

Relationship Between Cognitive Flexibility, Anxiety Sensitivity and Coronaphobia

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ABSTRACT

Objective: In this study, it was aimed to determine relationship two transdiagnostic factors (anxiety sensitivity and cognitive flexibility) between Coronavirus-19 (COVID-19) phobia.

Method: For the study, the forms were sent to social media groups with 4,000 and 3,500 people on social media, and the participants were selected by the simple random sampling method. 280 volunteers who met the inclusion criteria were accepted. Sociodemographic Data Form, Cognitive Flexibility Inventory (CFI), Anxiety Sensitivity Index-3 (ASI-3), COVID-19 Phobia Scale was used to evaluate the volunteers.

Result: 161 male and 101 female volunteers participated in the study. Both sexes have similar characteristics regarding age, marital status, and years of education. In the correlation analyses, positive correlations were found between coronaphobia scale total scores and ASI- physical ($r=.584$), ASI- cognitive ($r=.556$), ASI- social ($r=.524$), ASI-total ($r=.609$), whereas a negative correlation was found between coronaphobia scale total scores and CF-alternatives ($r=-.232$), CF-control ($r=-.375$), CF-total ($r=-.328$). Stepwise regression analysis was applied with ASI and CFI subscales to predict coronaphobia scale scores. According to the results, ASI-physical ($\beta=.287$), ASI-cognitive ($\beta=.178$) positive and CF-control ($\beta=-.148$) negatively predicted coronaphobia total scores significantly ($F(7, 254) = 23,361, p < .01$), with an R^2 of .375

Discussion: Our results were shown that sub-type of transdiagnostic factors were more closely related to coronaphobia and even predicted.

Keywords: coronavirus, anxiety, cognition

“Bilişsel Esneklik, Anksiyete Duyarlılığı ve COVID-19 Fobisi Arasındaki İlişkinin İncelenmesi”

Amaç: Bu çalışmada, Koronavirüs-19 (COVID-19) fobisi ile transdiagnostik faktörler (anksiyete duyarlılığı ve bilişsel esneklik) arasındaki ilişkinin incelenmesi amaçlanmıştır.

Materyal/Method: Araştırma için formlar sosyal medya üzerinden 4.000 ve 3.500 kişilik sosyal medya gruplarına gönderildi. Katılımcılar basit rastgele örnekleme yöntemi ile seçildi, dahil edilme kriterlerini karşılayan 280 gönüllü kabul edildi. Çalışmada Sosyodemografik Veri Formu, Bilişsel Esneklik Envanteri (BEE), Anksiyete Duyarlılık İndeksi-3 (ASI-3), COVID-19 Fobi Ölçeği kullanıldı.

Sonuç: Çalışmaya 161 erkek ve 101 kadın gönüllü katıldı. Her iki cinsiyet de yaş, medeni durum ve eğitim yılı açısından benzer özelliklere sahipti. Korelasyon analizlerinde, koronafobi ölçeği toplam puanları ile ASI-fiziksel ($r=.584$), ASI-bilişsel ($r=.556$), ASI-sosyal ($r=.524$), ASI-toplam ($r=.609$) arasında anlamlı pozitif ilişki, BE-alternatifler ($r=-.232$), BEkontrol ($r=-.375$), BE-toplam ($r=-.328$) arasında anlamlı negatif ilişki bulundu. Yapılan regresyon analizlerine göre, koronafobi puanlarını; ASI-fiziksel ($\beta=.287$), ASI-bilişsel ($\beta=.178$) puanlarının anlamlı pozitif ve BE-kontrol ($\beta=-.148$) puanlarının anlamlı negatif yordadığı saptandı. ($F(7, 254) = 23.361, p < .01$), $R^2:375$

Tartışma: Sonuçlarımız, transdiagnostik faktörlerin bazı alt tiplerinin koronafobi ile daha yakından ilişkili olduğunu, koronafobiyi öngördüğünü gösterdi.

Anahtar kelimeler: koronavirüs, anksiyete, biliş

The coronavirus (COVID-19) pandemic, which broke out in Wuhan, China, and spread rapidly throughout the world, adversely impacted humanity not only physically but also mentally (1,2). While the pandemic is spreading rapidly, it is thought that the physical damage as well as the psychological damage will be substantial, as the virus has the potential to be transmitted easily, there is no known a fully effective treatment and there is a risk of death. (1,3). When the literature is reviewed, it is noticed that outbreaks such as SARS, MERS cause phobic reactions, anxiety, depression, feelings of hopelessness, and hostility, just like natural disasters and wars (4-6). Based on these findings, it is considered that there will be similar outcomes in the COVID-19 pandemic. Considering the processes during and after the COVID-19 pandemic, psychological vulnerability as an important part of developing approaches that can benefit in this area is considered important for taking potential protective measures. As the concern about catching COVID-19 and the processes after it has come to the fore, it is considered crucial to identify psychological risk factors as a part of developing comprehensive approaches in this field to take potential protective measures.

Anxiety sensitivity has been defined as a trait that reflects the tendency to fear the consequences of anxiety. Anxiety sensitivity has been classified into three sub-dimensions: physical, social and cognitive. (7). The concept of anxiety sensitivity was initially considered to be one-dimensional, but as a result of factor analyzes, it was considered as a concept with three sub-dimensions (8). *Physical subtype of anxiety sensitivity*, which is one of these three sub-factors, has been described as being concerned about the consequences of the physical symptoms of anxiety (8). While *cognitive anxiety sensitivity*, which is another sub-factor, has been described as the state of being worried about the loss of cognitive control due to anxiety, the last sub-factor, *social anxiety sensitivity*, has been conceptualized as worrying about the unfavorable social consequences of observing anxiety symptoms by others (8). Previous studies have revealed that anxiety sensitivity is a transdiagnostic factor by associating it with numerous mental illnesses. (9-11). As anxiety sensitivity is openly associated with the assessment of an event and the importance attributed to that status, it has been demonstrated that anxiety sensitivity is a considerable determining factor for increased stress perception (11). Transdiagnostic factors such as anxiety sensitivity are considered to be a key component for elucidating how individuals experience COVID-19-specific fear, anxiety and depression (12). Based on this, it can be suggested that increased anxiety sensitivity might

increase the severity of phobic symptoms associated with COVID-19. In a research, examining the relationship between COVID 19 and anxiety sensitivity, it was determined that high anxiety sensitivity scores were strongly associated with COVID-19 phobia, and particularly the physical sub-dimension of anxiety sensitivity was a significant predictive factor for COVID-19 phobia (12). In a study scrutinizing the predictive factors of COVID-19 anxiety in healthy controls and individuals diagnosed with anxiety disorder in 2020, in both samples, anxiety sensitivity was found to be a significant predictor of COVID-19-related psychiatric diseases, independent of age, sex, chronic diseases, and exposure to COVID-19 (13).

Cognitive flexibility, another transdiagnostic factor, has been described as the ability to adapt thinking to changing environmental conditions (13). Individuals with cognitive flexibility can produce alternative thoughts that are more appropriate for the situation and assess challenging situations as more manageable instead of maladaptive thoughts that cause distress. Cognitive flexibility can also be thought of as a person's capacity to adapt to different situations, to think from multiple angles, or to approach the current problem with different strategies (14). In a crisis such as the outbreak of a life-threatening infectious virus that jeopardizes people's sense of security and well-being, one of the most significant things that could potentially impact the mental well-being of individuals is cognitive flexibility. Cognitive flexibility can be beneficial, particularly when faced with stress that an individual cannot control (15). In the current pandemic environment, which can be considered as an uncontrollable stress factor, cognitive flexibility can play a role as a tool to reframe the understanding of disaster and reconsider behaviors (e.g., hand washing, wearing face masks) that will help reduce their risks. (16,17). The studies analyzing the relationship between cognitive flexibility and COVID-19 phobia are limited. In a study conducted by Kalia et al. in 2020 (18), the relationship between early traumatic experiences, cognitive flexibility, and perceived threat related to COVID-19 was assessed, and it was observed that as cognitive flexibility decreases, the severity of perceived threat related to COVID-19 increases.

In this study, we intended to analyze two basic transdiagnostic factors that might be effective in the emergence of mental problems associated with the COVID-19 pandemic in the Turkish population. For this purpose, we planned to assess the relationship between cognitive flexibility, anxiety sensitivity, and COVID-19 anxiety. The hypotheses of the study;

1. There is a positive correlation between anxiety sensitivity and COVID-19 anxiety.
2. There is a negative correlation between cognitive flexibility and COVID-19 anxiety.

MATERIAL - METHOD

Selection of the Sample Group

For the study, the forms were sent to social media groups with 4,000 and 3,500 people on social media, and the participants were selected by the simple random sampling method. In total, volunteers from a population of 7,500 participated in the study, and an invitation link was sent to the social media groups for the study, along with the information on the research. The participants of the study were informed in detail and it was confirmed whether they volunteered on the first page of the online form. Individuals between the ages of 18-65, who were literate and volunteered to participate were included in the study. Having psychiatric diagnosis and treatment and cognitive disorders (such as mental retardation, dementia) were considered as exclusion criteria. A total of 292 people participated in the study, 12 people were not included in the analyzes due to the shorter than expected questionnaire response time (<5 minutes), and the analyzes were completed with 280 people in this way.

Ethics Committee Approval

Ethics committee approval dated February 17th 2021 and numbered E1-21-1544 was obtained from the Ankara City Hospital Ethics Committee.

Data Collection Tools

Sociodemographic Data Form: It is a form created by researchers that includes sociodemographic characteristics such as age, gender, marital and educational status, occupation, economic status, and clinical data such as psychiatric diagnosis and treatment history, alcohol and substance use history.

Cognitive Flexibility Inventory (CFI): The scale was measures the ability of individuals for generating alternative and compatible ideas in challenging situations (13). This 20-item scale has two subscales: control and alternatives. It is considered that as the score obtained from the scale increases, the cognitive flexibility level of the person increases. The Turkish validity and reliability study of this scale was performed by Gülüm et al., which was developed by Dennis and Vander Wal, was performed by Gülüm et al. (13,19)

Anxiety Sensitivity Index-3 (ASI-3): The scale developed in 2007 evaluates anxiety sensitivity with its dimensions (20). The scale, like the original ASI, consists of 18 items with physical, cognitive, and social sub-dimensions and 6 items in each sub-dimension, and allows a five-point Likert type measurement. The lowest score that can be obtained from the scale is 0, and the highest score is 72. High measure scores on the scale were associated with increased anxiety sensitivity. The Turkish validity and reliability study of the scale was conducted by Mantar et al. (21).

COVID-19 Phobia Scale: The scale developed by Dilbaz et al. (22) in 2020, to assess phobic symptoms related to coronavirus-19. The scale measuring Likert type consists of 22 items. The lowest score that can be obtained from the scale is 22, and the highest score is 110. Based on the factor analysis, it was found that the scale consists of 4 sub-dimensions. These dimensions include anxiety, mood, reassurance/precaution-taking, and avoidance.

Statistical Analysis

Data were analyzed using the software of Statistical Package for Social Sciences (SPSS) version 15.0. Numerical variables were analyzed as a percentage and standard deviation. Correlations between scale scores were analyzed via the Pearson correlation method. Stepwise regression analyzes were carried out to assess the predictors of the COVID-19 phobia scale score. The results were considered significant at $p < 0.05$.

RESULTS

Sociodemographic Characteristics and Scale Scores

While 61.5% (N:161) of the volunteers included in the study were male, 38.5% (101) were female. The marital status, years of education and the scale scores of the participants are given in the related table (Table 1).

The sociodemographic data and scale scores of the volunteers participating in the study were compared in terms of being male and female. Both sexes have similar characteristics regarding age, marital status, and years of education. When the scale scores were compared, it was determined that anxiety sensitivity and coronaphobia scores were similar, whereas there was a significant difference in terms of cognitive flexibility scores (Table 2).

Table 1. Sociodemographic Characteristics and Scale Scores	
Age Mean ± SD	39.5 (± 9.95)
Sex n(%)	
Male	161 (61.5%)
Female	101 (38.5%)
Marital status n(%)	
Married	189 (72.4%)
Single	61 (23.4%)
Other	11 (4.2%)
Years of education Mean ± SD	15.2 (± 2.9)
ASI-physical Mean ± SD	8.42 (± 5.82)
ASI-cognitive Mean ± SD	6.26 (± 5.44)
ASI-social Mean ± SD	8.50 (± 5.49)
ASI-total Mean ± SD	23.18 (± 15.28)
CFI-alternative Mean ± SD	56.31 (± 6.05)
CFI-control Mean ± SD	26.14 (± 5.11)
CFI-total Mean ± SD	82.45 (± 10.13)
COVavoidance Mean ± SD	7.53 (± 1.87)
COVmood Mean ± SD	7.79 (± 2.70)
COVareas Mean ± SD	23.63 (± 5.20)
COVworry Mean ± SD	31.25 (± 9.08)
COVtotal Mean ± SD	70.21 (± 16.58)
<p><i>SD: Standard Deviation, ASI-physical: Anxiety Sensivity Physical, ASI-cognitive: Anxiety Sensivity Cognitive, ASI-social: Anxiety Sensivity Social, AStotal: Anxiety Sensivity total score, CFalternative: Cognitive Flexibility Alternative, CFI-control: Cognitive Flexibility Control, CFI-total: Cognitive Flexibility total score, COVavoidance: COVID-19 Phobia Avoidance, COVmood: COVID-19 Phobia Mood, COVareas: COVID-19 Phobia Areas, COVworry: COVID-19 Phobia Worry, COVtotal: COVID-19 Phobia total score.</i></p>	

Table 2. Sociodemographic Characteristics and Scale Scores Compared in Male And Female			
	Female	Male	P
Your age? Mean ± SD	41 ± 11	39 ± 9	.187
Your marital status? n(%)			.784
Married	71 (70.3%)	119 (73.9%)	
Single	25 (24.8%)	36 (22.4%)	
Other	5 (5.0%)	6 (3.7%)	
Years of education Mean ± SD	15 ± 3	15 ± 3	.489
ASphysical Mean ± SD	8.02 (± 5.16)	8.66 (± 6.19)	.364
AScognitive Mean ± SD	5.89 (± 4.83)	6.48 (± 5.80)	.372
ASsocial Mean ± SD	7.99 (± 4.88)	8.83 (± 5.84)	.212
AStotal Mean ± SD	21.90 (± 13.38)	23.98 (± 16.35)	.286
CFalternative Mean ± SD	55.05 (± 5.55)	57.11 (± 6.24)	.007*
CFcontrol Mean ± SD	24.80 (± 4.92)	26.98 (± 5.06)	.001*
CFtotal Mean ± SD	79.85 (± 9.31)	84.08 (± 10.31)	.001*
Coronaavoidance Mean ± SD	7.70 (± 1.78)	7.42 (± 1.92)	.238
Coronamood Mean ± SD	7.87 (± 2.59)	7.74 (± 2.78)	.701
Coronaareas Mean ± SD	23.68 (± 5.51)	23.60 (± 5.02)	.903
Coronaworry Mean ± SD	30.88 (± 9.30)	31.48 (± 8.96)	.602
Coronatotal Mean ± SD	70.14 (± 17.02)	70.25 (± 16.36)	.959
<p><i>SD: Standard Deviation, ASI-physical: Anxiety Sensivity Physical, ASI-cognitive: Anxiety Sensivity Cognitive, ASI-social: Anxiety Sensivity Social, AStotal: Anxiety Sensivity total score, CFalternative: Cognitive Flexibility Alternative, CFI-control: Cognitive Flexibility Control, CFI-total: Cognitive Flexibility total score, COVavoidance: COVID-19 Phobia Avoidance, COVmood: COVID-19 Phobia Mood, COVareas: COVID-19 Phobia Areas, COVworry: COVID-19 Phobia Worry, COVtotal: COVID-19 Phobia total score. statistical analyzes: two samples t-test</i></p>			

Bivariate correlation analyzes were conducted to determine the correlations between the coronaphobia scale/sub-dimensions measuring the severity of coronavirus anxiety, the anxiety sensitivity index/sub-dimensions measuring transdiagnostic factors, and the cognitive flexibility inventory/sub-dimensions in the volunteers participating in the study.

In the correlation analyses, positive correlations were found between coronaphobia scale total scores and ASI- physical (r=.584), ASI- cognitive (r=.556), ASI- social (r=.524), ASI-total (r=.609), whereas a negative correlation was found between coronaphobia scale total scores and CF-alternatives (r=-.232), CF-control (r=-.375), CF-total (r=-.328). (Table 3)

Stepwise regression analysis was applied with ASI and CFI subscales to predict coronaphobia scale scores. According to the results, ASphysical (β=.287), ASCognitive (β=.178) positive and CFcontrol (β=-.148) negatively predicted coronaphobia total scores significantly {F(7, 254) = 23,361, p < .01}, with an R² of .375 (Table 4).

Table 3. Correlation Analyses Between Coronaphobia Scale and Cognitive Features Scale.

		Cavoidance	Cmood	Careas	Cworry	Ctotal
ASphysical	p	.298**	.579**	.449**	.576**	.584**
	r	.000	.000	.000	.000	.000
ASCognitive	p	.234**	.580**	.434**	.546**	.556**
	r	.000	.000	.000	.000	.000
ASSocial	p	.225**	.504**	.457**	.499**	.524**
	r	.000	.000	.000	.000	.000
AStotal	p	.278**	.608**	.490**	.593**	.609**
	r	.000	.000	.000	.000	.000
CFalter-native	p	-.013	-.176**	-.034	-.105	-.100
	r	.826	.003	.575	.080	.093
CFcontrol	p	-.069	-.366**	-.192**	-.315**	-.302**
	r	.253	.000	.001	.000	.000
CFtotal	p	-.042	-.289**	-.115	-.220**	-.211**
	r	.486	.000	.054	.000	.000

ASphysical: Anxiety Sensivity Physical, ASCognitive: Anxiety Sensivity Cognitive, ASSocial: Anxiety Sensivity Social, AStotal: Anxiety Sensivity total score, CFalter-native: Cognitive Flexibility Alternative, CFcontrol: Cognitive Flexibility Control, CFtotal: Cognitive Flexibility total score, COVavoidance: COVID-19 Phobia Avoidance, COVmood: COVID-19 Phobia Mood, COVareas: COVID-19 Phobia Areas, COVworry: COVID-19 Phobia Worry, COVtotal: COVID-19 Phobia total score, statistical analyses: Pearson correlation test.

Table 4. Regression Analyses Between Coronaphobia Scale and Cognitive Features Scale.

	Adjusted R Square	B	SE	β	t	95%CI (LL / UL) for β	p
	.375						
(Constant)		59,655	9,611		6,207	40.728 / 78.582	.000
Your sex?		.066	1,737	.002	.038	-3.355 / 3.487	.970
Your age?		.099	.084	.059	1,173	-.067 / .265	.242
ASphysical		.818	.247	.287	3,306	.331 / 1.305	.001*
ASCognitive		.544	.268	.178	2,028	.016 / 1.071	.044*
ASSocial		.412	.235	.137	1,754	-.051 / .875	.081
CFalter-native		.095	.177	.035	.539	-.253 / .443	.591
CFcontrol		-.480	.226	-.148	-2,124	-.924 / -.035	.035*

LL: Lower Level, UL: Upper Level, ASI-physical: Anxiety Sensivity Physical, ASI-cognitive: Anxiety Sensivity Cognitive, ASI-social: Anxiety Sensivity Social, AStotal: Anxiety Sensivity total score, CFI alternative: Cognitive Flexibility Alternative, CFI control: Cognitive Flexibility Control, CFI total: Cognitive Flexibility total score, COVavoidance: COVID-19 Phobia Avoidance, COVmood: COVID-19 Phobia Mood, COVareas: COVID-19 Phobia Areas, COVworry: COVID-19 Phobia Worry, COVtotal: COVID-19 Phobia total score, statistical analyses: hierarchical regression analyses *p<.05

DISCUSSION

In this study, it was aimed to investigate the transdiagnostic factors that may be associated with COVID-19 anxiety.

One of the hypotheses of our study was that increased anxiety sensitivity levels were a predictive factor for COVID-19 anxiety. In the analyzes performed, it was found that anxiety sensitivity was a considerable predictor of COVID-19 phobia; however, when the subscales were analyzed, it was noticed that only the physical and cognitive sub-dimensions of anxiety sensitivity were significant predictors of COVID-19 anxiety. Similar to the results of our study, in a study investigating the relationship between COVID-19 anxiety and anxiety sensitivity, it was revealed that there was a significant correlation between these two variables, and the physical sub-dimension of anxiety sensitivity was a significant predictive factor for COVID-19 anxiety (23). In another study conducted in 2020, scrutinizing the relationship between COVID-19 anxiety, anxiety sensitivity, and metacognitions, it was determined that anxiety sensitivity is directly associated with COVID-19 anxiety (24). In a study examining the relationship between COVID-19 anxiety and disgust tendency/sensitivity and anxiety sensitivity, it was found out that all three sub-dimensions of anxiety sensitivity were predictors for COVID-19 anxiety (25).

Owing to the nature of COVID-19, it is a disease in which symptoms of respiratory system diseases can be observed as one of the remarkable causes of mortality. When the studies on the subject are examined, it can be said that high anxiety sensitivity predicts the anxiety about respiratory symptoms. (26).

Considering all these findings, it can be suggested that anxiety sensitivity is a significant predictor for COVID-19 anxiety. The findings of our study support the relevant literature. Unlike previous studies, it was revealed that the cognitive sub-dimension of anxiety sensitivity was a significant predictor for coronaphobia, as well as the physical sub-dimension. Since anxiety sensitivity is associated with the anxiety caused by experiencing its symptoms, it is considered that individuals with increased anxiety sensitivity might be more likely to interpret events catastrophically and may show phobic responses in the face of anxiety-provoking events. Considering all these findings, specific interventions for anxiety sensitivity would be helpful in the treatment of COVID-19 related anxiety. Previous studies indicate that mindfulness-based exercises, meditation, and physical activity could improve symptoms of anxiety and sensitivity (27, 28). There is value in integrating cognitive and behavioral interventions for anxiety sensitivity into treatment when coping with the mental problems associated with COVID-19. Strategies to reduce increased anxiety susceptibility (eg, interoceptive exposure interventions) could be beneficial in lowering the levels of COVID-19-related anxiety.

Another of the hypotheses of the study was that there is a negative relationship between cognitive flexibility and COVID-19 anxiety. In the analyzes made, it was found out that cognitive flexibility was negatively correlated with COVID-19 anxiety, and cognitive flexibility-control sub-dimension was a significant predictor of COVID-19 anxiety. When the literature is reviewed, it is noticed that studies investigating the relationship between COVID-19 and cognitive flexibility are remarkably limited. In a research conducted with dentists in Iran in 2020, the relationship between the cognitive flexibility and perceived threat of COVID-19 was studied. A significant correlation was found between cognitive flexibility and the perceived threat of COVID-19, and the control subscale of cognitive flexibility was found to be an important predictor of COVID-19 anxiety (29). In a study conducted in 2020, the relationship between early traumatic experiences, COVID-19 perceived threat, cognitive flexibility, and anxiety was scrutinized, and a positive correlation was determined between the control sub-dimension of cognitive flexibility and

anxiety (18). Cognitive flexibility is the ability to approach the problem from multiple perspectives and see an alternative solution, without insisting on a single solution when faced with a challenge. The cognitive flexibility control sub-dimension quantifies the tendency of the person to perceive new and challenging situations as controllable (13). It is noteworthy that lower scores on the cognitive flexibility-control scale indicate that the person perceives challenging situations as uncontrollable. In some studies, seeing one's own resources as sufficient to cope with negative events contributes to the evaluation of events as controllable, while thinking that the event cannot be changed independently of one's own actions is associated with evaluating it as uncontrollable.. It is one of the expected results to show phobic symptoms in the face of an unknown and unmanageable situation such as the COVID-19 pandemic.

Up-to-date data on the COVID-19 pandemic reveals that the pandemic causes widespread mental health problems and that psychiatric problems will be of great significance in terms of public health in the forthcoming period. Preventive and curative interventions for COVID-19 related anxiety are an integral part of the struggle against the pandemic. It is thought that it is crucial to consider the transdiagnostic factors that may be related and to make specific interventions when necessary in the treatment of COVID-19 related anxiety.

When interpreting the results of the study, it should be noted that the study has some limitations. Due to the cross-sectional nature of the research, it should be supported by the results of the longitudinal study for determining the causal relationship between the anxiety of COVID-19 and the cognitive factors evaluated. Moreover, study questionnaires consist of self-report scales and thus there may be response bias. It is considered that the findings obtained from this study will be guiding for longitudinal and more comprehensive studies related to COVID-19 anxiety.

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