

# POSITIVITY AND POST-TRAUMATIC STRESS DISORDER (PTSD) IN COVID-19 SURVIVORS: MEDIATING ROLE OF RUMINATION AND FEAR OF COVID-19

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## SUMMARY

**Background:** COVID-19 pandemic, which still continues to affect the whole world, has led to an increase in PTSD symptoms in societies, especially individuals who have been diagnosed with the disease and recovered are at significant risk for PTSD have been reported. Although it has been observed that PTSD symptoms of individuals who were infected in the past epidemics such as SARS and Ebola continued for a long time even after the epidemic, it is noteworthy that the studies conducted during the COVID-19 process do not focus enough on people who survived the COVID-19 disease. The purpose of this study is to determine the direct and indirect impact of positivity on PTSD symptoms of individuals who have recovered from COVID-19 and the role of rumination and fear of COVID-19 as potential mediators in this effect.

**Subjects and methods:** In the study, the Impact of Event Scale-Revised, Ruminative Response Scale, Positivity Scale, and Fear of COVID-19 Scale were applied to 551 Turkish participants, who survived the COVID-19 disease. SEM-based mediation analysis was used to test hypothesized relationships.

**Results:** Mediating roles of fear of COVID-19 and rumination between positivity and PTSD were tested. Results indicated that rumination and fear of COVID-19 had a full mediating role in the relationship between positivity and PTSD.

**Conclusion:** These findings pointed out that positivity might be an indirect protective disposition against COVID-19-related PTSD and might reduce risk factors associated with PTSD among COVID-19 survivors. Mental health practices for COVID-19 patients should aim to increase positive thinking, since they have ruminative thoughts about transmission of the virus and hospitalization process and these thoughts may lead to negative mental health conditions. In this sense, positive psychology-focused implementations can be organized for COVID-19 patients and survivors.

**Key words:** positivity – PTSD - fear of COVID-19 - rumination

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## INTRODUCTION

COVID-19, which started at the end of 2019 spread all over the world, has caused the death of millions of people. In March 2022, the total number of cases in the world exceeded 440 million and the number of deaths exceeded 5.9 million. In addition, March 2022, the number of COVID-19 cases in Turkey exceeded 13 million and the number of deaths exceeded 91 thousand. Therefore, the COVID-19 pandemic process continues its impact (Ministry of Health Republic of Turkey 2022). In this process, social distancing, curfew or quarantine have been adopted in many countries in order to prevent the spread of the epidemic. Turkey also implemented the necessary precautions and measures against the pandemic in line with the plan prepared by the Coronavirus Science Board, which consists of thirty experts. In the prepared plan, there are some policies to be followed under the headings of coordination, monitoring and evaluation of the situation, protection and control, medical practices, communication and psychological support when necessary in the context of risk and crisis management (Sertdemir 2020). These measures triggered the emergence and increase of various psychological

disorders in societies (Forte et al. 2020). The increase in psychological symptoms in societies during the COVID-19 epidemic is associated with the traumatic effects of the pandemic. Traumatic events refer to experiences that threaten people with death, injury, or disruption of physical integrity (APA 2013). The threat to the physical health of individuals, the effects of the measures taken to prevent the spread of the virus in various areas of life, and the deaths due to the disease can make the COVID-19 epidemic a traumatic experience for individuals. Indeed, a study in China found that 96.2% of people who recovered from COVID-19 showed significant symptoms of PTSD (Bo et al. 2021). In a study conducted in Turkey, it was determined that individuals had a more stable life due to the precautions and measures taken and various psychological symptoms were observed in individuals (Bulguroğlu et al. 2021). In another study conducted in a Turkish sample, it was determined that symptoms such as fear of death, loneliness, boredom, and anxiety were observed intensely, especially in individuals who contracted the disease and were quarantined (Erdoğan & Hocaoğlu 2020). It is stated that these symptoms during the quarantine period may occur even days after the quarantine process (İzci et al.

2021). Therefore, the prevention or treatment of PTSD in individuals who have survived the COVID-19 pandemic is one of the issues that mental health services should prioritize (Xiao et al. 2020).

Exposure to trauma poses a risk for PTSD, however, not everyone who has been exposed to traumatic experiences develops symptoms of PTSD (Basharpour et al. 2015). This means that there may be protective factors that prevent individuals from developing PTSD after exposure to a traumatic event. Positiveness or positive orientation can be one of the important personal strengths that protect survivors of COVID-19 against temporary or permanent negative effects of the pandemic (Yıldırım & Güler 2021). Positivity, it is one of the features that people need to deal with stressful and challenging events such as bad events, failures or losses in life (Caprara et al. 2019, Caprara et al. 2012b, 2016). People with positive orientation tend to think positively about their selves, lives and futures (Caprara et al. 2010). The positive perspective is important for coping with life's setbacks and losses and to maintain interest in life despite the inevitability of death (Caprara et al. 2012b) and is necessary to face the fundamental challenges of being human such as illness, aging or death (Caprara et al. 2019). People who tend to think negatively instead of positively, on the other hand, are more vulnerable to psychological problems because they cannot cope with stress situations (Bakioğlu et al. 2021). For example, in a study conducted with university students after a terrorist bombing attack found that PTSD was associated with low positive orientation (Karaman et al. 2020). For individuals with positive orientation, it may be easier to adapt to the challenging conditions and changes in the COVID-19 pandemic (Arpacı et al. 2021). Positive orientation makes patients more susceptible to adapting to medical treatment, utilizing existing support and using cognitive strategies to deal with the disease. Thus, they can effectively cope with diseases. Considering its importance in the process of coping with diseases, positivity can be expected to be protective against PTSD in people who have survived the COVID-19 pandemic.

Although past studies have indicated that positive orientation is negatively associated with PTSD (Israel-Cohen et al. 2016; Karaman et al. 2020), it remains unclear how positivity in the context of COVID-19 protects survivors against the development of PTSD. In order to clarify this subject, the current study focuses on two psychological concepts that pose a risk for PTSD disorder and deals with the effect of positivity on these risk factors. One of these risk factors is rumination (Nolen-Hoeksema et al. 2008), and the other one is fear of COVID-19 (Ahorsu et al. 2020). Positive thinking tendency can help survivors of COVID-19 reduce their reflective behaviors and negative emotions related to the pandemic, thus protecting them against PTSD symptoms. In this context, rumination and fear of COVID-19 may be potential mediating variables in the relationship between positivity and PTSD.

Rumination is the tendency to think repeatedly and continuously about the problems experienced by the person and their consequences (Slavish et al. 2018). Rumination deprives the person of problem-solving skills, the ability to initiate instrumental behaviors, and social support systems, and increases negative thoughts (Lyubomirsky et al. 2015). Rumination can make a person vulnerable to the development of mental health problems after a traumatic experience (Valdez & Lilly 2017). Increased rumination tendency is associated with an increase in negative emotions (Asıcı et al. 2020, Oral & Arslan 2017). In this context, rumination is a strong risk factor for PTSD (Michael et al. 2007). It can both trigger the development of PTSD (Jenness et al. 2016) and act as a perpetuator of PTSD symptoms (Santa Maria et al. 2012). Especially the "Why?" about the traumatic experience and "Oh... if it was?" repetitive thoughts containing questions such as PTSD are significantly associated with PTSD (Michael et al. 2007). Studies conducted with individuals exposed to different traumatic experiences (Basharpour et al. 2015, Ehring et al. 2008, Viana et al. 2017) and various studies conducted during the COVID-19 process have shown that rumination tendency positively predicts PTSD (Ikizer et al. 2021, Wong et al. 2021). Ruminative thoughts about contact with the virus, getting sick, and hospitalization, accompanied by the fear and guilt feelings that exist in individuals with COVID-19 (Sun et al. 2021) may trigger the development of PTSD.

Fear is an adaptive defense mechanism that emerges in the presence of a threatening situation and is used by the organism to survive (Ornell et al. 2020). Unusual situations such as epidemics can increase fear among people (Pakpour & Griffiths 2020). The COVID-19 outbreak has also caused widespread anxiety, fear and anxiety, as it can result in serious illness, hospitalization, and even death (Ahorsu et al. 2020, Li 2021). While the fear associated with the pandemic is useful in motivating people to comply with the measures taken to prevent the spread of the disease, it causes problems at both individual and social levels when it is excessive (Mertens et al. 2020). Fears about COVID-19 have been proven to be associated with various mental health problems such as depression, anxiety, stress, distress, traumatic stress, and insomnia (Di Crosta et al. 2020, Georgieva et al. 2021, Şimşir et al. 2022). Therefore, fear of COVID-19 can be expected to be positively related to PTSD. On the other hand, it is known that positivity is negatively associated with fear of COVID-19 (Bakioğlu et al. 2021) and anxiety in the pandemic process (Arpacı et al. 2021).

The fact that the COVID-19 pandemic has led to an increase in PTSD symptoms in societies (Cenat et al. 2021, Cooke et al. 2020), especially individuals who have been diagnosed with the disease and recovered are at significant risk for PTSD (Bo et al. 2020) have been reported. Although it has been observed that PTSD symptoms of individuals who were infected in the past epidemics such as SARS (Mak et al. 2010) and Ebola

(Jalloh et al. 2018) continued for along time even after the epidemic, it is noteworthy that the studies conducted during the COVID-19 process do not focus enough on people who survived the COVID-19 disease. For this reason, the current study focuses on PTSD in individuals surviving COVID-19 disease, and aims to determine the protective and risk factors associated with PTSD and the relationships between them. Determining the protective and risk factors associated with COVID-19-related PTSD may contribute to the developing therapeutic interventions for survivors of COVID-19 and might be beneficial in preventing mental health problems as well as physical health problems during the pandemics in future. In this context, the aim of this study is to examine (a) the direct and indirect impact of positivity on PTSD symptoms of individuals who have recovered from COVID-19, and (b) the role of rumination and fear of COVID-19 as potential mediators in this effect. As the psychological effects of the COVID-19 pandemic can vary depending on gender (Di Crosta et al. 2020, Liu et al. 2020, Qui et al. 2020, Wang et al. 2020) and age (Huang & Zhao 2020, Li et al. 2020, Qui et al. 2020) while examining the direct and indirect effects of positivity on PTSD, age and gender were considered as control variables.

## SUBJECTS AND METHODS

### Participants

The sample of the study consisted of 551 Turkish participants, 390 females (70.8%), and 161 males (29.2%) who survived the COVID-19 disease. The study sample consists of participants from 32 different provinces of Turkey. Their ages ranged from 18 to 60 ( $M = 28.37$ ,  $SD = 9.9$ ). Of the participants 244 (44.3%) had mild disease 280 (50.8%) had moderate disease 27 (4.9%) had severe disease.

### Procedure

The data of this study were collected between January 12-19, 2021. In this period, the spread of the disease was high in Turkey. In order to reduce the spread of the disease, the Turkish government took decisions such as curfews, closing of restaurants and cafes. The Ministry of Health announced on June 30 that a total of 50.048 people have died because of COVID-19 since the past (Ministry of Health Republic of Turkey 2021).

The study was carried out using a cross-sectional design. In the literature, a sample size-parameter ratio of at least 10:1 has been suggested in SEM-based studies (Kline 2015). The total number of items in the measurement tools in this study is 47 and at least 470 participants are needed. Our sample size is sufficient considering this information. Participants answered the questions via a web-based questionnaire. While preparing the online survey form used in this study, the Checklist for Reporting Results of Internet E-Surveys

(CHERRIES) guide was taken into consideration (Eysenbach 2004). Accordingly, first of all, it was stated in the consent form that the personal information would be kept confidential, that it would only be used for scientific research purposes, and also the purpose and justification of the research. It has been announced that Institutional Review Board approval has been obtained. The usability and technical functionality of the online survey were tested before the questionnaire was filled. Informed consent was obtained from the participants. One of the sections that must be answered at the beginning of the created online survey is this informed consent form. The participant cannot continue with the survey created without accepting the informed consent form.

Participants were asked to respond to measurement tools that assess posttraumatic stress disorder, rumination, positivity, and fear of COVID-19. Participants who survived the COVID-19 disease were reached via social media (eg Facebook, Twitter, etc.). Participants were also asked to share our study link with others. One week was given for the online survey response time, and when the time was up, the survey was closed for answers. Participants were asked to write a code consisting of a nickname and a number in order to prevent multiple entries from the same individual.

All procedures performed in the study involving human participants were in accordance with the Declaration of Helsinki in 1995 (as revised in Edinburgh 2000). The study was approved by the Scientific Research Ethics Committee of Pamukkale University (date and number of approval: 02.06.2021/ 10/3).

### Measures

#### *Impact of Event Scale-Revised (IES-R)*

This scale was used to measure the posttraumatic stress disorder (PTSD) experiences of the participants. It was developed by Weiss and Marmar (1997). The scale contains 22 items (e.g. I tried to remove it from my memory). Individuals are asked to answer the questions in a 4-point Likert type (1= Not at all, 4= Extremely). The Turkish adaptation study of the scale was carried out by Çorapçioğlu et al. (2006). Authors reported the cut-off value of the Turkish version of the scale was between 24 and 33, while the sensitivity and specificity values were found to be greater than 70% and had acceptable internal consistency (Cronbach alpha=0.94). In the current study, internal consistency coefficients are acceptable (Cronbach alpha=0.92, Omega= 0.92).

#### *A short version of The Ruminative Response Scale (RRS)*

This scale was used to measure the rumination of the participants. The scale was developed by Treynor, Gonzalez, and Nolen-Hoeksema (2003). The scale consists of 10 items (e.g. Think “What am I doing to deserve this?”). Individuals are asked to answer the questions in a 4-point Likert type (1= Almost Never, 4= Almost Always). The Turkish adaptation of the scale

was made by Erdur-Baker and Bugay (2010). The authors reported that the Turkish version of the scale showed good fit indices ( $\chi^2/sd = 3.93$ , GFI = 0.95, CFI = 0.88 and RMSEA = 0.07) and had acceptable internal consistency (Cronbach alpha = 0.72). In the current study, internal consistency coefficients are acceptable (Cronbach alpha = 0.83, Omega = 0.84).

### The Positivity Scale (P Scale)

This scale was used to measure the positivity level of the participants. The scale was developed by Caprara et al. (2012a). The scale includes 8 items (e.g. I generally feel confident in myself). Participants are asked to answer the questions in a 5-point Likert type (1= Strongly Disagree, 5= Strongly Agree). The Turkish adaptation of the scale was made by Çıkrıkçı, Çiftçi and Gençdoğan (2015). The authors reported that the Turkish version of the scale showed good fit indices ( $\chi^2/sd = 2.92$ , GFI = 0.97, CFI = 0.95 and RMSEA = 0.06) and had acceptable internal consistency (Cronbach alpha=0.73). In the current study, internal consistency coefficients are acceptable (Cronbach alpha = 0.69, Omega = 0.73).

### The Fear of COVID-19 Scale (FCV-19)

This scale was used to measure the participants' level of fear of COVID-19. The scale was developed by Ahorsu et al. (2020). The scale includes 7 items (e.g. I am afraid of losing my life because of coronavirus-19). Participants are asked to answer the questions in a 5-point Likert type (1= Strongly disagree, 5= Strongly agree). The Turkish adaptation of the scale was made by Haktanir et al. (2022). The authors reported that the Turkish version of the scale showed good fit indices ( $\chi^2/sd = 2.77$ , GFI = 0.99, CFI=0.99 and RMSEA = 0.05) and had acceptable internal consistency (Cronbach alpha=0.86). In the current study, internal consistency coefficients are acceptable (Cronbach alpha = 0.89, Omega = 0.89).

### The descriptive questionnaire

The questionnaire was used to obtain descriptive information about the participants, including gender (female and male), age, province of residence, disease state (I had mild disease, I had moderate disease, I had severe disease).

### Data Analysis

Correlations and descriptive statistics were performed using IBM SPSS 21, mediation analysis was performed using IBM AMOS 24 program. Considering the recommendation in the literature (Van Jaarsveld et al. 2010), gender and age were used as control variables in order to isolate the indirect effect. The statistical significance of the mediator variable was examined using 10000 bootstrap samples. This method revealed 95% confidence intervals (CI) of indirect effects. The literature states that the investigated effect is significant when the confidence intervals do not include zero (Preacher & Hayes 2008).

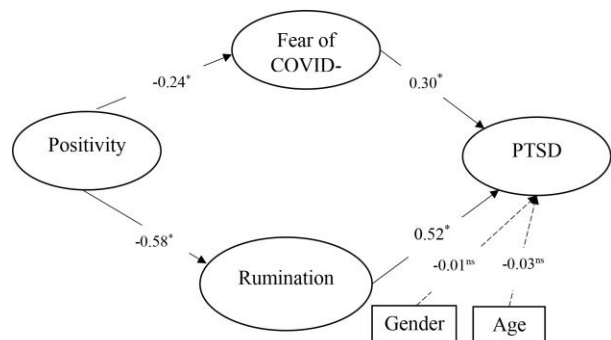
## RESULTS

### Correlation and descriptive statistics of variable

Descriptive statistics and bivariate correlations are shown in Table 1. Skewness and kurtosis indices were normal for all variables (Skewness ranged from -0.48 to 0.50 and Kurtosis from -0.57 to 1.18). According to the results, PTSD was positively correlated with Rumination ( $r=0.52$ ) and fear of COVID-19 ( $r=0.41$ ). On the other hand, Positivity was negatively correlated with PTSD ( $r=-0.27$ ), Rumination ( $r=-0.39$ ) and fear of COVID-19 ( $r=-0.21$ ). Rumination was positively correlated with fear of COVID-19 ( $r=0.22$ ). All variables revealed significant relationships with each other.

### Structural Model

The mediation of Rumination and fear of COVID-19 in the relationship between PTSD and positivity is seen in the model in Figure 1. The findings show that the path analysis is significant and has acceptable fit indices ( $\chi^2/df = 2.39$ , CFI = 0.92, SRMR = 0.006, RMSEA = 0.06). The findings demonstrated that Positivity was related negatively to Rumination ( $\beta=-0.58$ ,  $p<0.001$ , 95% CI = [-0.65, -0.48]) and fear of COVID-19 ( $\beta = -0.24$ ,  $p<0.001$ , 95% CI = [-0.34, -0.13]). Rumination positively was related PTSD. ( $\beta=0.52$ ,  $p<0.001$ , 95% CI = [0.41, 0.63]). Fear of COVID-19 directly positively was related PTSD ( $\beta=0.30$ ,  $p<0.001$ , 95% CI = [0.21, 0.39]). Also, the effect of gender and age on PTSD was non-significant. Thus, the indirect effect was tested regardless of gender and age.



Note: \* $p<0.001$ , ns non-significant

Figure 1. Standardized Factor Loading for the Fully Mediated Structural Model

### Bootstrapping

Mediating roles of fear of COVID-19 and Rumination between Positivity and PTSD were tested via the bootstrapping procedure. Table 2 shows the indirect effects were tested and their associated 95% CI, where the indirect effect of Positivity on PTSD through fear of COVID-19 and Rumination was significant ( $\beta=-0.37$ ,  $p<0.001$ , 95% CI = [-0.47, -0.28]). It can be stated that fear of COVID-19 and Rumination are the full mediators between Positivity and PTSD.

**Table 1.** Descriptive Statistics and Correlations Among Study Variables

Variable	1	2	3	4	M	SD	Skewness	Kurtosis
Positivity	-				29.68	4.11	-0.48	1.18
PTSD (IES-R)	-0.27*	-			30.30	29.68	0.35	-0.48
Rumination	-0.39*	0.52*	-		22.17	5.12	0.33	0.34
Fear of COVID-19	-0.21*	0.41*	0.22*	-	17.27	6.96	0.50	-0.57

\* p < 0.001

**Table 2.** Direct, Indirect Effects, and 95 % Confidence Intervals for the Model

Model Pathways	Estimated	95% CI	
		Lower	Upper
<b>Direct Effect</b>			
Positivity → Fear of COVID-19	-0.24*	-0.34	-0.13
Positivity → Rumination	-0.58*	-0.65	-0.48
Rumination → Impact of Event PTSD	0.52*	0.41	0.63
Fear of COVID-19 → Impact of Event PTSD	0.30*	0.21	0.39
<b>Indirect Effect</b>			
Positivity → (Fear of COVID-19- Rumination) → Impact of Event PTSD	-0.37*	-0.47	-0.28

\* p < 0.001

## DISCUSSION

As a traumatic experience, COVID-19 pandemic led to many psychological problems in societies. COVID-19-related PTSD is one of the most common psychological problems (Qui et al. 2020; Xu et al. 2021). Although COVID-19-related PTSD threats all segments of society, COVID-19 survivors are especially at high risk group (Chamberlain et al. 2021, Huang et al. 2020, Xiao et al. 2020) and many COVID-19 patients might have PTSD symptoms (Bo et al. 2020). On the other hand, exposure to a traumatic experience does not always result in PTSD (Basharpour et al. 2015). There might also be protective and risk factors for COVID-19-related PTSD. Emergency mental health services should aim to increase protective factors and to decrease risk factors in COVID-19 patients or survivors (Xiao et al. 2020).

Current findings can be summed as follows: Positivity had no direct effect on PTSD, however, it indirectly affected PTSD through rumination and fear of COVID-19. The mediating role of rumination was stronger than fear of COVID-19 since the negative indirect effect of positivity on PTSD mostly arose from rumination (-0.30 of total -0.37 effect on PTSD was through rumination). These findings pointed out that positivity might be an indirect protective disposition against COVID-19-related PTSD and might reduce risk factors associated with PTSD among COVID-19 survivors.

Literature on positivity emphasizes that positive thinking or outlook increases ego resiliency (Miloni et al. 2016), facilitates coping with stressful events (Caprara et al. 2012b, 2016, 2019) and adapting to changes (Arpaci et al. 2021), and prevents developing mental health problems (Bakioğlu et al. 2021, Caprara et al. 2010, 2012b). Karaman et al. (2020) reported that

after a terrorist attack, PTSD was directly associated with low positive orientation among university students. Hence, the insignificant direct effect of positivity on PTSD was an unexpected result. According to current findings, the relationship between positive orientation and PTSD may change depending on the type of traumatic event, illness, and the features of participants. In addition, duration and severity of traumatic event or illness may be important determinants. On the other hand, tools for measuring positive orientation and PTSD might cause discrepancy between the results of current and previous studies.

Rumination had a significant mediating role in the effect of positivity on PTSD among COVID-19 survivors. Positivity led to a significant decrease in rumination and so it contributed to relief of PTSD symptoms. We could not find a study focusing on the relation between positivity and rumination. However, the definitions of positivity and rumination concepts seem opposite to each other. Positivity focuses on positive perspective, approaches, and thinking and is related to positive psychological constructs including self-esteem, optimism, and life satisfaction (Caprara et al. 2010, 2012a,b). On the other hand, rumination refers to thinking about negative aspects of events and negative emotions caused by these negative events (Nolen-Hoeksema et al. 2008). Hence, the negative impact of positivity on rumination was an expected result and showed that positivity might be a significant preventive disposition against COVID-19 survivors' repetitive thoughts about transmission of the virus, treatment or hospitalization process.

It was well-documented that rumination caused developing PTSD and continue its existence after various traumatic experiences, including traffic accident, terrorist attack, physical impairment, spouse's death, serious illness of self or relatives, imprisonment of spouse,

divorce (Basharpoor et al. 2015, Ehring et al. 2008, Jenness et al. 2016, Michael et al. 2007, Santa Maria et al. 2012, Viana et al. 2017). Parallel with previous studies which were conducted during COVID-19 pandemic (Ikizer et al. 2021, Wong et al. 2021), current findings showed that COVID-19 survivors with higher rumination tendency experienced more PTSD symptoms. COVID-19 patients may have repetitive thoughts about transmission of the virus and hospitalization process (Sun et al. 2021). They might consistently occupy their mind with the questions like “Why me?”, “What if I died?”, “What if I infect others?”. This type of thoughts and questions trigger negative emotions (Asıcı et al. 2020, Oral & Arslan 2017) and can make them predispose to PTSD originating from COVID-19 pandemic. For COVID-19 patients, social support is a key factor in fighting against negative effects of illness (Sun et al. 2021). COVID-19 survivors with high rumination tendency may be more vulnerable to mental health problems, since rumination is associated with poor social support (Lyubomirsky et al. 2015).

Fear of COVID-19 had a significant mediating role in the impact of positivity on PTSD among COVID-19 survivors. Positivity led to a significant decrease in fear of COVID-19 and so it contributed to relief of PTSD symptoms. The negative impact of positivity on fear of COVID-19 supported the findings of previous studies conducted during COVID-19 pandemic (Arpaci et al. 2021, Bakioğlu et al. 2021). Patients with high positivity are more inclined to believe the possibility of recovery and rely on the effectiveness of treatment (Caprara et al. 2016). Being positive includes thinking in an optimistic way (Arpaci et al. 2021). The optimistic perspective of people with high positivity may reduce negative emotions such as fear, worry or anxiety. In this sense, COVID-19 patients with high positivity experience less death anxiety (Yıldırım & Güler 2021). On the other hand, contagion or infection related fear or anxiety (Di Crosta et al. 2020, Georgieva et al. 2021, Şimşir et al. 2022) cause PTSD. Similarly, current findings revealed that fear of COVID-19 led to an increase in PTSD symptoms among COVID-19 survivors.

Previous studies revealed that females were more affected by the pandemic psychologically (Qui et al. 2020, Wang et al. 2020) and had more PTSD symptoms (Di Crosta et al. 2020, Liu et al. 2020). In addition, it is seen that effects of COVID-19 on mental health might change among different age groups (Huang & Zhao 2020, Li et al. 2020, Qui et al. 2020). However, current findings showed that gender and age did not have a significant effect on PTSD among COVID-19 survivors. It can be said that catching COVID-19 disease results in similar psychological effects regardless of gender and age.

This study has some limitations. First, there might be a great number of factors causing COVID-19-related PTSD among COVID-19 survivors, whereas, the current study focused only on three psychological constructs. For example, the course and severity of

COVID-19 disease might change in case of the presence of chronic illnesses. The patients with a chronic illness might experience more fear and death anxiety, and this might result in more PTSD symptoms. However, this study did not pay regard to the presence of a chronic illness in participants. Similarly, COVID-19 survivors might also have psychological symptoms before the pandemic. These psychological symptoms might make them more vulnerable to COVID-19-related PTSD. Moreover, COVID-19 patients might have lost their job and been experiencing economic difficulties. Hence, COVID-19 related PTSD among COVID-19 survivors is a multiple aspect issue. Future studies should focus on different preventive and risk factors including demographic variables or health variables. Second, this study was designed as a cross-sectional and quantitative study. COVID-19 pandemic still maintains its impact. Depending on the number of new cases or death, individuals' psychological response to an outbreak may change. The perceived severity of pandemic during the data collection process may have affected the responses of participants. In future, longitudinal and qualitative studies can be conducted to get a better understanding of COVID-19-related PTSD. Third, data were collected online. Online data collecting process involves some problems such as the survey's being responded by a wrong person or by the same participant more than once (Coulson 2015). Fourth, this study accepted rumination as a negative construct, however, rumination can also be positive (Yang et al. 2020). In the context of COVID-19, next studies may examine the effects of positive rumination.

Based on obtained findings, following suggestions were offered: Findings revealed that the presence of rumination tendency was a significant risk factor for PTSD symptoms among COVID-19 survivors and positivity was a protective disposition against repetitive and negative thinking. Mental health practices for COVID-19 patients should aim to increase positive thinking, since they have ruminative thoughts about transmission of the virus and hospitalization process (Sun et al. 2021) and these thoughts may lead to negative mental health conditions. In this sense, positive psychology-focused implementations can be organized for COVID-19 patients and survivors. Individual or group counseling can be beneficial for COVID-19 survivors who have high levels of PTSD symptoms. Counseling practices may include positive emotions, emotional regulation, and coping with negative emotions and thoughts.

## CONCLUSION

COVID-19 pandemic still continues to affect all over the world and mental health problems because of COVID-19 pandemic are increasing day by day in societies. PTSD is one of the most common pandemic related mental health problems. Even if COVID-19

pandemic is over, its traumatic impacts will continue. Thus, therapeutic interventions for survivors should be developed. In addition, new viruses may also emerge in the future. Governments should prepare contingency plans for possible new pandemics and these plans should also focus on preventing mental health problems as well as physical health problems. This study discussed PTSD in COVID-19 survivors. Results demonstrated that rumination tendency makes the COVID-19 survivors vulnerable to COVID-19 related PTSD and being positive is helpful in decreasing ruminative thinking. Current results may guide both therapeutic and preventive interventions.

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### Contribution of individual authors:

Aykut Gunlu, Hayri Koç, Esra Asici & Tuncay Oral: conceptualization, methodology, formal analysis, investigation, data, writing - original draft preparation, writing - review and editing.

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