

THE ABILITY OF EMOTION RECOGNITION ASSOCIATES WITH RESPONSIVE BEHAVIORS RELATED TO COVID-19 AMONG TURKISH INDIVIDUALS

*Assist. Prof. Dr. Pınar Ünal-Aydın, International University of Sarajevo**
Assist. Prof. Dr. Orkun Aydın, International University of Sarajevo
Canahmet Boz, Clinical psychologist

ABSTRACT

It has been shown that emotions such as fear and anger may play a role in responsive and preventive behaviors of individuals during the COVID-19 outbreak. Accurate interpretation of such emotions may contribute to early management of disease spread measures by eliciting avoidance from the risky situations. In this study, we aimed to examine the relationship between emotion recognition (ER) ability, responsive and preventive behaviors related to the pandemic among healthy individuals. 520 adult participants were recruited for the study. A sociodemographic data form, a personal information form including responsive and preventive behaviors related to COVID-19, and the Reading the Mind from The Eyes Test (RMET) were applied to the participants via online platform. The vast majority of the participants indicated COVID-19 as a dangerous disease, and they stated their avoidance from outside gatherings and public transportation. Additionally, it was found that those who can define neutral emotions better, worry about the disease and take a more active role in responsive behaviors such as eating out and avoiding public places. It has been shown that individuals who are more effective with recognition of negative and neutral emotions during the outbreak are more active in risk-avoiding behaviors during COVID-19. Attempts to increase emotion recognition skills can be beneficial for both healthy individuals and people with mental illness in the early development of preventive behavior.

Keywords: *COVID-19, emotion recognition, preventive behavior, outbreak, pandemic, corona virus*

* Corresponding author: Assist. Prof. Dr. Pınar Ünal-Aydın, International University of Sarajevo, E-mail: paydin@ius.edu.ba.

INTRODUCTION

In December 2019, a new type of corona virus called SARS-CoV-2 was reported by the Corona Virus Working Group (Gorbalenya, 2020) in China (Zhu et al., 2020). On February 11, 2020, the disease caused by the new type of corona virus was officially named COVID-19 by the World Health Organization (WHO). Findings have shown that COVID-19 is a different type than beta-corona viruses associated with Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) (Zhu et al., 2020). COVID-19 has become a global emergency health condition within a few weeks with its high spreading rate (Wang et al., 2020). In addition, the number of detected and suspected cases has increased rapidly in 85 countries outside of China (Munster et al., 2020). According to the latest data in Turkey until December 6, 2020, the number of cases is 828295 and 14900 of the cases resulted in death (Worldometer, 2020).

Our emotions, which are part of our daily life; constantly interacts with our thinking process, belief and decision-making skills and constitutes a very important place in guiding our behavior (Mayer et al., 1999; Mayer et al., 1990). Recognition of emotional expressions is linked to the Theory of Mind (ToM) of social cognition. This theory aims to understand the mental states of others in order to provide appropriate social interactions (Bora & Pantelis, 2016). According to this theory, any disruption in perception of emotions can significantly affect the social interaction and lead to a decrease in social functionality (Ibanez et al., 2014). Impairment in emotion recognition has been reported in many psychiatric disorders such as anxiety (Aydın et al., 2019), depression (Leppänen et al., 2004), schizophrenia (Couture et al., 2006), generalized anxiety and panic disorders (Mennin et al., 2005; Ünal-Aydın et al., 2019). In addition, it is argued that there is a bi-directional relationship between stress and emotion perception. According to this hypothesis, long-term exposure to stress decreases emotion recognition ability or inability to define emotion, causing misinterpretation of social cues in interpersonal communication and increasing the stress load on the person (Wirkner et al., 2019).

After the outbreak of the COVID-19, majority of the people began to isolate

themselves from the society and put social distance between them (Qian et al., 2020). During the pandemic, with the decrease in social interaction, negative emotional reactions emerged in individuals and these reactions had a negative effect on coping skills by increasing the stress level of individuals (L. Huang & rong Liu, 2020; Li et al., 2020). Due to these limitations, it can be considered that excessive stress may affect the individual's emotion recognition skill, or it can be predicted that individuals with lower emotion recognition skills may have higher perceived stress levels. During the outbreak, limiting measures are focused on identifying, treating, isolating, screening of the chain of contact, quarantine, and promoting pandemic preventive behavior (Brug et al., 2004; Lau et al., 2003; Qian et al., 2020). However, the responsive and preventive behaviors of the society have a crucial role in the control of disease in terms of preventing the disruption of the health services and the spread of the pandemic (Basch et al., 2020). Responsive behaviors include avoidance from eating out/public transport/public area; preventive behaviors such as wear mask/vinyl gloves, taking vitamin supplements are examples (Basch et al., 2020; Oh et al., 2020; Zhong et al., 2020). It has been determined that emotional experience as well as socio-demographic variables such as age, education, gender, ethnicity, and religion can be influenced by the exposure and maintenance of these behaviors and may differ among individuals (Oh et al., 2020; Pakpour & Griffiths, 2020). Especially fear and anxiety were emphasized about emotions that guided the behavior of the individual. According to the model; these emotions come to the forefront in healthy communication and change the individuals' health status, attitudes, and behaviors in a way that allows them to improve (Tannenbaum et al., 2015). This relationship is also assumed to have a cognitive component (risk perception) related to risk perception. It has been stated that these feelings leading to an increased risk of perceived risk are life-threatening, and therefore individuals show more preventive behavior (Moser et al., 2007). For example, in a study conducted during the SARS epidemic, the majority of participants stated that they had a fear of infection in public areas. In the vast majority of individuals who experience fear exhibit more frequently hygiene behaviors (wearing a mask, hand washing, house cleaning) than those who did not feel negative emotions. It has been reported that the frequency of hygiene behavior was directly proportionate to perceived emotion intensity (Lau et al., 2003). In a study conducted during the COVID-19 outbreak was reported that as the perceived fear and threat increase, the individuals have

more preventive behaviors (Harper et al., 2020). It was emphasized that this situation may be a factor in increasing the adaptation of society to preventive behaviors in the fight against COVID-19 (Harper et al., 2020). In this study, it was aimed to find out the effect of COVID-19 outbreak on the emotion recognition skills of individuals, to investigate their preventive and responsive behaviors. In the light of our findings we aim to highlight the relationship between positive, negative, neutral emotion recognition skills and those preventive/responsive behaviors.

Method

Participants

Snowball (chain) sampling method was applied for the study. The announcement of the study was made through websites and social media platforms. The data of the participants were collected via online questionnaires. Participants did not receive any incentives or allowances (e.g. food, travel). The inclusion criteria were: i) at least 18 years or above, ii) to complete the all online tests, iii) to reside in Turkey, and the exclusion criteria were; the presence of any psychiatric disorder that may affect the responses. 520 participants between 18-70 ages who gathered via online surveys were included in the study. 19 participants reported having psychiatric illness and due to incomplete responses, 5 participants were excluded from the study. Thus, the analyzes were completed with 496 participants. All participants approved the written consent form. Ethics committee approval was received for the current study.

Instruments

Sociodemographic Data Form

It was prepared by the researchers to obtain information about sociodemographic characteristics (age, gender, marital status, education year, financial status, place of residence, smoking and alcohol habits, psychiatric diagnosis) of the participants.

Personal Information Form

The form consists of 12 questions about the preventive behaviors related

to the COVID-19 outbreak was prepared by the researchers. Questions of responsive behaviors include: “How often did you follow news about COVID-19 about blogs, Facebook, Twitter, Instagram or YouTube in the last week?”, “How worried are you about getting COVID-19 disease?”, “How dangerous do you think COVID-19 disease is?”, “Are you afraid of COVID-19 disease?” and “Are you angry about COVID-19 disease?”. Questions about preventive behaviors include: “Have you avoided eating outside / using public transport / going to public areas due to COVID-19 in the last 1 week?”, “Have you increased your frequency of personal hygiene (e.g. handwashing, bathing) due to COVID-19 in the last 1 week?”, “Have you used a face mask when you were going out due to COVID-19 in the last 1 week?”, “Have you used gloves due to COVID-19 in the last 1 week?”, and “Have you taken vitamin supplements due to COVID-19 in the last 1 week?”. The questions are in a 5-point Likert style and have been rated the “Never” (1), “Rarely” (2), “Sometimes” (3), “Usually” (4), “Always” (5) responses.

Reading the Mind in the Eyes Test (RMET)

The RMET was developed by Baron-Cohen et al. (Baron-Cohen et al., 2001) to evaluate the person’s ability to read the intentions, feelings, and thoughts of others through facial expressions. The test, which is frequently used to evaluate social cognition and ToM skills, consists of 36 black and white photographs containing only the eye area (Baron-Cohen et al., 2001; Emery & Clayton, 2009). The participants are required to determine the emotion of the eye area in the photo and choose one of the four options (one correct word, three distractor words). The test includes photos with positive (RMET_Pos), negative (RMET_Neg), and neutral emotions (RMET_Neu), and the overall success score (RMET_Total) can also be calculated (Harkness et al., 2005). It evaluates 7 positive (e.g. playful, fantasizing, thoughtful), 11 negatives (e.g. upset, worried, preoccupied), and 14 neutral emotions (e.g. desire, insisting, uneasy) and a higher score of the RMET points indicates better emotion recognition skills in the related fields. Several studies have shown that the test can measure emotion recognition skills in both healthy and psychiatric groups (Guastella et al., 2010; Harrison et al., 2010; Shamay-Tsoory et al., 2009). The Turkish validity and reliability study (consist of 32 photos) was conducted by Yıldırım et al. (Ejder Akgun

Yildirim et al., 2011).

Statistical Analyses

The analysis of distribution plots and Shapiro-Wilks tests were utilized for the parametric statistical testing. The variables showed normal distribution among the sample. Descriptive statistics analysis of the sociodemographic characteristics of the participants, answers to the questions related to COVID-19 outbreak, and RMET scores were performed. Pearson correlation analysis was conducted to investigate the relationship between RMET and preventive behavior related to the COVID-19 outbreak. Statistical significance (p) value was set at 0.05 and all analyzes were calculated using statistical analysis software (IBM SPSS 25, Statistical Package for the Social Sciences).

Results

Sociodemographic Information of Participants

In the sample, the age of the participants was between 18 and 70 [32.09 ± 10.93] and the number of female participants was higher than male participants [328 female (66.1%), 168 males (33.9%)]. The average education year of the participants was 15.63 ± 3.73 . 40.1% (n = 199) of the sample were married and most of the participants stated their financial status as a middle level [344 (69.4%)] and current location as the city center [407 (82.1%)]. The majority of the participants have present tobacco [345 (69.6%)] and alcohol [398 (80.2%)] use (Table 1).

Distribution of preventive and responsive behaviors related to COVID-19 among the sample

While 73.6% of the participants stated that they usually and always, follow the blogs, Facebook, Twitter, Instagram, or YouTube about the COVID-19 outbreak, 90% stated that they usually think that the COVID-19 problem is dangerous. While around 40% of participants stated that they sometimes feel anxious and fear of getting infected, and feeling anger is usually a concomitant feeling for 30% of the sample. Approximately 80% of the

participants stated that they frequently avoid eating from outside, using public transportation, going to the public areas. Increased frequency of personal hygiene also increased due to COVID-19 outbreak in the last week. Participants seem to have adopted the most frequent wearing of face masks among preventive behaviors (49%), followed by wearing gloves and taking vitamin supplements (Table 2).

The relationship between responsive and preventive behaviors related to COVID-19 outbreak and emotion recognition

While the RMET_Pos mean score of the participants was 4.55 ± 1.11 ; the RMET_Neg mean score was 7.78 ± 1.79 . The average score of the participants from the RMET_Neu subtest was 10.02 ± 2.10 ; RMET_Total mean score was found as 22.35 ± 3.62 . According to the results, a positive significant relationship was found between RMET_Neg and avoiding using public transportation ($r = .145, p < 0.01$). Moreover, a positive and significant relationship was found between RMET_Neu and having worry about getting COVID-19 disease ($r = .094, p < 0.05$); avoidance from eating outside ($r = .093, p < 0.05$); avoiding using public transportation ($r = .092, p < 0.05$); and avoiding from going to public areas ($r = .090, p < 0.05$). There was positive and significant relationship between RMET_Total and avoiding using public transport ($r = .137, p < 0.01$); and avoiding going to public areas ($r = .094, p < 0.05$) (Table 3).

Discussion

The findings of the current study showed that most of the individuals residing in Turkey follow the news about COVID-19 very closely and feel intense anxiety and fear due to the outbreak and perceive the disease as dangerous. In addition, it has been observed that individuals have various avoidance behaviors (not eating out/avoiding using public transportation/not going to public places), and preventive behaviors (increased personal hygiene, wearing masks) in order to protect themselves and reduce the risk of contamination. These findings are consistent with previous COVID-19 studies that investigated similar factors and showed an increase in both perceived risk and responsive behaviors (L. Huang & rong Liu, 2020; Qian et al., 2020; Zhong et al., 2020). Based on this result, it can be considered

that the emotional responses to the pandemic and the measures to reduce the risk do not diverge in different societies. Although the number of cases and deaths is different, it can be stated that the reaction of the pandemic is similar in different societies. Several researchers have linked this to the widespread use of communication tools (internet, social media), increased speed of access to information, and large data flow related to the pandemic (Cinelli et al., 2020; Hua & Shaw, 2020; Vaezi & Javanmard, 2020). From this standpoint, individuals in low-risk positions may have an increased risk perception due to sharing information unlike the real situation. Therefore, it has been asserted that they can give increased responses as people in high-risk regions. For instances, Turkey currently ranked 12th in total cases, while the total number of deaths ranks 17th (Worldometer, 2020), however, the emotional and behavioral responses of individuals to the pandemic have been shown to exhibit similar reactions as in individuals in high-risk areas.

In our study, emotion recognition ability was measured with RMET which is one of the ToM tests. The overall performance of the participants was found similar to that in other studies involving healthy groups (Altıntaş et al., 2019; Aydın et al., 2019; Ünal-Aydın et al., 2020; Ejder Akgün Yildirim et al., 2011). The negative interaction between long-term stress and psychiatric disorders and emotion recognition has been shown in previous studies (Mennin et al., 2005; Ünal-Aydın et al., 2019; Wirkner et al., 2019). However, the current study indicates that the present participants had high emotion recognition ability. Causatively, it may be shown that our sample consisted of healthy people without any mental illness, and stress caused by the outbreak is not long-term. Emotion recognition ability measured by RMET was evaluated separately for positive, negative, and neutral emotions. Correlation analysis revealed that individuals who have an improved ability to identify negative emotions tend to have more frequent responsive behavior (avoiding from using public transport). Moreover, individuals with a better level of neutral emotion recognition ability performed responsive behaviors (avoiding eating outside/public transportation/public places) and worry more about the pandemic. The association between negative and neutral emotions and responsive behaviors and emotional responses towards the outbreak can be explained by the developmental process. Positive, negative, or neutral emotions have a central role in obtaining coping strategies compatible with the environment throughout life (Demos, 1986). Despite the necessity of all emotions, stress which is

an inevitable developmental factor to learn to tolerate, resist, and adapt to negative effects, seems to be more related to negative emotions (Kopp, 1989). In another study conducted by Lee et al. indicated that the similarity between neutral emotions and negative emotions, and neutral emotions are identifying more negatively by individuals (Lee et al., 2008). Therefore, it can be concluded that the recognition of neutral emotions along with negative emotions has become more important than positive emotions for the development of coping mechanisms required in the development of the individual (Kopp, 1989). Risk-reduction behavior in the COVID-19 outbreak can also be explained by the activation of these coping mechanisms. For example, a study in South Korea during the MERS epidemic stated that feelings of fear and anger may lead to an increase in the perceived risk and have an intermediary role in the increase of responsive behavior (Oh et al., 2020). From this standpoint, the present study suggested that those who can identify negative and neutral emotions better may increase their level of perceived risk during the COVID-19 outbreak. Additionally, these people tend to prefer responsive behavior in order to minimize the risk of disease (Harper et al., 2020; Pakpour & Griffiths, 2020).

The interaction between emotion recognition and responsive behaviors may be important in terms of taking precautions in the early period during the COVID-19 outbreak and limiting the spread of the disease. Individuals with limited emotion recognition ability may perceive the risk of the COVID-19 outbreak understate and abstain from exhibiting responsive behaviors. On the other hand, the findings provide evidence that emotion recognition ability has decreased or impaired in various psychiatric illnesses (Aydın et al., 2019; Couture et al., 2006; Leppänen et al., 2004; Mennin et al., 2005; Ünal-Aydın et al., 2019). This can reduce the responsive behavior of individuals with psychiatric illness and lead them more vulnerable to contracting COVID-19. Moreover, taking precautions on the individual level plays a crucial role in preventing the spread of the disease (Basch et al., 2020). However, people may be at risk due to decreased emotion recognition ability.

The present study has some limitations. The exclusion of individuals with mental illness limits us to assess the emotion recognition and responsive behaviors of this group. Emotion recognition was evaluated with only one

test (RMET), different tests that measure different areas of ToM may yield different results. The tests were applied with web-based questionnaires. Face to face evaluations may conclude different results. The correlational and cross-sectional design of the study precludes us to determine the direction of individual changes during the pandemic. The longitudinal studies are required to provide clearer results.

However, to the best of the authors' knowledge, no report has been found so far investigating the relationship between emotion recognition and preventive/responsive behaviors in Turkish society. In light of the present data, it has been revealed that emotion recognition ability may be associated with responsive behaviors against the pandemic. In both healthy individuals and individuals with mental illnesses, efforts to increase emotion recognition ability (Greenberg, 2004; Machado et al., 1999; Schipor et al., 2011) can promote to take immediate precautions with enhancing the risk perception against the outbreak. Further research regarding the role of psychiatric disorders would shed light on this field.

REFERENCES

- Altıntaş, M., İnanç, L., Hunca, A. N., Ektiricioğlu, C., Yılmaz, N., Tuna, Z. O., & Üney, R. (2019). *Theory of mind, aggression and impulsivity in patients with synthetic cannabinoid use disorders: a case-control study.*
- Aydın, O., Balıkçı, K., Çökmüş, F. P., & Ünal Aydın, P. (2019). The evaluation of metacognitive beliefs and emotion recognition in panic disorder and generalized anxiety disorder: effects on symptoms and comparison with healthy control. *Nordic Journal of Psychiatry*, 1–9.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “Reading the Mind in the Eyes” Test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, 42(2), 241–251.
- Basch, C. H., Hillyer, G. C., Meleo-Erwin, Z. C., Jaime, C., Mohlman, J., & Basch, C. E. (2020). Preventive behaviors conveyed on YouTube to mitigate transmission of COVID-19: cross-sectional study. *JMIR Public Health and Surveillance*, 6(2), e18807.
- Bora, E., & Pantelis, C. (2016). Meta-analysis of social cognition in attention-deficit/hyperactivity disorder (ADHD): comparison with healthy controls and autistic spectrum disorder. *Psychological Medicine*, 46(4), 699–716.
- Brug, J., Aro, A. R., Oenema, A., De Zwart, O., Richardus, J. H., & Bishop, G. D. (2004). SARS risk perception, knowledge, precautions, and information sources, the Netherlands. *Emerging Infectious Diseases*, 10(8), 1486.
- Cinelli, M., Quattrocioni, W., Galeazzi, A., Valensise, C. M., Brugnoli, E., Schmidt, A. L., Zola, P., Zollo, F., & Scala, A. (2020). The covid-19 social media infodemic. *ArXiv Preprint ArXiv:2003.05004*.
- Couture, S. M., Penn, D. L., & Roberts, D. L. (2006). The functional significance of social cognition in schizophrenia: a review. *Schizophrenia Bulletin*, 32(suppl_1), S44–S63.

Demos, V. (1986). *Crying in early infancy: An illustration of the motivational function of affect*.

Emery, N. J., & Clayton, N. S. (2009). Comparative social cognition. *Annual Review of Psychology*, 60, 87–113.

Gorbalenya, A. E. (2020). Severe acute respiratory syndrome-related coronavirus—The species and its viruses, a statement of the Coronavirus Study Group. *BioRxiv*.

Greenberg, L. S. (2004). Emotion–focused therapy. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, 11(1), 3–16.

Guastella, A. J., Einfeld, S. L., Gray, K. M., Rinehart, N. J., Tonge, B. J., Lambert, T. J., & Hickie, I. B. (2010). Intranasal oxytocin improves emotion recognition for youth with autism spectrum disorders. *Biological Psychiatry*, 67(7), 692–694.

Harkness, K., Sabbagh, M., Jacobson, J., Chowdrey, N., & Chen, T. (2005). Enhanced accuracy of mental state decoding in dysphoric college students. *Cognition & Emotion*, 19(7), 999–1025.

Harper, C. A., Satchell, L. P., Fido, D., & Latzman, R. D. (2020). Functional fear predicts public health compliance in the COVID-19 pandemic. *International Journal of Mental Health and Addiction*.

Harrison, A., Tchanturia, K., & Treasure, J. (2010). Attentional bias, emotion recognition, and emotion regulation in anorexia: state or trait? *Biological Psychiatry*, 68(8), 755–761.

Hua, J., & Shaw, R. (2020). Corona virus (Covid-19)“infodemic” and emerging issues through a data lens: The case of china. *International Journal of Environmental Research and Public Health*, 17(7), 2309.

Huang, L., & rong Liu, H. (2020). Emotional responses and coping strategies of nurses and nursing college students during COVID-19 outbreak. *MedRxiv*.

Ibanez, A., Aguado, J., Baez, S., Huepe, D., Lopez, V., Ortega, R.,

Sigman, M., Mikulan, E., Lischinsky, A., & Torrente, F. (2014). From neural signatures of emotional modulation to social cognition: individual differences in healthy volunteers and psychiatric participants. *Social Cognitive and Affective Neuroscience*, 9(7), 939–950.

Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental view. *Developmental Psychology*, 25(3), 343.

Lau, J. T. F., Yang, X., Tsui, H., & Kim, J. H. (2003). Monitoring community responses to the SARS epidemic in Hong Kong: from day 10 to day 62. *Journal of Epidemiology & Community Health*, 57(11), 864–870.

Lee, E., Kang, J. I., Park, I. H., Kim, J.-J., & An, S. K. (2008). Is a neutral face really evaluated as being emotionally neutral? *Psychiatry Research*, 157(1–3), 77–85.

Leppänen, J. M., Milders, M., Bell, J. S., Terriere, E., & Hietanen, J. K. (2004). Depression biases the recognition of emotionally neutral faces. *Psychiatry Research*, 128(2), 123–133.

Li, S., Wang, Y., Xue, J., Zhao, N., & Zhu, T. (2020). The impact of COVID-19 epidemic declaration on psychological consequences: a study on active Weibo users. *International Journal of Environmental Research and Public Health*, 17(6), 2032.

Machado, P. P. P., Beutler, L. E., & Greenberg, L. S. (1999). Emotion recognition in psychotherapy: Impact of therapist level of experience and emotional awareness. *Journal of Clinical Psychology*, 55(1), 39–57.

Mayer, J. D., Caruso, D. R., & Salovey, P. (1999). Emotional intelligence meets traditional standards for an intelligence. *Intelligence*, 27(4), 267–298.

Mayer, J. D., DiPaolo, M., & Salovey, P. (1990). Perceiving affective content in ambiguous visual stimuli: A component of emotional intelligence. *Journal of Personality Assessment*, 54(3–4), 772–781.

Mennin, D. S., Heimberg, R. G., Turk, C. L., & Fresco, D. M. (2005). Preliminary evidence for an emotion dysregulation model of generalized anxiety disorder. *Behaviour Research and Therapy*, 43(10), 1281–1310.

Moser, R. P., Mccaull, K., Peters, E., Nelson, W., & Marcus, S. E. (2007). Associations of perceived risk and worry with cancer health-protective actions: data from the Health Information National Trends Survey (HINTS). *Journal of Health Psychology*, 12(1), 53–65.

Munster, V. J., Koopmans, M., van Doremalen, N., van Riel, D., & de Wit, E. (2020). A novel coronavirus emerging in China—key questions for impact assessment. *New England Journal of Medicine*, 382(8), 692–694.

Oh, S.-H., Lee, S. Y., & Han, C. (2020). The Effects of Social Media Use on Preventive Behaviors during Infectious Disease Outbreaks: The Mediating Role of Self-relevant Emotions and Public Risk Perception. *Health Communication*, 1–10.

Pakpour, A. H., & Griffiths, M. D. (2020). The fear of COVID-19 and its role in preventive behaviors. *Journal of Concurrent Disorders*.

Qian, M., Wu, Q., Wu, P., Hou, Z., Liang, Y., Cowling, B. J., & Yu, H. (2020). Psychological responses, behavioral changes and public perceptions during the early phase of the COVID-19 outbreak in China: a population based cross-sectional survey. *MedRxiv*.

Schipor, O. A., Pentiu, S. G., & Schipor, M. D. (2011). The utilization of feedback and emotion recognition in computer based speech therapy system. *Elektronika Ir Elektrotehnika*, 109(3), 101–104.

Shamay-Tsoory, S. G., Aharon-Peretz, J., & Perry, D. (2009). Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions. *Brain*, 132(3), 617–627.

Tannenbaum, M. B., Hepler, J., Zimmerman, R. S., Saul, L., Jacobs, S., Wilson, K., & Albarracín, D. (2015). Appealing to fear: A meta-analysis of fear appeal effectiveness and theories. *Psychological Bulletin*, 141(6), 1178.

Ünal-Aydın, P., Balıkçı, K., Sönmez, İ., & Aydın, O. (2019). Associations between emotion recognition and social networking site addiction. *Psychiatry Research*, 112673.

Ünal-Aydın, P., Balıkçı, K., Sönmez, İ., & Aydın, O. (2020). Associations between emotion recognition and social networking site addiction. *Psychiatry Research*, 284, 112673.

Vaezi, A., & Javanmard, S. H. (2020). Infodemic and risk communication in the era of CoV-19. *Advanced Biomedical Research*, 9.

Wang, C., Horby, P. W., Hayden, F. G., & Gao, G. F. (2020). A novel coronavirus outbreak of global health concern. *The Lancet*, 395(10223), 470–473.

Wirkner, J., Ventura-Bort, C., Schwabe, L., Hamm, A. O., & Weymar, M. (2019). Chronic stress and emotion: Differential effects on attentional processing and recognition memory. *Psychoneuroendocrinology*, 107, 93–97.

Worldometer, D. (2020). *COVID-19 Coronavirus Pandemic*.

Yildirim, Ejder Akgün, Kaşar, M., Güdük, M., Ateş, E., Küçükparlak, İ., & Özalmete, E. O. (2011). Gözlerden Zihin Okuma Testi'nin Türkçe Güvenirlilik Çalışması. *Türk Psikiyatri Dergisi*, 22(3).

Yildirim, Ejder Akgun, Kasar, M., Guduk, M., Ozalmete, O., Ates, E., & Kucukparlak, I. (2011). Investigating reliability of Reading Mind in the Eyes Test in a Turkish population. *Turkish Journal of Psychiatry, June 2016*. <https://doi.org/10.5080/u6500>

Zhong, B.-L., Luo, W., Li, H.-M., Zhang, Q.-Q., Liu, X.-G., Li, W.-T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*, 16(10), 1745.

Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., Zhao, X., Huang, B., Shi, W., & Lu, R. (2020). A novel coronavirus from patients with pneumonia in China, 2019. *New England Journal of Medicine*.

APPENDIX

Table 1. Sociodemographic Information of Participants

Variables	Mean	S.D.
Age	32.09	10.93
Education Year	15.63	3.73
	n	%
Gender		
Male	168	33,9%
Female	328	66.1%
Marital Status		
Married	199	40.1%
In relationship	119	24.0%
No relationship	178	35.9%
Financial Situations		
Worse	19	3.8%
Moderate	344	69.4%
Better	133	26.8%
Current Location		
City Center	407	82.1%
Not City Center	89	17.9%
Present Tobacco Use		
Yes	345	69.6%
No	151	30.4%
Present Alcohol Use		
Yes	398	80.2%
No	98	19.8%

Table 2. Distribution of preventive behaviors related to COVID-19 among the sample

	Never		Rarely		Sometimes		Usually		Always	
	n	%	n	%	n	%	n	%	n	%
COVID19_1	9	1.8%	30	6.0%	92	18.5%	198	39.9%	167	33.7%
COVID19_2	2	0.4%	6	1.2%	41	8.3%	232	46.8%	215	43.3%
COVID19_3	20	4.0%	62	12.5%	201	40.5%	139	28.0%	74	14.9%
COVID19_4	29	5.8%	60	12.1%	183	36.9%	149	30.0%	75	15.1%
COVID19_5	90	18.1%	102	20.6%	148	29.8%	78	15.7%	78	15.7%
COVID19_6	36	7.3%	20	4.0%	28	5.6%	75	15.1%	337	67.9%
COVID19_7	36	7.3%	11	2.2%	18	3.6%	50	10.1%	381	76.8%
COVID19_8	16	3.2%	16	3.2%	47	9.5%	133	26.8%	284	57.3%
COVID19_9	12	2.4%	21	4.2%	45	9.1%	171	34.5%	247	49.8%
COVID19_10	147	29.6%	45	9.1%	61	12.3%	78	15.7%	165	33.3%
COVID19_11	152	30.6%	61	12.3%	97	19.6%	66	13.3%	120	24.2%
COVID19_12	221	44.6%	53	10.7%	77	15.5%	72	14.5%	73	14.7%

Notes: COVID19_1=How often did you follow news about COVID-19 about blogs, Facebook, Twitter, Instagram or YouTube in the last week?, COVID19_2=How dangerous do you think COVID-19 disease is?, COVID19_3=How worried are you about getting COVID-19 disease?, COVID19_4= Are you afraid of COVID-19 disease?, COVID19_5=Are you angry about COVID-19 disease?, COVID19_6=Have you avoided eating outside due to COVID-19 in the last 1 week?, COVID19_7=Have you avoided using public transport due to COVID-19 in the last 1 week?, COVID19_8=Have you avoided going to public areas due to COVID-19 in the last 1 week?, COVID19_9=Have you increased your frequency of personal hygiene (e.g. handwashing, bathing) due to COVID-19 in the last 1 week?, COVID19_10=Have you used a face mask when you were going out due to COVID-19 in the last 1 week?, COVID19_11=Have you used gloves due to COVID-19 in the last 1 week?, COVID19_12=Have you taken vitamin supplements due to COVID-19 in the last 1 week?

Table 3. The relationship between responsive and preventive behaviors related to COVID-19 outbreak and emotion recognition

	RME T Pos	RM ET Neg	RM ET Neu	COV ID19 _1	COV ID19 _2	COV ID19 _3	COV ID19 _4	COV ID19 _5	COV ID19 _6	COV ID19 _7	COV ID19 _8	COV ID19 _9	COV ID19 _10	COV ID19 _11	COV ID19 _12
RMET_Pos	1	.181*	.210*	.082	.002	-.024	-.027	-.050	-.012	.037	.037	.077	.063	.004	.045
RMET_Neg		1	.332*	.006	.026	.013	.000	.037	.047	.145*	.062	.012	.054	.061	-.023
RMET_Neu			1	.017	.079	.094*	.047	.030	.093*	.092*	.090*	.085	.055	-.011	.032
COVID19_1				1	.333*	.340*	.301*	.238*	.200*	.178*	.196*	.373*	.055	.041	.155*
COVID19_2					1	.461*	.477*	.198*	.242*	.271*	.254*	.390*	.250*	.225*	.107*
COVID19_3						1	.701*	.262*	.282*	.282*	.264*	.362*	.226*	.195*	.210*
COVID19_4							1	.303*	.263*	.264*	.246*	.357*	.169*	.154*	.110*
COVID19_5								1	.201*	.131*	.188*	.266*	.132*	.098*	.097*
COVID19_6									1	.690*	.605*	.298*	.198*	.183*	.216*
COVID19_7										1	.646*	.317*	.172*	.175*	.118*
COVID19_8											1	.348*	.221*	.232*	.156*
COVID19_9												1	.183*	.155*	.227*
COVID19_10													1	.632*	.197*
COVID19_11														1	.133*
COVID19_12															1

Notes: RMET_Pos= Positive Emotions Subtest of Reading the Mind in the Eyes Test, RMET_Neg= Negative Emotions Subtest of Reading the Mind in the Eyes Test, RMET_Neu= Neutral Emotions Subtest of Reading the Mind in the Eyes Test, RMET_Total= Reading the Mind in the Eyes

Test Total Scores, COVID19_1=How often did you follow news about COVID-19 about blogs, Facebook, Twitter, Instagram or YouTube in the last week?, COVID19_2=How dangerous do you think COVID-19 disease is?, COVID19_3=How worried are you about getting COVID-19 disease?, COVID19_4= Are you afraid of COVID-19 disease?, COVID19_5=Are you angry about COVID-19 disease?, COVID19_6=Have you avoided eating outside due to COVID-19 in the last 1 week?, COVID19_7=Have you avoided using public transport due to COVID-19 in the last 1 week?, COVID19_8=Have you avoided going to public areas due to COVID-19 in the last 1 week?, COVID19_9=Have you increased your frequency of personal hygiene (e.g. handwashing, bathing) due to COVID-19 in the last 1 week?, COVID19_10=Have you used a face mask when you were going out due to COVID-19 in the last 1 week?, COVID19_11=Have you used gloves due to COVID-19 in the last 1 week?, COVID19_12=Have you taken vitamin supplements due to COVID-19 in the last 1 week?

