# Direct and indirect relationships between cognitive flexibility and COVID-19 related psychological distress: The mediating role of maladaptive cognitive emotion regulation strategies

*Bilişsel esneklik ve COVID-19 ile ilgili psikolojik sıkıntı arasındaki doğrudan ve dolaylı ilişkiler: Uyumsuz bilişsel duygu düzenleme stratejilerinin aracı rolü*

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**SUMMARY**

**Objective:** The effects of the COVID-19 pandemic are remarkable on individuals' mental health. During the COVID-19 pandemic, there is an increase in mental health problems and psychological distress in uninfected healthy people. The present study aimed to examine the mediator role of maladaptive cognitive emotion regulation strategies in the relationship between cognitive flexibility and COVID-19 related psychological distress experienced during the current pandemic. **Method:** The sample consisted of 351 young adults (86% female and 14% male) who were not infected with COVID-19 aged between 18 to 25 years old. Participants completed the self-report questionnaires, including the Cognitive Flexibility Inventory, Cognitive Emotion Regulation Questionnaire, and COVID-19 Related Psychological Distress Scale. Mediation analysis estimated total, indirect, and direct effects between cognitive flexibility and COVID-19 related psychological distress. **Results:** The correlation analyses showed that cognitive flexibility-control dimension was negatively associated with both COVID-19 related psychological distress and maladaptive cognitive emotion regulation strategies. Also, maladaptive cognitive emotion regulation strategies and COVID-19 related psychological distress was found to be positively correlated. In the study sample, the results of the bootstrap mediation indicated that maladaptive cognitive emotion regulation strategies, including self-blame, acceptance, rumination, catastrophizing, and blaming others, fully mediated the relationship between cognitive flexibility - control and COVID-19 related psychological distress. **Discussion:** Our findings would help psychological interventions designed for COVID-19 uninfected healthy people who have lower-level cognitive flexibility - control dimension by highlighting the prominence that the fewer people use maladaptive cognitive emotion regulation strategies, the less they feel COVID-19 related psychological distress.

**Key Words:** Cognitive flexibility, cognitive emotion regulation, COVID-19 pandemic, psychological distress

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**ÖZET**

**Amaç:** COVID-19 pandemisinin bireylerin zihinsel sağlığı üzerinde dikkate değer etkileri bulunmaktadır. COVID-19 pandemisi süresince, COVID-19 geçirmemiş sağlıklı bireylerde zihinsel sağlık sorunlarının ve psikolojik sıkıntının arttığı kaydedilmiştir. Çalışmanın amacı, bilişsel esneklik ve COVID-19 ile ilişkili psikolojik sıkıntı arasındaki ilişkide uyumsuz bilişsel duygu düzenleme stratejilerinin aracı rolünü halen devam etmekte olan pandemi sürecinde incelemektir. **Yöntem:** Katılımcılar 18-25 yaş arası COVID-19 geçirmemiş sağlıklı 351 genç yetişkinden (%86 kadın ve %14 erkek) oluşmaktadır. Katılımcılar Bilişsel Esneklik Envanteri, Bilişsel Duygu Düzenleme Ölçeği ve COVID-19 Psikolojik Sıkıntı Ölçeği'nden oluşan öz-bildirim ölçeklerini tamamlamıştır. Aracılık analiziyle, bilişsel esneklik ve COVID-19 ile ilişkili psikolojik sıkıntı arasındaki toplam, doğrudan ve dolaylı etkiler değerlendirilmiştir. **Bulgular:** Korelasyon analizleri, bilişsel esneklik-kontrol boyutunun hem COVID-19 ile ilişkili psikolojik sıkıntı hem uyumsuz bilişsel duygu düzenleme stratejileri ile negatif ilişkili olduğunu göstermiştir. Ayrıca, uyumsuz bilişsel duygu düzenleme stratejileri ve COVID-19 ile ilişkili psikolojik sıkıntı pozitif ilişkili bulunmuştur. Çalışmanın örnekleminde, aracı değişken analizleri bilişsel esneklik ve COVID-19 ile ilişkili psikolojik sıkıntı arasında, uyumsuz duygu düzenleme stratejilerinden kendini suçlama, kabullenme, ruminasyon, felaketleştirme ve başkalarını suçlamanın tam aracı rolleri olduğunu göstermiştir. **Sonuç:** Çalışmanın bulguları, bireylerin uyumsuz bilişsel duygu düzenleme stratejilerini ne kadar az kullanırlarsa COVID-19 ile ilişkili psikolojik sıkıntıyı o kadar az yaşadığının önemini vurgulayarak, araştırmanın düşük seviyede bilişsel esneklik-kontrol boyutuna sahip olan COVID-19 geçirmemiş sağlıklı bireylere yönelik geliştirilecek psikolojik müdahale programlarının oluşturulmasına katkı sağlayacağı düşünülmektedir.

**Anahtar Sözcükler:** Bilişsel esneklik, bilişsel duygu düzenleme, COVİD-19 pandemisi, psikolojik sıkıntı

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## INTRODUCTION

The present outbreak of the Coronavirus disease 2019 (COVID-19), a new type of coronavirus, has spread quickly worldwide (1). The first COVID-19 case was detected and reported in China's Wuhan region on December 31, 2019 (2). The total number of cases was over 126 million, and the total number of deaths was over 2.5 million on March 30 across the world (3). In Turkey, the first COVID-19 case was officially reported on March 11, 2020. The total number of cases was over 3 million people, and the total number of deaths from COVID-19 was over 30 thousand on March 30 (4). Precautions against the spreading of the COVID-19 were taken all around the world rapidly. In Turkey, required precautions were taken to deal with the virus. To exemplify, according to age range and COVID-19 infected status, Turkish citizens have been kept themselves at home under voluntary quarantine or forced quarantine imposed by the government. Also, closed areas such as schools, shopping malls, sports centers, and movie theaters were shut down temporarily (5).

Previous studies have shown a significant relationship between infectious diseases and psychological distress (6,7). The infectious and relatively deadly nature of the COVID-19 pandemic and sudden government decisions create risks to individuals' mental health (5). It was reported that there is an increase in mental health problems and psychological distress in uninfected healthy people (8,9). The increment in COVID-19 cases, the unpredictable nature of the COVID-19 pandemic, misinformation about COVID-19, fake news related to COVID-19 (10), and official social media accounts' posts giving current COVID-19 information might have caused an increment in public anxiety (11). Prior research has suggested a significant positive correlation between anxiety and fear of COVID-19 (5,12). Some studies have suggested that infectious diseases increase fear in public because of the transmissible, imminent, and invisible nature of the infectious diseases (13).

The COVID-19 pandemic is a negative life event, and how people cope with the negative life event and control their emotions are crucial for psychological health (14). Emotion regulation refers to managing one's own emotions in the manner of being unconscious and conscious (15). Cognitive emotion regulation (CER) strategies proposed by Garnefski et al. (16) are beneficial for dealing with adverse life events. CER refers to controlling and regulating emotions or feelings to handle a stressful/threatening life event (16). Maladaptive and adaptive strategies are the two types of CER strategies. Maladaptive CER strategies are self-blame, blaming others, rumination, and catastrophizing. Adaptive CER strategies are acceptance, refocus on planning, positive refocus, positive reappraisal, and putting into perspective. Although acceptance is one of the adaptive CER strategies (16), later studies have suggested that acceptance has been regarded as a maladaptive CER strategy in Turkish samples (17). Martin et al. (18) further showed that it might be linked to depression and stress, so we treated acceptance as a maladaptive strategy in the present study.

According to Garnefski et al. (19), CER is crucial for mental health. A bulk of studies were found that CER strategies predicted the psychological distress in negative life events. A study that examined the relationship between CER and psychological distress found that maladaptive strategies of CER were positively associated with psychological distress (18). Another study by Muñoz-Navarro et al. (20) found that maladaptive strategies of CER were more likely to induce negative symptoms of general anxiety; on the other hand, adaptive strategies of CER were more likely to reduce negative symptoms of general anxiety. A study conducted with nurses showed that using rumination, catastrophizing, and acceptance strategies increases anxiety symptoms during the COVID-19 pandemic (21). In line with the literature reviewed above, this recent study is also crucial to show that acceptance might be regarded as a maladaptive strategy instead of an adaptive one.

As described, most studies have focused on the relationship between CER and psychological distress in the literature, albeit remained limited. There has been less previous evidence for the relationship between CER and COVID-19 related distress. One study by Riaz et al. (22) found that CER predicted psychological distress experienced during

the COVID-19 pandemic. Another study by Muñoz-Navarro et al. (20) found that maladaptive strategies of CER were positively correlated with worry about COVID-19 contagion and general anxiety. In this regard, the COVID-19 pandemic provides a unique opportunity to study cognitive emotion regulation.

The COVID-19 pandemic is a brand-new situation that people have to adapt and notice options in the new condition. Cognitive flexibility refers to being adjustable and flexible to the changing situations and recognizing the alternatives in the changing situation (23). To illustrate, multitasking, flexible problem solving, and novelty generation are some of the behaviors that are related to cognitive flexibility (24). In a study conducted with younger adults, it was found that when younger adults showed a lower level of cognitive flexibility, they were more vulnerable to had anxiety symptoms (25). In another study by Johnco et al. (26), the similar results showed that a decrease in cognitive flexibility might lead to developing anxiety symptoms due to not being flexible for changing the strategy that is ineffective or difficulty in finding new ways to deal with changing situations. To draw a conclusion from those findings, cognitive flexibility could play an essential role in psychological distress. Although previous studies have almost exclusively focused on the relationship between cognitive flexibility and psychological distress, to the best of our knowledge, no prior research has investigated the relationship between cognitive flexibility and COVID-19 related psychological distress. We expected that people who have higher cognitive flexibility would be less vulnerable to have COVID-19 related psychological distress. We further assumed that cognitive flexibility could be a prevention for having COVID-19 related psychological distress, and also maladaptive CER strategies would have essential roles in this relationship.

Given the previous research, this study addressed potential mediator roles of maladaptive CER strategies in the relationship between cognitive flexibility and COVID-19 related psychological distress during the current pandemic. . We hypothesized that cognitive flexibility would indirectly affect COVID-19 related psychological distress by increasing maladaptive strategies of CER, which in turn have an effect on COVID-19 related psychological distress.

## METHOD

### Participants

Some inclusion criteria were used to recruit participants. Participants between 18 and 25 years old were included in the study. On the other hand, participants who were infected with COVID-19 were excluded from the study. Besides, participants who reported that they had been diagnosed with a psychiatric/neurological disorder in the last six months were excluded. Hence, based on these inclusion criteria, the participants of this study consisted of 351 young adults aged 18-25 years (M= 21.4, SD=1.9) who were not infected with COVID-19. The characteristics of the sample are presented in Table 1. The study was conducted with a cross-sectional approach. A convenience random sampling strategy was used to reach the participants.. The participants volunteered to take part in the study.

### Materials

*Demographic Information Form:* The demographic information form included questions about participants' gender, age, occupation, marital status, education level, working status, and economic condi-

**Table 1.** Distributions of demographic variables in the study sample

| Variables | | Frequency (N) | Percentag (%) |
|---|---|---|---|
| Gender | Female | 302 | 86 |
| | Male | 49 | 14 |
| Marital status | Single | 275 | 78.4 |
| | Married | 5 | 1.4 |
| | Divorced | 1 | .3 |
| | In a relationship | 64 | 18.2 |
| | Others | 6 | 1.7 |
| Years of education | Less than 12 years | 35 | 10 |
| | More than 12 years | 316 | 90 |
| Employment status | Employed | 23 | 6.6 |
| | Part time employed | 10 | 2.9 |
| | Unemployed | 24 | 6.8 |
| | Student | 289 | 82.3 |
| | Others | 5 | 1.4 |
| Perceived socioeconomic status | High | 16 | 4.6 |
| | Middle | 293 | 83.4 |
| | Low | 42 | 12 |
| Chronic disease history | Yes | 31 | 8.8 |
| | No | 320 | 91.2 |
| Psychiatric-neurological history | Yes | 41 | 11.7 |
| | No | 310 | 88.3 |
| Get tested for COVID-19 | Yes | 76 | 21.7 |
| | No | 275 | 78.3 |

*Note.* $N = 351$

tions. Also, it collected information about participants' history of chronic, psychiatric, neurologic disease, COVID-19 infected status, and COVID-19 test status.

*Cognitive Flexibility Inventory (CFI):* The CFI was developed by Dennis et al. (27) to measure individuals' ability to perceive difficult life occurrences as controllable, produce alternative explanations and solutions to difficult situations. The inventory is a 20-items self-report questionnaire and has two subscales: alternatives and control. Alternatives subscale has 13-items, and control subscale has 7-items scored on a five-point Likert type scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores on the inventory are indicative of greater cognitive flexibility. Cronbach's alpha coefficients were .91 for alternatives, and .86 for control subscales (27). The CFI was adapted into Turkish by Gülüm et al. (28). Cronbach's alpha coefficients were calculated as .89 for alternatives, and .85 for control subscales, indicating good internal consistencies (28). In this study, Cronbach's alpha coefficients were calculated as .87 for alternatives and .86 control subscales.

*Cognitive Emotion Regulation Questionnaire (CERQ):* The CERQ measures strategies people use after they live in a stressful/ threatening environment (16). The CERQ is a 36-items self-report questionnaire which assesses nine dimensions: self-blame, acceptance, rumination, putting into perspective, positive refocusing, refocus on planning, positive reappraisal, catastrophizing, and blaming others. Each dimension consists of four items rated on a five-point Likert type scale, from 1 (almost never) to 5 (almost always) (16). The total score ranges from 4 to 20 for each dimension, and higher scores indicate the greater frequency of using the corresponding emotion regulation strategy. Cronbach's alpha coefficients of dimensions ranged from .68 to .83, so each dimension indicated good internal consistency (16). The CERQ was adapted into Turkish by Tuna et al. (17). Cronbach's alpha coefficients were calculated as .73 for self-blame, .68 for acceptance, .77 for rumination, .81 for putting into perspective, .77 for positive refocus, .76 for refocus on planning, .80 for positive reappraisal, .77 for catastrophizing and .74 for blaming others (17). In this study, Cronbach's alpha coefficients were calculated as .74 for self-blame, .58 for acceptance, .76 for rumination, .76 for putting into perspective, .82 for positive refocus, .78 for refocus on planning, .77 for positive reappraisal, .81 for catastrophizing and .81 for blaming others.

*COVID-19 Related Psychological Distress Scale (CORPD):* The CORPD is a 12-items self-report scale that measures uninfected individuals' psychological distress level related to COVID-19 (29). The scale has two dimensions: anxiety & fear and suspicion. Anxiety & fear dimension consists of five items, and suspicion dimension consists of seven items rated on a five-point Likert type scale, from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha coefficients were reported as .74 for anxiety & fear and .87 for suspicion (29). The CORPD was adapted into Turkish by Ay et al. (30). Cronbach's alpha coefficients were calculated as .81 for anxiety & fear and .82 for suspicion subscales, indicating good internal consistencies (30). In this study, Cronbach's alpha coefficients were calculated as .80 for anxiety & fear and .84 for suspicion subscales.

**Procedure**

This study was reviewed and approved by the Social and Humanities Scientific Research and Publication Ethics Committee of the university to which the corresponding author belongs. Data collection was provided by using an online survey system. The informed consent, the demographic information form, the CFI, the CERQ, and the CORPD were uploaded to Qualtrics. A university's psychology department students were invited to the study via e-mail. They were compensated with course credit. Additionally, announcements on social media were made to reach potential participants. Participants who voluntarily participated were informed about the aim of the study through the informed consent form. For those who were infected with COVID-19 before, the survey window automatically closed. Thus, uninfected participants took the whole items in the survey. Before moving on to the following page, participants were required to answer all questions on the same page. As a result, there was no chance of missing data.

Upon full survey completion, participants were thanked for their time. The data collection took approximately 20 minutes. The data were collected between 2021 August - October.

### Data Analysis

The statistical data analysis was performed with IBM SPSS (SPSS version 25, IBM Inc., Armonk, NY, USA). Prior to the analyses of the data, Kurtosis and Skewness values of the research variables were examined for the normality assumption. The values fell within the specified range of ±1.5, so the normality assumption has been met (31). Extreme values were also determined by calculating distance values regarding Mahalanobis, Cook, and Leverage parameters. Twelve participants with extreme values based on two parameters were excluded from the data. After the data cleaning processes, 351 young adults who had not extreme values were determined. Next, Pearson correlation coefficients were generated from the scores of the CF total, CF-control, CF-alternatives, maladaptive CER strategies, CORPD total, CORPD-anxiety & fear, and CORPD-suspicion. For maladaptive CER strategies score, arithmetic average of self-blame, acceptance, rumination, catastrophizing, and blaming others strategies' scores were calculated (20,32). The results of the Pearson correlation analysis showed that acceptance was positively correlated with all other maladaptive CER strategies, namely, self-blame ($r = .38$, $p < .01$), rumination ($r = .21$, $p < .01$), catastrophizing ($r = .23$, $p < .01$), and blaming others ($r = .21$, $p < .01$); so, acceptance was treated as a maladaptive CER strategy, in line with the previous studies (16,17). All statistical tests were evaluated at the $p < .05$ significance level. Also, independent sample t-test was performed to examine potential gender effect on the dependent variable. In addition, Cronbach's alpha coefficients were calculated for internal consistencies of the scales. Finally, bootstrapping analyses and the simple mediation model 4 test were performed by using PROCESS Macro Version 3 (33).

## RESULTS

First, the gender effect was found significant on the total score of the CORPD via independent sample t-test ($p < .001$). Therefore, gender was included as a covariate factor in the subsequent mediation analyses. Then, we calculated descriptive statistical values of study variables. Means and standard deviations of scores that participants got from the CF-control, CF-alternatives, CF total, maladaptive CER strategies, CORPD-anxiety & fear, CORPD-suspicion, and CORPD total are shown in Table 2.

**Table 2.** Correlations among study variables

| Variables | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. CF-Control | 23.17 | 5.26 | | | | | | |
| 2. CF-Alternatives | 52.17 | 5.93 | **.48**** | | | | | |
| 3. CF-Total score | 75.34 | 9.65 | **.84**** | **.88**** | | | | |
| 4. Maladaptive CERS | 12.07 | 1.79 | **-.48**** | -.08 | **-.31**** | | | |
| 5. CORPD-Anxiety & Fear | 18.89 | 4.01 | -.10 | **.15**** | .04 | **.20**** | | |
| 6. CORPD-Suspicion | 22.36 | 5.83 | **-.22**** | -.02 | **-.13*** | **.26**** | **.65**** | |
| 7. CORPD-Total score | 41.25 | 8.97 | **-.19**** | .06 | -.07 | **.26**** | **.87**** | **.94**** |

*Note.* $^{*}p < .05$. $^{**}p < .01$. $N = 351$. CF: cognitive flexibility; CERS: cognitive emotion regulation strategies; CORPD: COVID-19 related psychological distress.

Next, Pearson correlation coefficients were calculated to examine the relationships among the study variables (Table 2). In support of our hypothesis, CF-control was negatively associated with the total score of the CORPD ($r = -.19$, $p < .01$). In addition, CF-control was negatively associated with maladaptive CER strategies ($r = -.48$, $p < .01$). Also, the maladaptive CER strategies were positively correlated with the total score of the CORPD ($r = .26$, $p < .01$).

First, we tested the mediating role of maladaptive CER strategies on the relationship between CF-total and CORPD-total using simple mediation model 4 via PROCESS Version 3 (33). Bootstrap analysis was conducted, and the size of the bootstrap resample was determined as 5000. As shown in Table 3, the total effect of CF-total on CORPD (c path) was found to be insignificant.

Since the CF-total was an insignificant predictor of CORPD-total, we continued our analysis with the

**Table 3.** PROCESS model summary with coefficients for cognitive flexibility-total score

| Outcome Variable | Predictive Variables | Coeff | SE | *t* | *p* | CI Low | CI High |
|---|---|---|---|---|---|---|---|
| COVID-19 Related Psychological Distress Total Score | Cognitive Flexibility Total score | -0.5 | .05 | -.95 | .71 | -.14 | .05 |
| | Maladaptive Cognitive Emotion Regulation Strategies | 1.18 | .27 | 4.35 | .00 | .65 | 1.72 |
| | Gender | -4.44 | 1.34 | -3.31 | .00 | -7.08 | -1.80 |
| $R^2$ | | .10 | | | | | |
| F | | 12.29 | | | | | |

*Note. Coeff:* Unstandardized beta coefficient, *SE:* Standard error, *CI:* Confidence interval.

inclusion of the CF-control (Figure 1). The total effect of CF-control on CORPD (c path) was found to be significant, explaining 10% of variance. More specifically, CF-control significantly predicted CORPD (B = -.27, SE = .09, t(348) = -2.99, p < .01, 95% CI[-.45, -.09]). CF-control also significantly predicted maladaptive CER strategies (B = -.16, SE = .02, t(348) = -9.83, p < .001, 95% CI[-.19, -.13]). Maladaptive CER strategies exerted predictive effects on CORPD (B = 1.00, SE = .29, t(347) = 3.43, p < .001, 95% CI[.43, 1.58]). Also, gender predicted CORPD (B = -4.24, SE = 1.35, t(348) = -3.15, p < .01, 95% CI[-6.89, -1.59]), such that women reported higher levels of CORPD than men. The direct effect of CF-control on CORPD (c' path) was not significant (B= -.11, SE = .10, t(348) = -1.08, p > .05, 95% CI[-.31, .09]). The indirect effect of CF-control on CORPD was -.16, 95% CI[-.27, -.06]. Perfect mediation exists if the predictive variable has no impact on the predicted variable when the mediator is controlled. Thus, the full mediator role of maladaptive CER strategies between the relation of CF-control and CORPD was affirmed. These findings revealed that maladaptive CER strategies fully mediated the effect of CF-control on CORPD, such that younger adults who had lower levels of CF-control tended to report higher levels of CORPD, in part, because they tended to report higher scores on maladaptive CER strategies. The model of present study was significant and explained %10 of the variance in CORPD [R2= .10, F(3,347)= 12.67, p < .001].

## DISCUSSION

The present study aimed to examine the mediator role of maladaptive CER strategies in the relationship between CF and CORPD among young adults (18 to 25 years) uninfected with COVID-19. The results indicated that there was a negative relationship between the CF-control dimension and CORPD, between CF-control and maladaptive CER strategies, and a positive relationship between maladaptive CER strategies and CORPD. Moreover, CF-control predicted CORPD. The present study's results were similar to the study of Johnco et al. (34); they found that CF-control predicted reduction of subjective distress. A similar conclusion reached by Dağ et al. (35) has indicated that CF-control was negatively associated with social anxiety. In line with these previous findings, our findings supported that CF-control decreases psychological distress related to COVID-19.

A recent study by Lin (36) has concluded that uninfected healthy people have a fear of contact with COVID-19 patients. On the other hand, it has been found that COVID-19 related fear might cause irrational thoughts (37). According to Feng et al.

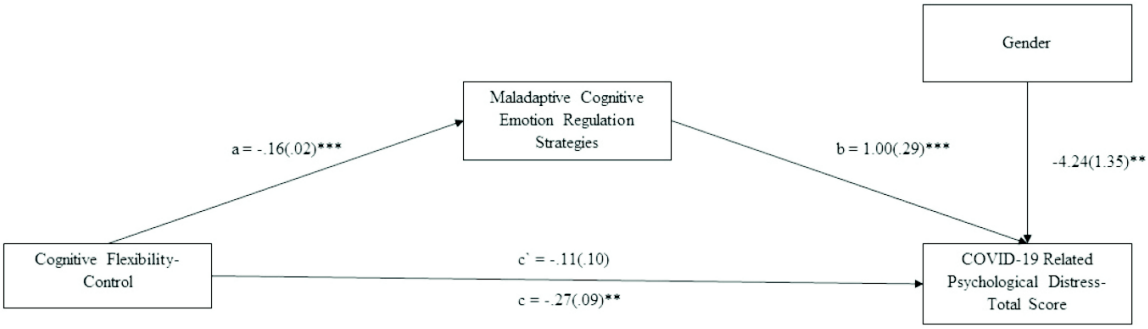


Figure 1. The mediational model of Maladaptive Cognitive Emotion Regulation Strategies in the relationship between Cognitive Flexibility-Control and COVID-19 Related Psychological Distress-Total Score while being Gender controlled as a covariate.

*Note.* $^{**}p < .01$, $^{***}p < .001$.
a: Direct effect of Cognitive Flexibility-Control (predictive variable) on Maladaptive Cognitive Emotion Regulation Strategies (mediator variable); b: Direct effect of Maladaptive Cognitive Emotion Regulation Strategies on COVID-19 Related Psychological Distress-Total Score (outcome variable); c : Direct effect of Cognitive Flexibility-Control on COVID-19 Related Psychological Distress-Total Score; c: Total effect of Cognitive Flexibility-Control on COVID-19 Related Psychological Distress-Total Score; Unstandardized B values and parenthetical Standard Error values were included.

(29), COVID-19 related psychological distress is also associated with suspicion. It has been found that uninfected healthy people suspect the presence of COVID-19 in people who do not use masks and who have a fever, cough, and vomit symptoms (29). Moreover, uninfected healthy people may suspect that the air open to the public (i.e., streets, markets) is contaminated by the COVID-19 virus (29). In light of the above arguments, the COVID-19 pandemic itself might be considered a risk factor for high levels of psychological distress.

With the idea of expanding the previous limited works, we focused on exploring the role of cognitive flexibility on maladaptive CER strategies particularly. In general, cognitive flexibility might be linked to the ability to regulate emotions. Moreover, the COVID-19 pandemic offers a particular opportunity to examine cognitive emotion regulation. In fact, the link between CF and CER strategies has been previously assessed only to a very limited extent. During the current pandemic, CF-control emerged as a significant predictor of the maladaptive CER strategies, including self-blame, acceptance, rumination, catastrophizing, and blaming others. In the present study, as the participants' predisposition to perceive hard situations as controllable decreased, they tended to use more maladaptive CER strategies. This finding is consistent with what has been found in previous studies that CF might be negatively associated with maladaptive forms of coping (27). Also, in a study by Küçüker (38), cognitive flexibility and maladaptive CER strategies were found to be negatively correlated. Along with the present study's findings, the association between CF and maladaptive CER strategies regulation was examined to fill this literature gap.

In addition, the findings revealed that maladaptive CER strategies were predictors of CORPD during the current pandemic. In another saying, the more people used maladaptive CER strategies, the more they felt psychologically distressed related to COVID-19. These findings extend previous research to the circumstances regarding the COVID-19 pandemic. A similar pattern of this result was obtained in the study of Muñoz-Navarro et al. (20), indicating that maladaptive CER strategies were positively correlated with worry about COVID-19 contagion and general anxiety. According to Martin et al. (18), people who use more self-blame, rumination, and catastrophizing strategies and people who use less positive reappraisal strategies to deal with negative life events would be more vulnerable to anxiety symptoms. Along with these findings, the current results suggested that participants who were more likely to use the maladaptive CER strategies reported high levels of psychological distress related to COVID-19.

In the current study, the results indicated a statistically significant gender effect on CORPD. Thus, gender was added as a covariate variable in the simple mediation analysis. This finding could be explained by many of the studies, which indicated that women are more prone to report psychological distress than men (39,40,41).While being gender controlled as a covariate, the mediator role of maladaptive CER strategies in the relationship between CF-total score and CORPD was tested with a simple mediation model. When we tested the CF-total score in the mediation model, the model failed to show a significant predictive role of CF-total score on CORPD. After the failed model with CF-total score, we analyzed the predictive role of CF-alternatives on CORPD, and we found that the predictive role of CF-alternatives on CORPD was insignificant. This is consistent with a prior report by Dağ et al. (35), indicating that, the CF-alternatives dimension was not associated with psychological distress. The CF-alternatives dimension measures the ability to perceive several alternative explanations for difficult situations and generate solutions for events. Instead, the CF-control dimension is crucial to adapt to continuously changing environments (27). During the pandemic, CF with a tendency to perceive difficult situations as controllable could be more functional for individuals than CF with a tendency to produce alternative solutions. Since the nature of the pandemic is unclear, some solutions may not be possible. In addition, it is not so plausible for individuals to generate new ideas and solutions for restrictions implemented by governments. However, it is not entirely clear why the CF-control dimension, but not the CF-alternatives dimension, predicted CORPD. Future studies should explore this issue.

In the current study, there was a negative relationship between CF-control scores and CORPD, so we tested the CF-control scores in the simple mediation model while being gender controlled as a covariate again. The results revealed that the relationship between CF-control dimension and CORPD was mediated by maladaptive CER strategies, including self-blame, acceptance, rumination, catastrophizing, and blaming others. It has been found that in the relationship between CF-control and CORPD, maladaptive CER strategies had a full mediator role. To put it another way, COVID-19 uninfected younger adults who were less prone to perceive challenging situations as controllable reported higher levels of CORPD because they tended to use more maladaptive CER strategies. Prior research suggests that the lack of control has a negative effect on psychological well-being (42). The present study provides additional evidence for the link between the sense of control and psychological distress. Considering that participants with low levels of CF-control were more likely to use maladaptive CER strategies, our data demonstrated that those participants might be vulnerable to developing psychological distress related to COVID-19. To the best of our knowledge, we are the first to report these relationships between CF, maladaptive CER strategies, and CORPD.

Several limitations were found in the present study. This study was a cross-sectional study using only self-report scales that could not indicate a cause-and-effect relationship between CF-control and CORPD. This study was carried out in a single time period, so the results would change in another time period of the COVID-19 pandemic. This might be an issue for future research to explore. Also, future studies should focus on long-term psychological distress caused by the COVID-19 pandemic. The study sample was predominantly female. Psychological distress is a sign of mental health (43) and women are more vulnerable to developing and reporting psychological distress than men (44,45). Also, in the COVID-19 pandemic, women have a higher risk for psychological distress (46). Therefore, future studies should aim to replicate results in more representative samples based on equally distributed gender. In addition, this study was carried out with young adults uninfected with COVID-19. It is recommended to test the model in middle and late adulthood. In future work, investigating the change in psychological distress related to COVID-19 across different developmental periods might prove critical. It will also be essential that future research investigate the variables in individuals infected with COVID-19. Although we did exclude participants who reported a psychological/neurological disorder, we did not evaluate the depression levels of our participants. Depression symptoms were not assessed, which might be considered a limitation. Future research should consider the potential role of depression levels more carefully. Future research should further develop and confirm these initial findings by looking for other variables that might impact psychological distress, such as sleep quality, level of loneliness, loss of job. Despite the limitations, this is the first attempt to explore the link between cognitive flexibility and CORPD via the mediator role of maladaptive CER strategies during the present pandemic.

## CONCLUSION

In conclusion, maladaptive CER strategies have a full mediator role in the relationship between CF-control and CORPD. We assumed that this study would enhance our comprehension of the effects of people's CF-control level on CORPD and the role of maladaptive CER strategies in this relationship. The present study's results indicated that people who have a lower level of CF-control would be more vulnerable to the use of maladaptive CER strategies. The more they use maladaptive CER strategies, the more their CCORPD increase. Our findings would help psychological interventions designed for COVID-19 uninfected people who have lower-level cognitive flexibility by highlighting prominence that the less people use maladaptive CER strategies, the less they feel CORPD.

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