living in general and view their lives through a positive lens (Alessandri, Caprara, & Tisak, 2012).

Studies showed that positivity is significantly associated with life satisfaction, self-esteem, optimism, depressive symptoms (Caprara et al., 2012), happiness (Lauriola & Iani, 2015), quality of interpersonal relationships (Laguna, Alessandri, & Caprara, 2017), and resilience (Milioni, Alessandri, Eisenberg, & Caprara, 2016). Evidence also suggests that people with resources, capacities, and psychological strengths such positive emotions (e.g., happiness), positive individuals' traits (e.g., positivity), and social environmental factors (e.g., social support) may help to maintain positive mental health (Yildirim & Arslan, 2020). Trait-like variables have significant effects on happiness, well-being, and positive mental health (Sheldon & Lyubomirsky, 2004). Due to the trait-like nature of positivity, it can act as an effective mediator toward the examination of death distress and happiness, particularly within the context of COVID-19.

Empirical studies have examined the impacts of COVID-19 related risk factors in contributing to psychological distress during the pandemic (Arslan et al., 2020), yet little attention has been paid to the underlying mechanism that reduces psychological distress and increases happiness. Previous research has shown that psychological resource capacities like hope, optimism, and self-esteem can reduce death anxiety (Barnett, Anderson, & Marsden III, 2018; Hiyoshi, Becker, Oishi, & Fukuyama, 2017; Soleimani et al., 2020). However, to date, there is no direct evidence testing the impact of positivity in the relationship between COVID-19 risk perception and death distress. Positivity is an individual characteristic that may assist to sustain individuals' happiness and mental health due to its protective role (Caprara et al., 2012). Thus, it is also plausible that positivity may create the motivational resources to help people cope with the challenges of pandemic and consequently protect their mental health. Terror Management Theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) can help us to understand the cognitive, emotional, and behavioural responses to COVID-19. The theory assumes that people have a dual-process system that acts as a protective function against people's awareness of vulnerability and inevitable mortality. According to the TMT, death anxiety underlies much of the human behaviours, but people with high psychological resource capacities will experience less anxiety against death-related scenes.

Given the profound adverse effects of COVID-19 on mental health outcomes such as death distress, it is critical to understand the underlying mechanism of COVID-19 related psychological factors like perceived risk, death distress, and happiness. Therefore, this study aimed to examine the mediating role of positivity on the relationship between COVID-19 related perceived risk, death distress, and happiness. The hypotheses are as follows: (1) perceived risk would have a significant effect on positivity, death distress, and happiness; (2) positivity would have a significant effect on death distress and happiness; (3) positivity mediates the association between perceived risk, death distress and happiness (Fig. 1).

2. Method

2.1. Participants

The sample included 3109 Turkish adults drawn from general public. Their ages ranged between 18 and 70 with a mean age of 38.64 (SD = 10.40). They were proportionally distributed by gender (49.98%

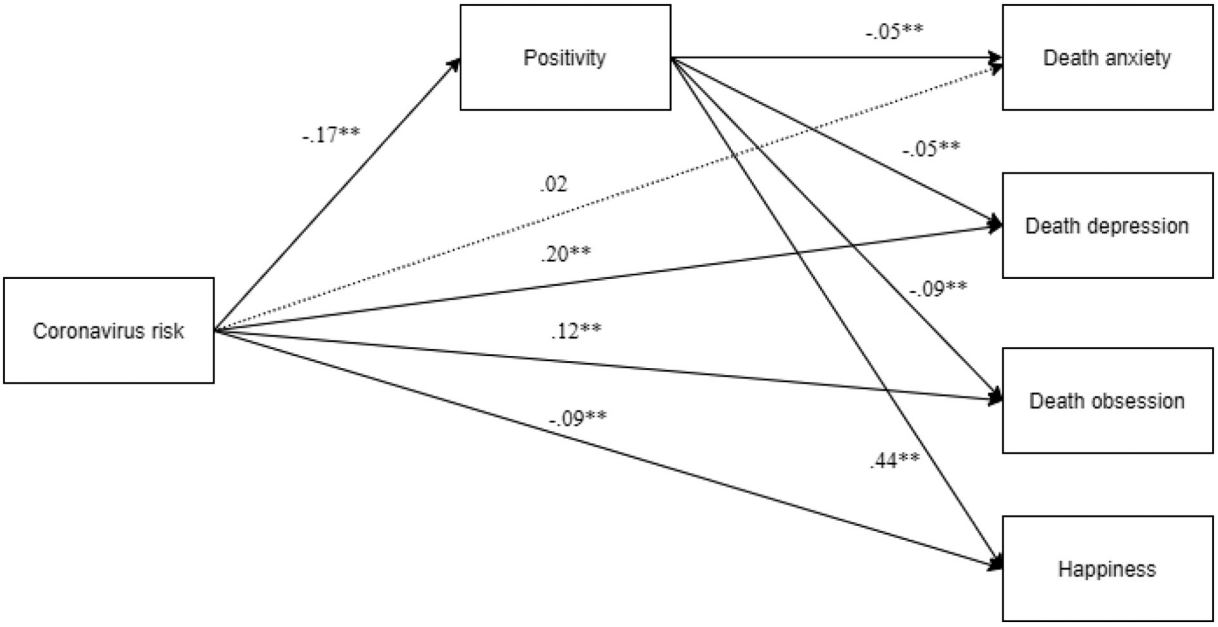

Fig. 1. The proposed model indicating the associations between the variables.

males). The majority of participants (64.68%) were married, university graduate (39.76%), belonging to average perceived socioeconomic status (68.51%), without any chronic disease (72.40%), living with three or four people (53.30%), and living in the city centre (81.76%).

2.2. Procedure

This study was conducted during the COVID-19 pandemic throughout April 2020. A message contained the study link was distributed online to all potential participants. Before beginning to partake in the study, participants were given information explaining the aims of the study, the voluntary nature of involvement, potential benefits, risks, and data confidentiality at the first page of the survey. After providing informed consent, they were allowed to proceed. The study protocol was approved through institutional ethical committee.

2.3. Measures

2.3.1. COVID-19 Perceived Risk Scale (CPRS)

The CPRS measures the COVID-19 related to personal risk (Yıldırım & Güler, 2020). The scale includes 8 items and two dimensions (cognitive and emotional). Each item is rated on a Likert-type scale between 1 (negligible) and 5 (very large). Sample items include "What is the likelihood that you would acquire the COVID-19?" (cognitive) and "How worried are you about contracting the COVID-19?" (emotional). Higher scores reflect greater risk related to COVID-19. Yıldırım and Güler (2020) reported that the CPRS has a two-factor structure (shown through exploratory and confirmatory factor analyses), good convergent validity with COVID-19 severity, self-efficacy, and mental health and high internal consistency reliability.

2.3.2. Positivity Scale (PS)

The PS measures one's positive views about self, life, and future alongside his/her confidence in others (Caprara et al., 2012). The scale includes 8 items, rating on a Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). A sample item is "I have great faith in the future." Higher scores indicate greater positivity. For the scale, good evidence of reliability and validity has been reported (Çıkrıkçı, Çiftçi, & Gençdoğan, 2015).

2.3.3. Death Distress Scale (DDS)

The DDS is a 9-item measure of death distress with three components: anxiety, depression, and obsessive thoughts (Dadfar & Lester, 2020). Items are rated on a Likert-type scale from 1 (never) to 5 (always). Sample items are "I am not at all afraid to die" (anxiety), "Hearing the word death makes me sad" ("depression", and "I can't get the notion of death out of my mind" (obsession). The scores of each component are obtained by summing the response to each of the items on the respective component. Higher scores indicate higher levels of death distress. As the DDS has not been validated in Turkish yet, this study investigated the psychometric properties of the DSS to enhance its utility for use in research and practice (see Results section).

2.3.4. The Short Depression-Happiness Scale (SDHS)

The SDHS is a short measure of bipolar dimension of happiness on a continuum from depression to happiness (Joseph, Linley, Harwood, Lewis, & McCollam, 2004). The scale comprises of 6 items answered on a 4-point Likert-type scale ranging from 0 (never) to 3 (often) where higher scores reflect greater happiness. A sample item is "I felt dissatisfied with my life." Yıldırım and Belen (2019) reported sound psychometric properties for the scale in Turkish language.

2.4. Data analysis

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted to examine the factor structure of the CPRS and DDS. Participants were randomly split into two subsamples of roughly equal size. Subsample 1 (n = 1565) was used for EFA and Subsample 2 (n = 1544) for CFA, which was conducted using SPSS-AMOS (v.24). CFA results were evaluated using multiple indices: Chi-Square/degree of freedom ratio ($\chi 2/df$), the goodness of fit index (GFI), adjusted goodness of fit (AGFI), comparative fit index (CFI), incremental fit index (IFI), Tucker-Lewis fit index (TLI), root mean squared error of approximation (RMSEA), and standardized root mean square residual (SRMR) were used to assess the fit of the model to data (Tabachnick & Fidell, 2007). The statistics that represent a "good" fit are demonstrated by GFI, AGFI, CFI, IFI and TLI ≥ 0.95, RMSEA ≤ 0.08, SRMR ≤ 0.05, and $\chi 2/df < 3$ (Hu & Bentler, 1999; Kline, 2005). Pearson's correlation was run to explore the relationships between the variables. The SPSS macro PROCESS (Hayes, 2013) was used to perform mediation

Table 1
Descriptive statistics and factor loadings for the nine items of DDS.

					Factor loadings		
Item	Mean	SD	Skew	Kurt	Anxiety	Depression	Obsession
1. I am not at all afraid to die.	3.17	1.14	−0.17	−0.49	0.81	−0.08	0.02
2. The thought of death never bothers me.	3.25	1.17	−0.22	−0.62	0.90	0.00	0.00
3. I feel that the future holds nothing for me to fear.	3.31	1.15	−0.20	−0.66	0.49	0.13	−0.02
4. Hearing the word death makes me sad.	3.04	1.34	−0.01	−1.13	0.02	0.82	0.00
5. Passing by cemeteries makes me sad.	2.50	1.36	0.48	−0.98	0.00	0.79	0.03
6. I feel sad when I dream of death.	2.82	1.33	0.24	−1.06	0.01	0.91	0.01
7. I can't get the notion of death out of my mind.	2.03	1.09	0.91	0.15	−0.01	0.10	0.79
8. I am preoccupied by thoughts of death.	1.78	0.99	1.30	1.28	0.01	−0.04	0.96
9. I find it greatly difficult to get rid of my thoughts about death.	1.80	1.06	1.33	1.15	−0.01	−0.01	0.87

analyses. The bootstrapping method with 5000 resamples to estimate the 95% confidence intervals (CI) was subsequently conducted to demonstrate the significance of indirect effects.

3. Results

3.1. Psychometric analysis

Using Subsample 1 (n = 1565), we conducted EFA with principal axis factoring and promax rotation to identify the underlying factor structure of the DDS. Kaiser-Meyer-Olkin value was 0.78 and the Barlett's test of sphericity was also significant, $\chi 2\ (_{df=36}) = 8011{,}92$, $p < .001$. The analysis demonstrated a three-factor solution with eigenvalue of 3.79, 2.09, and 1.20, which explained 42.08% (death obsession), 23.17% (death depression), and 13.28% (death anxiety) of the total variance, respectively. The factor loadings for the nine items ranged between 0.49 and 0.96. Internal consistency reliabilities were computed as 0.77 for death anxiety, 0.88 for death depression, and 0.91 for death obsession. Additional statistics are reported in Table 1.

CFA was used to examine whether the proposed three-factor model of the DDS could be replicated in Subsample 2 (n = 1544). Other than $\chi 2/df$, which showed a moderate fit statistic-less than five- (Kline, 2005), the results evidenced a good model fit: $\chi 2(df = 24) = 96{,}454$, $\chi 2/df = 4.019$, $p < .001$, GFI = 0.987, AGFI = 975, IFI = 0.990, TLI = 0.985, CFI = 0.990, RMSEA = 0.044, and SRMR = 0.035. All items contributed significantly to their corresponding factor. The standardized item factor loadings ranged from 0.42 to 0.93 for anxiety, from 0.78 to 90 for depression, and from 0.84 to 0.92 for obsession.

3.2. Descriptive statistics

Descriptive statistics, internal consistencies, and correlation matrix are presented in Table 2. For the main variables, skewness values ranged between −0.22 and 1.19 and that kurtosis scores ranged between −0.02 and 0.99, indicating that all variables had approximately normal distribution based on the criteria of skewness and kurtosis values $\leq |2|$. The internal consistency reliability of the scales had satisfactory-to-strong internal reliability coefficients (range α = 0.75 to 0.91). COVID-19 risk was negatively correlated with positivity, happiness, and positively correlated with death distress. Positivity and happiness were negatively correlated with death distress.

3.3. Testing the mediating role of positivity

Following the exploration of the preliminary results, we tested the mediating role of the positivity in the relationships between coronavirus risk and death anxiety, death depression, death obsession, and happiness. The results of mediation analyses are reported in Tables 3 and 4. Firstly, the results showed that coronavirus risk had a significant negative direct effect on positivity, but not on death anxiety. Positivity had a significant negative direct effect on death anxiety. Positivity fully mediated the effect of coronavirus risk on death anxiety. Coronavirus risk and positivity together accounted for 1% of the total variance in death anxiety. Secondly, the direct effect of coronavirus risk on death depression was positive and significant. Coronavirus risk led to decreased positivity which in turn led to decreased death depression. Collectively, coronavirus risk and positivity accounted for 11% of the total variance in death depression. Thirdly, the direct effect of coronavirus risk on death obsession was positive and significant. The indirect effect of coronavirus risk on death obsession through positivity was negative and significant. Coronavirus risk and positivity together accounted for 10% of the total variance in death obsession. Finally, the direct effect of coronavirus risk on happiness was negative and significant. Positivity functioned as a partial mediator between coronavirus risk and happiness. Coronavirus risk led to decreased positivity which in turn led to increased happiness. Coronavirus risk and positivity accounted for 38% of the total variance in happiness.

4. Discussion

This study investigated the role of positivity as a potential mechanism for linking between COVID-19 related perceived risk, death distress, and happiness. As predicted, perceived risk was associated with positivity, death distress, and happiness. More importantly, the results suggested that the effect of perceived risk on death distress and happiness was mediated by positivity.

Our findings that COVID-19 related perceived risk had a significant direct effect on positivity, death distress, and happiness supported our

Table 2
The results of descriptive statistics and correlation analysis (N = 3109).

Variable	α	Mean	SD	Skew	Kurt	1.	2.	3.	4.	5.	6.
1. Personal risk	0.82	26.30	5.66	−0.48	0.19	–	−0.19**	0.05**	0.33**	0.27**	−0.23**
2. Positivity	0.83	29.30	5.13	−0.62	0.93		–	−0.10**	−0.13**	−0.20**	0.60**
3. Death Anxiety	0.75	9.72	2.79	−0.22	−0.02			–	0.09**	0.02	−0.07**
4. Death Depression	0.88	8.30	3.58	0.26	−0.87				–	0.48**	−0.24**
5. Death Obsession	0.91	5.61	2.90	1.19	0.99					–	−0.27**
6. Depression-Happiness	0.83	10.99	3.94	−0.26	−0.35						–

** Correlation is significant at the 0.001 level (2-tailed).

Table 3
Unstandardized structural path coefficients and 95% bootstrap confidence intervals (BCI).

Consequent	Antecedent	Coeff	SE	*t*	*p*
Positivity	*X* (coronavirus risk)	−0.17	0.02	−10.58	0.00
	M (positivity)	–	–	–	–
	$R^2 = 0.04$. $F = 111.92$; $p < .001$				
Death anxiety	*X* (coronavirus risk)	0.01	0.01	1.63	0.10
	M (positivity)	−0.05	0.01	−5.10	0.00
	$R^2 = 0.01$. $F = 16.48$; $p < .001$				
Death depression	*X* (coronavirus risk)	0.20	0.01	18.24	0.00
	M (positivity)	−0.05	0.01	−3.93	0.00
	$R^2 = 0.11$. $F = 194.15$; $p < .001$				
Death obsession	*X* (coronavirus risk)	0.12	0.01	13.91	0.00
	M (positivity)	−0.09	0.01	−9.04	0.00
	$R^2 = 0.10$. $F = 166.97$; $p < .001$				
Happiness	*X* (coronavirus risk)	−0.09	0.01	−8.59	0.00
	M (positivity)	0.44	0.01	39.96	0.00
	$R^2 = 0.38$. $F = 931.81$; $p < .001$				

Note. SE = standard error. Coeff = unstandardized coefficient. X = independent variable; M = mediator variables.

first hypothesis. This result is consistent with previous studies that explored the relationship between perceived risk and mental health outcomes occurred during the COVID-19 pandemic (e.g., Ahorsu et al., 2020; Xiao, 2020; Yıldırım et al., 2020; Zhang et al., 2020). This result suggests that excessive levels of COVID-19 related perceived risk can have a negative effect on psychological health by increasing experience of death distress, decreasing happiness and positive outlook about self, life, and future. Positivity was positively associated with happiness and negatively associated with death distress supporting the second hypothesis of this study. Previous studies demonstrated that higher level of positivity is related with increased satisfaction with life, happiness, optimism, resilience, and decreased depressive symptoms (Caprara et al., 2012; Lauriola & Iani, 2015; Milioni et al., 2016). This suggests that individuals with higher levels of positivity report higher levels of happiness and lower levels of psychological distress. Being positive can energize one's potential, relationships, worldview, and mental energies (Fredrickson, 2009).

The main finding of this study is that positivity mediates the link between COVID-19 related perceived risk, death distress, and happiness, confirming our third hypothesis. This result suggests that the underlying mechanism between perceived risk, death distress, and happiness can be explained in part by positivity. However, it is important to note that this study used a large sample suggesting that power can be very high in terms of producing significant results. For example, coronavirus risk and positivity together explained 1% of the total variance in death anxiety. Even though the proportion of explained variance is small for this model, it is significantly different from 0, showing that the hypothesised model has a significant explanatory power. According to Cohen's (1988) classifications of effect size where 0.02 = small, 0.15 = medium, and 0.35 = large, the amount of variance explained can be practically meaningful despite being small. This suggests that although the effects are small, positivity promotion strategies applied at an individual-level could potentially have a large cumulative impact at the population level.

The mediating role of positivity provides new insights into why people high in COVID-19 related perceived risk experience more death distress and less happiness. Studies highlighted that there is a wide range of psychological impact of pandemic related measures on people's mental health which can be severe and long-lasting (Kwok et al., 2020; Yıldırım et al., 2020; Yildirim & Arslan, 2020). During the pandemic, greater exposure to negative news content related to COVID-19 on social media increases the likelihood of rumination over information (Brooks et al., 2020). Research also reported high anxiety, depression, posttraumatic stress disorders, susceptibility to social risk, low life satisfaction and positive emotions (Li, Wang, Xue, Zhao, & Zhu, 2020; Liu et al., 2020). Strength-based model (Peterson & Seligman, 2004) emphasises individuals' self-determination and strengths that help individuals to protect their psychological health in adverse conditions by focusing on positive characteristics promoting to mental health and well-being rather than negative characteristics that cause distress or disease. Accordingly, having positive psychological strengths and resources like positivity can help people to diminish the detrimental effect of COVID-19 related perceived risk on psychological health.

Concerning adaptation of the DDS into Turkish language, the results showed that the DDS is a reliable and valid measurement tool assessing death distress among Turkish public. The construct validity of the DDS confirms a three-factor structure representing anxiety, depression, and obsession with good internal consistency reliability. The DDS also had adequate correlation with other employed study variables. This result is in accordance with the original study (Dadfar & Lester, 2020). Previous studies showed that three dimensions of death distress had none/low to high correlation with each other and explained different proportion of variance in an outcome variable among samples with different cultural backgrounds (e.g. Abdel-Khalek, 2004; Lester, 2003; Mohammadzadeh et al., 2018). Individual and cultural differences may influence the relationships between the dimensions of death distress and their relationships with other variables. Individual attitudes toward deaths can be formed by culture, and therefore these dimensions differ from each other across culture (Mohammadzadeh et al., 2018).

As researchers become increasingly interested in the mechanisms that underlie death distress and happiness (Iverach, Menzies, & Menzies, 2014; Yildirim, 2019). Positivity appears to be a key factor that can contribute to this investigation. In this study, we tested a model that facilitates to explain how COVID-19 perceived risk can reduce positivity, happiness, and increase death distress. Our results suggest that positivity can help to explain how coronavirus related risk contributes to the development of death distress and reduction in happiness. Broadly, positivity and its relationships with perceived risk, death distress, and happiness in particular are promising avenues for

Table 4
Indirect, direct, and total effects of coronavirus risk on death distress and happiness and 95% confidence interval (CI).

	Death anxiety			Death depression			Death obsession			Happiness		
		95% CI			95% CI			95% CI			95% CI	
Path	Effect	Low	High	Effect	Low	High	Effect	Low	High	Effect	Low	High
Total effect	0.02	0.01	0.04	0.21	0.19	0.23	0.14	0.12	0.16	−0.16	−0.19	−0.14
Direct effect	0.01	0.00	0.03	0.20	0.18	0.22	0.12	0.11	0.14	−0.09	−0.11	−0.07
Total indirect effect	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.01	0.02	−0.07	−0.09	−0.06
Coronavirus risk– > positivity– > death anxiety	0.01	0.00	0.01	–	–	–	–	–	–	–	–	–
Coronavirus risk– > positivity– > death depression	–	–	–	0.01	0.00	0.01	–	–	–	–	–	–
Coronavirus risk– > positivity– > death obsession	–	–	–	–	–	–	0.02	0.01	0.02	–	–	–
Coronavirus risk– > positivity– > happiness	–	–	–	–	–	–	–	–	–	−0.07	−0.09	−0.06

Note. $N = 3109$. Bootstrap sample size = 5000.

future research within the context of health crisis.

The practical implications of this research are also important. Given that one's positive views about self, life and future were a significant mediator between COVID-19 related risk and mental health, we may be able to promote positivity that will reduce the impact of coronavirus risk on death distress and happiness. Researchers and practitioners may incorporate positivity into their treatment of distress and may focus on the exploration of ways to increase positivity that can help individuals, who are under the risk of coronavirus, to protect their mental health and maintain positive functioning.

The findings of this study should be considered in light of several limitations. First, there are different forms of COVID-19 related risk such as unknown risk and dread risk, but the present study only focused on the personal risk at general level. Future studies may explore whether the mediating effect of positivity would vary as the forms of risk perception change. Second, as participants in the current study were recruited online, it is necessary to be cautious in respect to generalization of these findings to those who are unable to access the internet. Third, the current study is based on a cross-sectional research which could not verify the causal relationship between COVID-19 perceived risk, death distress, and happiness. Subsequent studies may attempt to adopt longitudinal designs with control for possible confounders to elucidate the relationship between COVID-19 perceived risk, death distress, and happiness alongside their underlying mechanism.

Researchers have recently begun to investigate the critical role of positive traits and psychological strengths as mediators/moderators of the influence of predictors on mental health during the pandemic (Arslan et al., 2020; Yildirim & Arslan, 2020). This study adds to this burgeoning body of research by demonstrating that positivity can diminish the negative influence of COVID-19 perceived risk on death distress and happiness. Therefore, the present findings offer fresh insights that can be utilised in tailoring and implementing subsequent psychotherapeutic approaches or psychological interventions aiming to promote one's positive views about self, life, and future. Focusing on such positive views could be a very fruitful of any intervention program aiming to help people, who are under the risk of coronavirus risk, to better function in their day-to-day lives.

CRediT authorship contribution statement

MY and AG conceived of the study idea and design. MY performed the analysis and drafted the paper. All authors provided critical revisions. All authors approved the final version of the paper.

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Declaration of competing interest

The authors declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Consent was obtained from all participants included in the study.

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