Turkish Adaptation of the Metacognitions about Symptom Control Scale and Its Revised Form: Reliability and Validity Study

Belirti Kontrolüne Dair Üstbilişler Ölçeğinin ve Kısa Formunun Türkçe'ye Uyarlanması: Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

Objective: The relationship between metacognitions and mental health in different chronic physical illnesses is examined, and current studies focus on symptom control. The aim of this study is to adapt the Metacognitions about Symptom Control Scale (MaSCS) and its revised form (MaSCS-R) into Turkish and evaluate whether metacognitions can be measured in a similar way to people with chronic illnesses living in England, Germany, and Arabia.

Method: The study sample (for both MaSCS and MaSCS-R) consisted of participants (81 and 80 respectively) with chronic physical illness. Participants' metacognition was assessed using the Metacognition Scale-30 (MCQ-30) and their general health was assessed using the Short Form-36 (SF-36).

Results: Consistent with the English and original versions of the scale, the Turkish versions of MaSCS and MaSCS-R had a two-factor structure, and the item distributions were similar. Reliability analyses showed that internal consistency coefficients for subscales of both forms were mostly in the acceptable and good range (.66-.83). Subscales of the MaSCS and MaSCS-R were found to have moderate relationships with most of subscales of the MCQ-30 and SF-36.

Conclusion: The subscale "negative metacognitions about symptom control" had cross-cultural and transdiagnostic convergent validity, while the subscale "positive metacognitions about symptom control" provided this to some extent. The results for both forms showed that positive metacognitions about symptom control are controversial and need further research. Also, the Turkish version of the MaSCS is more comprehensive and reliable than the short and revised versions.

Keywords: Metacognition, symptom control, mental health, validity, reliability

ÖZ

Amaç: Üstbilişler ve psikolojik sağlık arasındaki ilişki farklı kronik fiziksel hastalıklarda araştırılmakta ve güncel çalışmalar semptom kontrolüne odaklanmaktadır. Bu çalışmanın amacı Belirti Kontrolüne Dair Üstbilişler Ölçeği (BKDÜBÖ) ve kısa formunu (BKDÜBÖ-KF) Türkçeye uyarlamak ve üstbilişlerin, İngiltere, Almanya ve Arabistan'da yaşayan kronik hastalığı olan bireylerle benzer biçimde ölçülüp ölçülemeyeceğini değerlendirmektir.

Yöntem: Çalışmanın örneklemi (hem BKDÜBÖ hem BKDÜBÖ-KF için) kronik fiziksel hastalığı olan katılımcılardan (sırasıyla 81 ve 80 kişi) oluşmaktadır. Katılımcıların üstbilişleri Üstbiliş Ölçeği-30 (ÜBÖ-30) ile, genel sağlıkları Kısa Form-36 (KF-36) ile değerlendirilmiştir.

Bulgular: Ölçeğin İngilizce ve orijinal hali ile tutarlı olarak hem uzun hem de kısa form iki faktörlü bir yapıya sahip ve madde dağılımları benzerdir. Güvenirlik analizleri ise her iki formun alt boyutları için iç tutarlılık katsayılarının çoğunlukla kabul edilebilir ve iyi aralıkta (.66-.83) olduğunu göstermiştir. Ölçeğin ve kısa formunun alt boyutlarının ÜBÖ-30 ve KF-36 alt boyutlarının çoğu ile orta düzeyde ilişkilere sahip olduğu görülmüştür.

Sonuç: Semptom kontrolüne dair olumsuz üstbilişler alt boyutunun kültürlerarası ve tanılar üstü uyum geçerliğine sahip olduğu, semptom kontrolüne dair olumlu üstbilişler alt boyutunun ise bunu bir dereceye kadar sağladığı görülmüştür. Ölçeğin ve kısa formunun semptom kontrolüne dair olumlu üstbilişler alt boyutu için verilerin tutarsız olduğu ve daha fazla araştırılmaya ihtiyaç duyulduğu da söylenebilir. Dahası, BKDÜBÖ'nin Türkçe versiyonunun kısa formuna kıyasla daha kapsayıcı ve güvenilir olduğu görülmüştür.

Anahtar sözcükler: Üstbiliş, semptom kontrolü, psikolojik sağlık, geçerlik, güvenirlik

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Introduction

Globally, the burden of both chronic physical illnesses (CPIs) and mental disorders are becoming increasingly important (Thornicroft and Votruba 2015), and their comorbidities are also reported to be a real burden in emerging and developing countries (Daré et al. 2019). Chronic disease is defined as a condition that progresses slowly, lasts more than six months, can occur for a variety of reasons, affects quality of life, requires ongoing medical care, and interferes with daily life for these reasons (WHO 2020). The WHO (2020) also refers to chronic diseases as non-communicable diseases and reports that mortality rates from chronic diseases are increasing worldwide. The 2019 report also shows that 7 out of the 10 leading causes of death worldwide (74% of global deaths) are noncommunicable diseases (WHO 2020). According to 2023 data, the leading causes of death worldwide are cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes (WHO 2023). Moreover, while around a quarter of the European population experiences at least one CPI (van der Heide et al. 2015), this rate is nearly to 60% for Americans (CDC 2023). In addition, the prevalence of mental disorders is increasing worldwide, with one in eight people reporting a mental disorder (WHO 2022). Depression and anxiety disorders are the most common disorders worldwide, although they vary according to socio-demographic characteristics such as gender and age (WHO 2022). The co-occurrence rates of these mental disorders with various CPIs such as cancer (Nakash et al. 2014), heart disease (Alves et al. 2009), and diabetes (Grigsby et al. 2002, Al-Hayek et al. 2012, Mezuk et al. 2013, Yu et al. 2015) are also high and well studied. The overall picture is alarming, given that mental disorders are often associated with one or more CPIs, leading to severe physical health consequences. Furthermore, the care provided to people with mental disorders for their physical health problems is worse than that provided to people without mental disorders (Dare et al. 2019). In addition, comorbidities prolong hospital stays, increase the burden of diagnostic procedures and treatment costs, and have a negative impact on the health care system by reducing the effectiveness of medical and surgical treatment (Hall et al. 1996, Struijs et al. 2006). Therefore, understanding the psychological distress observed in people with CPI is important for improving individual and public health and for developing health policy.

Early theories explained the distress of people with CPI through the "cognitive paradigm", emphasising that their distress persists because of their negative appraisal of their illness. More recent research has emphasised "metacognition", defined as "thinking about thinking" (Flavell 1979, Wells 2000), drawing attention to the importance of how we think rather than what we think (Ak et al. 2012). The Self-Regulatory Executive Function (S-REF) model offers an alternative perspective and transdiagnostic approach to this issue (Cook et al. 2015a, Heffer-Rahn and Fisher 2018, Purewal and Fisher 2018). In this model, metacognitive beliefs (e.g., beliefs about control and executive cognition) are treated as functional determinants of emotional distress. In addition, inflexible, and dysfunctional responses to cognitive events are indicative of mental disorders (Wells 2009). In summary, it is individual responses to these perceptions (e.g., intense worry) rather than negative illness perceptions that lead to emotional distress (Fisher et al. 2018, Cook et al. 2015a). Metacognitive beliefs are of two types: positive and negative. Positive metacognitions relate to the benefits or advantages of engaging in cognitive activities that create and maintain the cognitive attentional syndrome (CAS, e.g., If I worry repeatedly, I can identify symptoms or early signs). Negative metacognitions are beliefs about the uncontrollability, importance, significance, and danger of thoughts and cognitive experiences (e.g., I can't stop worrying about the relapse of the illness) (Wells 2009, Wells and Mathews 1994). According to the S-REF model, mental health problems arise from repetitive thinking in the process of worry and rumination called CAS (Wells and Mathews, 1994, Wells 2009, 2013).

The S-REF model, which has been widely used to understand the mechanisms of mental disorders, is currently being tested for the CPI. Preliminary studies suggest that metacognitive beliefs are associated with depression and anxiety in people with Parkinson's disease (Allott et al. 2005, Brown and Fernie 2015), chronic fatigue syndrome (CFS) (Maher-Edwards et al. 2012), multiple sclerosis (Heffer-Rahn and Fisher 2018), heart disease (Anderson et al. 2019), cancer (Cook et al. 2015, 2015a) and epilepsy (Fisher and Noble 2017). The effect of metacognitions on anxiety and depression in chronic illness has been supported by a systematic review (Capobianco et al. 2020). In addition to the initial findings, it is noteworthy that the relationship between metacognitive processes and CPI symptoms has not been addressed much and the common point of these existing studies is symptom control.

In a study using the Metacognitive Profiling Interview (Wells 2000), most CFS patients focused on their symptoms and this focus negatively affected mood, prevented goal attainment, and exacerbated symptoms (Maher-Edwards et al. 2012). Accordingly, Fernie, Maher-Edwards, Murphy, Nikčević, and Spada (2015) developed a scale consisting of statements that specifically refer to cognitive and attentional processes and require thinking about symptoms. The scale, called the Metacognitions about Symptom Control Scale (MaSCS),

focuses not only on cognitive and attentional processes, but also on the role of symptoms (especially in the assessment, management, and control of physical symptoms) (Fernie et al. 2015). The 17-item scale has been revised and an 8-item short form has subsequently been created (Fernie et al. 2019). In a study using the MaSCS, after controlling for stress, anxiety, depression, and total metacognition scores, positive metacognitions about symptom control predicted impaired physical functioning in fibromyalgia (FMS), whereas negative metacognitions about symptom control predicted the overall impact of FMS symptoms (Kollmann et al. 2016). These findings suggest that metacognitions about symptom control may be a distinct structure that helps us to understand metacognitive processes in the CPI. However, there is no scale that measures metacognitions about symptom control in Turkish although there are various measures such as Metacognitions Scale-30 (Yılmaz et al. 2008), Metacognition Questionnaire for Children and Adolescents (Irak, 2012), Metacognition Scale about Rumination (Yılmaz et al. 2014).

Therefore, the aim of this study is to adapt the Metacognitions about Symptom Control Scale (MaSCS) and its short and revised form (MaSCS-R) into Turkish. The present study will contribute to the literature by assessing whether the metacognitions about symptom control of individuals with CPI in Türkiye can be measured in a similar way to individuals in the UK, Germany, and Arabia. The results of the present study will be compared with the literature and conclusions will be drawn about the relationship between metacognitions and health outcomes. The MaSCS provides an easy way to measure metacognitions about symptom control and is widely used in different studies. These advances increase the importance of adapting the scale to our culture. Finally, it is believed that this study will be very useful for mental health professionals and researchers by allowing the measurement of "metacognitions about symptom control" in Türkiye.
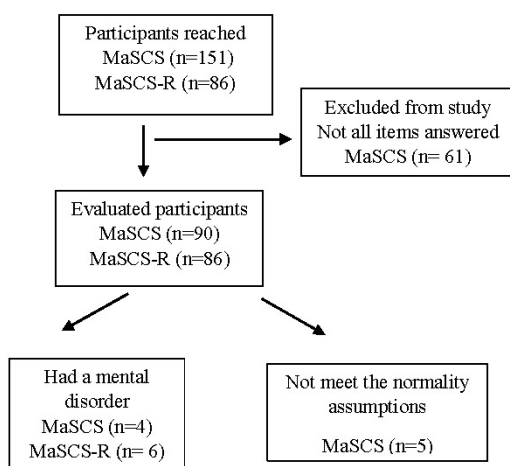

Figure 1. Diagram showing patients excluded from the study

Method

Sample

The sample (for both forms) consisted of participants who applied to the Rheumatology and Internal Medicine Departments of Bursa Uludağ University Hospital and consented to the study. Inclusion criteria for both studies were a) having a CPI (e.g., rheumatoid arthritis, FMS, multiple sclerosis, diabetes, blood pressure, thyroid disease) for at least 3 months or longer, b) not being diagnosed with mental disorders (e.g., major depression, anxiety, etc.), c) not taking any psychiatric medication, d) being 18 years or older. The G-Power 3.1 package programme was used to determine the number of chronic patients to be included in the sample. Correlation analysis was used to determine the relationships between the scales to be used in the study. Assuming that the relationships between the scales were at a moderate level, that the error level was 0.05 and that the power of the study was 0.80, it was found that 132 chronic patients should be reached at the end of the analysis. However, 151 people were reached for the MaSCS and 86 people were reached for the MaSCS-R, and some of the participants were excluded from the study, as shown in Figure 1. In the final analysis, the principle of at least five times the number of items for sample size (Bryman & Cramer, 2001) was met and the data were analysed.

The MaSCS final sample consisted of 81 participants (66 female, 15 male) and the MaSCS-R final sample consisted of 80 participants (65 female, 15 male). The mean age of the participants was 43.90 (SS= 11.93) years

for MaSCS and was 38.35 (SS= 13.17) years for MaSCS-R. Descriptive information about the participants in the scale and its revised form is given in Table 1.

Table 1. Data about the sociodemographic characteristics of both sample																
	MaSCS		MaSCS-Negative	t /F	p	MaSCS-Positive	t /F	p	MaSCS-R		N-MUR	t /F	p	P-MASH	t /F	
Variables	N	%	Mean (SD)			Mean (SD)			N	%	Mean (SD)			Mean (SD)		
Marital status				2.46	.07		.05	.98				.72	.49		.02	.98
Single	9	11.1	17.00 (6.24)			25.11 (6.21)			20	25	8.15 (2.13)			12.25 (2.67)		
Married	61	75.3	17.42 (6.69)			25.23 (5.94)			58	72.5	7.46 (3.16)			12.16 (3.37)		
Divorced	6	7.4	10.50 (3.33)			26.17 (6.64)			2	2.5	6.00 (2.83)			12.50 (3.53)		
Widower	5	6.2	13.20 (9.09)			24.80 (7.98)										
Living together				2.78*	.03		.86	.49				.67	.61		1.07	.38
With Spouse/Partner	17	21	16.00 (6.48)			27.18 (5.88)			16	20	8.29 (3.03)			13.45 (2.73)		
With Spouse and Children	43	53.1	18.12* (6.78)			24.77 (5.94)			39	48.8	7.26 (3.25)			11.59 (3.59)		
With children	7	8,6	9.57* (3.04)			26.28 (6.13)			2	2.5	6.00 (2.83)			12.50 (3.54)		
Alone	7	8.6	17.43 (8.56)			25.14 (6.96)			1	1.3	10.00			14.00		
Other	7	8.6	15.00 (4.76)			22.71 (6.26)			22	275	7.73 (2.21)			12.23 (2.60)		
Presence of children				.97	.33		-.24	.81				-61	.54		.04	.97
Yes	66	81.5	16.95 (6.83)			25.18 (5.99)			50	62.5	7.44 (3.25)			12.20 (3.49)		
No	15	18.5	15.07 (6.71)			25.60 (6.42)			30	37.5	7.85 (2.30)			12.17 (2.63)		
Education				.44	.82		.29	.92				.89	.47		1.38	.25
Illiterate	1	1.2	20.00			25.00										
Primary school graduate	11	13.6	17.73 (6.94))			23.73 (6.99)			9	11.3	8.00 (3.71)			13.55 (2.18)		
Secondary school graduate	12	14.8	17.25 (8.53)			24.50 (5.04)			4	5.0	7.50 (4.51)			12.00 (3.56)		
High school graduate	21	25.9	15.09 (5.18)			26.28 (6.74)			33	41.3	8.11 (3.05)			11.28 (3.42)		
University graduate	28	34.6	16.39 (7.18)			25.43 (5.47)			29	36.3	6.79 (2.38)			12.69 (3.14)		
Postgraduate education	8	9.9	18.37 (7.46)			25.25 (7.28)			5	6.3	8.20 (2.05)			13.00 (2.00)		
Work status				-.33	.74		1.48	.14				-1.42	.16		1.24	.22
Working	33	40.7	16.03 (6.92)			26.27 (5.97)			34	42.5	6.99 (2.13)			12.59 (2.90)		
Not working	44	54.3	16.54 (6.81)			24.27 (5.82)			44	55.0	7.91 (3.30)			11.70 (3.32)		
Reason for not working				.53	.59		.99	.38				1.69	.20		.40	.67
Retired	17	21	16.17 (6.25)			24.65 (6.65)			11	13.8	7.27 (3.04)			12.73 (3.66)		
Due to my illness	2	2.5	21.50 (10.61)			19.50 (7.78)			4	5	10.25 (5.12)			11.50 (3.41)		
Other	19	23.5	17.63 (8.13)			25.68 (5.19)			16	20	7.25 (2.41)			11.62 (3.14)		

Table 1. Data about the sociodemographic characteristics of both sample

	MaSCS		MaSCS-Negative	t /F	p	MaSCS-Positive	t /F	p	MaSCS-R		N-MUR	t /F	p	P-MASH	t /F	
Average monthly income1				1.28	.29		.35	.79				.51	.67		1.07	.37
0-1603 TL	6	7.4	18.00 (6.84)			24.83 (5.56)			5	6.3	8.40 (3.85)			11.60 (1.52)		
1 604-5 200 TL	50	61.7	15.50 (6.25)			24.84 (6.58)			51	63.8	7.69 (3.02)			12.00 (3.30)		
5 201-10 000 TL	14	17.3	17.86 (8.19)			26.57 (4.13)			18	22.5	7.50 (2.85)			12.22 (3.42)		
10 001 TL and above	9	11.1	19.67 (7.74)			26.11 (6.79)			5	6.3	6.20 (1.30)			14.60 (1.67)		
Family income level				.89	.47		2.87*	.03				1.28	.29		2.36	.08
Low	6	7.4	14.33 (4.23)			19.00* (4.10)			2	2.5	11.50 (4.95)			10.50 (2.12)		
Low middle	14	17.3	14.50 (4.91)			26.93* (6.54)			14	17.5	7.21 (2.12)			11.71 (3.07)		
Middle	49	60.5	16.90 (7.34)			24.90 (5.74)			51	63.8	7.59 (2.93)			11.88 (3.32)		
High middle	9	11.1	18.89 (7.13)			27.22 (5.21)			12	15	7.42 (3.45)			14.33 (2.15)		
High	3	3.7	19.33 (8.50)			30.00 (6.56)										

[1]Income ranges according to 2018 data; *$p < .05$

The illnesses of both samples were also evaluated in the study, and data on the course of the illness are given in Table 2.

Table 2. Data about illness process of both sample

Variables	MaSCS		MaSCS-R	
	N	%	N	%
Time passed after diagnoses	6 months -30 years		6 months-39 years	
Presence of another chronic illness				
Yes	30	37.0	29	36.3
No	51	63.0	51	63.8
Presence of chronic illness in the family				
Yes	48	59.3	38	47.5
No	33	40.7	42	52.5
Presence of psychiatric illness before				
Yes	12	14.8	9	11.3
No	69	85.2	71	88.8
Previously diagnosed psychiatric illness				
Depression	6	7.4	4	5.0
Panic disorder	4	4.9	2	2.5
Anxiety disorder			2	2.5
Obsessive-compulsive disorder			1	1.3
Presence of psychiatric illness in the family				
Yes	13	16.0	8	10
No	68	84.0	72	90
Psychiatric diagnoses in the family				
Major depression	5	6.2	2	2.5
Anxiety disorder	1	1.2	2	2.5
Schizophrenia	1	1.2	1	1.3
Obsessive-compulsive disorder			1	1.3
Panic disorder	1	1.2		
Bipolar disorder	1	1.2		

Procedure

Data of both studies were collected face-to-face. Permission to translate of the scale was obtained from the authors by e-mail on 09/02/2018. Ethical approval of the study was obtained from the Social Sciences and Humanities Research Ethics Committee of Istanbul University (date: 18/12/2018, decision number: 343829). After the translation process, the patients who applied to the Department of Rheumatology and Internal Medicine at Bursa Uludağ University Hospital were informed about the study, and patients who verbally reported having a psychiatric diagnosis or using psychiatric medication were not included in the study. Data for MaSCS were collected between December 2018 and December 2019, and data for MaSCS-R were collected between June and December 2019. Eligible and voluntary participants completed the scales themselves while waiting in hospital.

The Turkish version of the MaSCS was produced using the backward-forward translation approach. The MaSCS was first translated into Turkish by two independent linguists and the correct translations were accepted by the researchers. The accepted form of the scale was checked by independent Turkish linguists. The checked version of the scale was given to 10 people (from different gender, socio-economic and educational levels) and tested for clarity. After the necessary corrections were made, the scale was back-translated into English by two independent translators specialised in this field and the translation process was supervised by the researchers. The final back-translated version of the scale was approved by the authors of MaSCS.

Measures

Sociodemographic and Medical Information Form

This consists of questions prepared by the researchers to obtain information on the socio-demographic characteristics (such as age, gender, income status) and medical conditions of the participants.

The Metacognitions about Symptom Control Scale (MaSCS)

The Metacognitions about Symptom Control Scale (MaSCS) (Fernie et al. 2015) was developed to assess beliefs about symptom focus, rumination and worry in people with CFS. The 17-item scale consists of two subscales: positive metacognitions about symptom control (MaSCS-positive, e.g., monitoring my symptoms helps me to predict how they will develop) and negative metacognitions about symptom control (MaSCS-negative, e.g., when I have symptoms, it is impossible to focus on anything else). Each item is rated on a four-point Likert scale with the options ranging from 'strongly disagree' to 'strongly agree'. High scores indicate stronger metacognitive structures. The internal consistency of the scale is found to be α=.89 for MaSCS-positive, and α=.88 for MaSCS-negative (Fernie et al. 2015).

The eight-item Metacognitions about Symptom Control Scale-Revised Form (MaSCS-R) was created by removing the items that did not fit the theoretical rationale or were considered difficult to understand (Fernie et al. 2019). A high score on a 4-point Likert-type scale confirms the strength of metacognition (Fernie et al. 2019). The psychometric properties of the scale were assessed in individuals diagnosed with CFS (English), FMS (German) and type 1 diabetes (T1D, Lebanese). Results showed that MaSCS-R consists of two subscales: positive metacognitions about symptom hypervigilance (P-MASH) and negative metacognitions about the uncontrollability and physical repercussions of engaging in symptom focus, rumination, and/or worry (N-MUR). The internal consistency coefficients for each factor of the English, German and Arabic versions of the scale are acceptable and good (α=.70-.80). However, in the Arabic version, the internal consistency coefficient of the N-MUR subscale is questionable. In this study, MaSCS and MaSCS-R were adapted to Turkish, and their psychometric properties were examined.

Metacognitions Questionnaire-30 (MCQ-30)

The MCQ-30 was developed as a 65-item measure of metacognitive processes, and a short version of 30 items was developed as a satisfactory instrument with adequate psychometric properties (Wells and Cartwright-Hatton 2004). It consists of five subscales: positive beliefs about worry, negative beliefs about worry about uncontrollability and danger, beliefs about lack of cognitive confidence, beliefs about the need to control thoughts, and cognitive self-consciousness. Items are scored on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The total score obtained from the scale ranges from 30 to 120, with higher scores indicating greater dysfunction in metacognitive processes (Wells and Cartwright-Hatton 2004). The scale has good reliability and validity, with Cronbach's coefficient alphas for the subscales ranging from 0.72 to 0.93. The Turkish adaptation of the MCQ-30 was produced by Yılmaz, Gençöz and Wells (2008). As in the original version,

the Turkish version of the MCQ-30 consisted of five subscales: positive beliefs, negative beliefs: uncontrollability and danger, lack of cognitive confidence, need to control thoughts, cognitive self-consciousness. This scale is a valid and reliable instrument for use in Turkish samples with high internal consistency (α= .87 for total score, α= .73 to .89 for subscales) (Yılmaz et al. 2008).

Short Form 36 (SF-36)

The SF-36 was developed by Ware and Sherbourne (1992) as a comprehensive measure of general health status for use in the Medical Outcomes Study. This 36-item scale assesses quality of life over the previous 4 weeks and is categorised into eight domains: physical functioning, role limitations due to physical health problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems and mental health. The SF-36 is scored from 0 to 100, with higher scores indicating better quality of life. The Turkish version of the SF-36 was administered by Koçyiğit, Aydemir, Fişek, Ölmez, and Memiş (1999). The internal consistency coefficients for each subscale ranged from .73 to .76. The total item correlations of the scale were calculated to be between .47 and .88 (Koçyiğit et al. 1999).

Statistical analyses

Data were analysed using SPSS 21 (Statistical Package for Social Sciences). Frequency, outlier (according to skewness kurtosis values and histogram) and missing data analyses were performed for MaSCS and MaSCS-R prior to the main analyses. As a result of these analyses, 61 participants were excluded due to non-response and five participants were excluded due to outliers from the MaSCS data. No participants were excluded from the MaSCS-R data. Principal component analysis and varimax rotation were used to determine the factor structure of each scale. Cronbach's alpha was used to assess internal consistency. The relationship between MaSCS and MaSCS-R and other scales was tested using Pearson's correlation coefficient. T test and One-way ANOVA were used to determine whether the scale scores differed according to socio-demographic variables.

Results

Principal Components Analysis of the MaSCS and MaSCS-R

The Keiser Meyer-Olkin values were found to be .79 for the MaSCS items and .68 for MaSCS-R items. Bartlett's test results were calculated as $X2 (136) = 646.97 (p<0.001)$ for the MaSCS items and $X2 (28) = 209.52 (p<0.001)$ for the MaSCS-R items. These values indicate that the available data are suitable for factor analysis. In the analyses for MaSCS, the items were asked to cluster into two factors and the item distributions were found to be as in the original study. The first factor explained 28.46% of the variance and the second factor explained 23.64%. The total variance explained was 52.10%. The factor loadings for the MaSCS items varied between .49 and .87 and are shown in Table 3.

When the items of the MaSCS-R were asked to cluster into two factors, it was found that the item distribution was consistent with the original form. The first factor explained 33.97% of the variance and the second factor explained 26.15%. The total variance explained was 60.12%. The factor loadings for the items of the MaSCS-R varied between .49 and .86 are shown in Table 4.

As shown in Table 3, the item distributions of the MaSCS were the similar to the original scale (Fernie et al. 2015). Consistent with the original scale, the first factor was named 'negative metacognitions about symptom control (MaSCS-negative)' and the second factor was named 'positive metacognitions about symptom control (MaSCS-positive)'. As can be seen in Table 4, the item distributions of the MaSCS-R overlapped with the original scale (Fernie et al. 2019). Consistent with the original scale, the subscales were named as positive metacognitions about symptom hypervigilance (P-MASH) and negative metacognitions about the uncontrollability and physical repercussions of engaging in symptom focus, rumination, and/or worry (N-MUR).

Reliability of MaSCS and MaSCS-R

The reliability of the scales was tested by calculating the internal consistency coefficients. The analyses revealed Cronbach's alpha values was found of .89 for 'MaSCS-negative' and .83 for 'MaSCS-positive'. The item-total correlations of these subscales varied between .80-.42 and .74-.37, respectively.

In the analyses of the MaSCS-R subscales, internal consistency was found to be .83 for P-MASH, and .66 for N-MUR. The item-total correlations of these subscales varied between .70-.64 and .59-.29, respectively. According

to these values, it can be said that the first subscale is reliable at a good level and the second subscale is reliable at an acceptable level.

Table 3. Factor loadings of Turkish version of MaSCS		
MaSCS-Items	**Factor 1**	**Factor 2**
Negative metacognitions about symptom control (α= .89)		
7. Belirtilerim hakkında düşünmek beni olumsuz ve çökmüş hissettirir.	.87	
9. Belirtilerim hakkında düşünmek beni tükenmiş hissettirir.	.87	
11. Belirtilerime odaklanmak beni kaygılı ve stresli hissettirir.	.82	
16. Belirtilerime odaklanmak beni çökmüş hissettirir.	.81	
4. Belirtilerim hakkında düşünmek kendimi engellenmiş hissetmeme neden olur.	.79	
13. Belirtilerim hakkında düşünmeye bir kere başladım mı bunu durduramam.	.77	
17. Belirtilerim hakkında düşünmek onları daha kötü hale getirebilir.	.55	
1. Belirtileri deneyimlerken başka bir şeye odaklanmak imkansızdır.	.52	
Positive metacognitions about symptom control (α= .83)		
10. Belirtilerimi izlemek onları daha iyi kontrol etmemi sağlar.		.82
12. Belirtilerimi izlemek gelebilecek zararlardan kendimi korumama yardım eder.		.72
15. Belirtilerime dikkat etmemek, hastalığımın kötüleşmesine sebep olabilir.		.69
14. Belirtilerime odaklanarak, ne zaman daha iyiye gittiğimi fark edebilirim.		.68
8. Fiziksel sınırlarımı anlayabilmek için belirtilerimi izlerim.		.67
2. Belirtiye odaklanırsam, daha iyi olmak için uygun adımları atabilirim.		.67
6. Belirtilerimi izlemek onların nasıl gelişeceğini tahmin etmeme yardımcı olur.		.61
3. Belirtilerim hakkında uzun uzadıya düşünmek onlarla nasıl başa çıkacağımı bulmam konusunda bana yardımcı olur.		.50
5. Belirtilerime dikkat etmezsem, kendimi çok fazla zorlayabilirim.		.48

MaSCS: Metacognitions about Symptom Control Scale; α: Cronbach alfa

Table 4. Factor loadings for Turkish version of MaSCS-R		
MaSCS-R Items	**Factor 1**	**Factor 2**
Positive metacognitions about symptom hypervigilance (α= .83)		
5. Belirtilerimi izlemek onları daha iyi kontrol etmemi sağlar.	.86	
3. Fiziksel sınırlarımı anlayabilmek için belirtilerimi izlerim.	.81	
6. Belirtilerimi izlemek gelebilecek zararlardan kendimi korumama yardım eder.	.80	
2. Belirtilerimi izlemek onların nasıl gelişeceğini tahmin etmeme yardımcı olur.	.78	
Negative metacognitions about the uncontrollability and physical repercussions of engaging in symptom focus, rumination, and/or worry (α= .66)		
4. Belirtilerim hakkında düşünmek beni tükenmiş hissettirir		.80
7. Belirtilerim hakkında düşünmeye bir kere başladım mı bunu durduramam.		.79
1. Belirtileri deneyimlerken başka bir şeye odaklanmak imkansızdır		.74
8. Belirtilerim hakkında düşünmek onları daha kötü hale getirebilir.		.49

MaSCS-R: Metacognitions about Symptom Control Scale-Revised Form; α: Cronbach alfa

Finally, the means and standard deviations of the MaSCS and MaSCS-R are given in Table 5.

Tablo 5. Score distribution of MaSCS and MaSCS-R			
Subscales	**Mean**	**SS**	**N**
MaSCS-Negative	16.60	6.80	81
MaSCS-Positive	25.26	6.03	81
MaSCS-R N-MUR	7.59	2.92	80
MaSCS-R P-MASH	12.19	3.18	80

MaSCS: Metacognitions about Symptom Control Scale; MaSCS-R: Metacognitions about Symptom Control Scale-Revised Form; N-MUR: Negative metacognitions about the uncontrollability and physical repercussions of engaging in symptom focus, rumination, and/or worry; P-MASH: Positive metacognitions about symptom hypervigilance (P-MASH)

Correlations between MaSCS, MaSCS-R, MCQ-30, SF-36, and their subscales were calculated using Pearson correlation coefficients. As shown in Table 6, the "MaSCS-negative" had a significant positive correlation with the negative beliefs about worry and the need to control thoughts subscales of the MCQ-30 and a significant negative correlation with the physical functioning, pain, social functioning, vitality, and mental health subscales of the SF-36. The MaSCS-positive had a significant positive correlation with the total score, positive beliefs about worry, and cognitive self-consciousness subscales of the MCQ-3O.

N-MUR had a significant positive correlation with total MCQ-30 score, negative beliefs about worry; a significant negative correlation with the need to control thoughts subscale of the MCQ-30, physical functioning, social functioning, vitality, general health, and mental health subscales of the SF-36. P-MASH had a significant positive correlation with MCQ-30 total score, cognitive self-consciousness, and a negative correlation with need to control thoughts. The results of the correlation analyses for MaSCS, MaSCS-R, the subscales of the MCQ-30 and the SF-36 are shown in Table 6.

Table 6. Relationships between the MaSCS, MaSCS-R and the subscales of the MCQ-30 and SF-36				
	MaSCS-Negative	MaSCS-Positive	MaSCS-R N-MUR	MaSCS-R P-MASH
MCQ-30 Total Score	.21	.33**	.40**	.34**
MCQ-30 positive	.06	.28*	.19	.14
MCQ-30 negative	.29**	.20	.52**	.20
MCQ-30 lack of cognitive confidence	.03	.09	.21	.04
MCQ-30 need to control thoughts	.27*	.26	-.24*	-.35**
MCQ-30 cognitive self-consciousness	.05	.30**	.18	.45**
SF-36 physical functioning	-.24*	-.05	-36**	.07
SF-36 physical role limitations	-.20	-.005	-.19	-.18
SF-36 pain	-.27*	-.009	-.08	.10
SF-36 social functioning	-.31**	.08	-.26*	-.04
SF-36 vitality	-.30**	-.06	-.32**	.04
SF-36 emotional role limitations	-.18	-.07	-.06	-.12
SF-36 general health	-.13	.05	-.31**	.007
SF-36 mental health	-.29**	.08	-.44**	.01

p< .05 p< .01; N=81 for MaSCS; N=80 for MaSCS-R; MaSCS-Negative: Negative metacognitions about symptom control; MaSCS-Positive: Positive metacogntions about symptom control; N-MUR: Negative metacognitions about the uncontrollability and physical repercussions of engaging in symptom focus, rumination, and/or worry; P-MASH: Positive metacognitions about symptom hypervigilance (P-MASH); MCQ: Metacognitions Questionnaire; SF: Short Form

MaSCS and MaSCS-R scores in Relation to Socio-Demographic Variables

T test analyses showed that there were significant gender differences in the scores of MaSCS-positive (t = (79) = -2.34, p < .05), but not in the scores of MaSCS-negative. (t = (79) = 1.66, p > .05). Males received more MaSCS-positive scores (M = 28.47, SD = 5.15) than females (M = 24.53, SD = 6.01). There was no gender difference for N-MUR (t = (78) = 0.13, p > .05), P-MASH (t = (78) = -1.11, p > .05). T test analyses showed that both MaSC-positive, MaSCS-negative and N-MUR, P-MASH did not differ according to child presence and work status. The results of t tests are shown in Table 1.

One-way ANOVA results showed that only living together had a significant effect on MaSCS-negative [F (4, 76) = 2.78, p = 0.03] and family income level on MaSCS-positive [F (4, 76) = 2.87, p = 0.03]. Post-hoc comparisons using the Tukey test showed that the mean scores for living with a partner and children were significantly different from those for living with children. The mean score for having a low middle family income was also significantly different from having a low family income. There was no significant effect of other socio-demographic variables on MaSCS-positive and MaSCS-negative. Finally, one-way ANOVA results showed that there was no significant effect of marital status, living together, educational level, reason for not working,

average monthly income and family income level on N-MUR and P-MASH scores. The results of the one-way ANOVA are shown in Table 1.

Discussion

In this study, Turkish forms of the MaSCS (17-item) (Fernie et al. 2015), which was developed to assess metacognitions about symptom control in people with CFS (Fernie et al. 2015), and the MaSCS-R (8-item) (Fernie et al. 2019), which was revised in people with CFS, FMS and T1D, were created, and psychometrically tested. While there is only a German version of the MaSCS (Kollman et al. 2016), there are Arabic and German versions of the MaSCS-R (Fernie et al. 2019).

As a result of the factor analysis for MaSCS and MaSCS-R, it was found that the Turkish forms of the scales consisted of two subscales and the item distributions of these scales were consistent with the original studies. Accordingly, the factor loadings of the original form varied between .52-.88 for MaSCS-negative and .60-.82 for MaSCS-positive (Fernie et al. 2015), and it can be said that these loadings were in a similar range for both MaSCS-negative (.52-.87) and MaSCS-positive (.48-.82) in our study. Similarly, the factor loadings varied between .78-.86 for P-MASH and .49-.80 for N-MUR. It can be said that these factor loadings are consistent with the original study (Fernie et al. 2019).

According to the reliability analysis, the internal consistency coefficient was found to be α=.89 for MaSCS-negative and α=.83 for MaSCS-positive. These values were consistent with the original version of the scale (Fernie et al. 2015), and the subscales were reliable at a good level according to the widely accepted reliability classification (George and Mallery 2003). The results for MaSCS-R showed that P-MASH was reliable at a good level (α=.83) and N-MUR was reliable at an acceptable level (α=.66). These values are partially consistent with the data from the original version of MaSCS-R. The internal consistency coefficients for both factors of the English (CFS), German (FMS) and Arabic (T1D) versions of the revised scale were found to be mostly acceptable and in the good range (α= .70-.80). However, the internal consistency of the Arabic version of the N-MUR was reported to be controversial (α=.60) (Fernie et al. 2019). In this context, the N-MUR subscale differs in cross-cultural measurements and more research is needed in this regard.

When the relationships between the scales were assessed, moderate positive correlations were found between MaSCS-negative and negative beliefs about worry and need to control thoughts; moderate positive correlations were found between MaSCS-positive and MCQ-30 total score, positive beliefs about worry and cognitive self-consciousness. Similarly, MaSCS-negative was positively related to negative beliefs about the uncontrollability and danger of worry (r=.69) and need to control thoughts (r=.54); MaSCS-positive was positively related to positive beliefs about worry (r=.41) and cognitive self-consciousness (r=.26) in the German version of the scale (Kollman et al. 2016). The lower correlation coefficients can be explained by the small sample size. However, these results show that metacognitions and metacognitions about symptom control are related not only in Germany but also in Türkiye.

The results of the correlation analysis for MaSCS-R showed that N-MUR was positively related to MCQ-30 total score, and negative beliefs about worry; negatively related to need to control thoughts. In addition, P-MASH was positively related to MCQ-30 total score, cognitive self-consciousness and negatively related to need to control thoughts. These findings are partially consistent with the literature. While N-MUR was positively related to all subscales of the MCQ-30 (r=.62-.32) in the English and German versions of the scale, the same subscale was positively related to negative beliefs about worry (r=.31), lack of cognitive confidence (r=.33), and the need to control thoughts (r=.26) in the Arabic version (Fernie et al. 2019). Furthermore, T-test and one-way ANOVA results indicated that MaSCS-R scores did not differ according to socio-demographic variables. However, MaSCS-positive scores were higher in males than in females. Although this finding is not consistent with the metacognition literature (Bahrami and Yousefi 2011), it can be said that more research is needed.

When the results of MaSCS and MaSCS-R were evaluated together, metacognitions about symptom control were related to at least two of the major metacognitive structures, suggesting some cross-cultural and transdiagnostic convergent validity of the scale. It should also be noted that the MaSCS-R has controversial data.

Studies examining the impact of metacognitions on health have shown that metacognitions are associated with anxiety in cancer (Cook et al. 2015, 2015a), and Parkinson's patients (Brown and Fernie 2015), and predict emotional distress in multiple sclerosis patients (Heffer-Rahn and Fisher 2018). Furthermore, metacognitions have been shown to be a better predictor of symptom severity than depression and anxiety in CFS patients (Maher-Edwards et al. 2011). Therefore, the relationship between the MaSCS and the SF-36 and its subscales may provide evidence of convergent validity.

In the present study, both MaSCS-negative and N-MUR were negatively associated with physical functioning, social functioning, vitality, and mental health. In addition, MaSCS-negative was negatively related to pain and N-MUR was negatively related to general health. These findings are partially consistent with the original MaSCS and MaSCS-R data. The original MaSCS data showed that MaSCS-negative was positively related to fatigue, depression, and anxiety; both MaSCS-positive and MaSCS-negative predicted fatigue after controlling for anxiety and depression in CFS patients (Fernie et al. 2015). Similarly, Kollman and colleagues (2016) found that negative, and positive metacognitions about symptom control were positively related to impairment in physical functioning, work ability, depression, anxiety, and stress in FMS patients. According to the original findings of MaSCS-R, N-MUR was positively related to anxiety, depression, and symptom severity in all samples (CFS, FMS and T1D) (Fernie et al. 2019).

On the other hand, positive metacognitions about symptom control were not found to be related to general health measures in either scale analysis. Results from the original form of the scale showed that MaSCS-positive was positively related only to fatigue in CFS, but not to depression, anxiety, or physical functioning (Fernie et al. 2015). Results from the revised form showed that P-MASH was positively related only to anxiety and fatigue in CFS (Fernie et al. 2019). Although positive metacognitions about symptom control are expected to have negative effects on health, they were positively related to well-being in FMS patients (Kollman et al. 2016). The researchers have explained that FMS patients felt better because positive metacognitions about symptom control increased their perceived sense of control. Although there are no measures to test positive constructs such as perceived control and self-efficacy in the present study, testing metacognitions with these moderators will broaden the scope and provide a better understanding.

All the findings of the present study support that the negative metacognitions about symptom control have cross-cultural and transdiagnostic validity (Fernie et al. 2019), while the positive metacognitions have some degree of validity. Also, the data from MaSCS and MaSCS-R for positive metacognitions are inconsistent and require further research. Furthermore, the psychological meanings behind the metacognition were shared by three countries (British, German, and Arab) and two cultures (Western, Lebanese Arab) as well as Türkiye. This supports the evidence of the structural and measurement invariance of the MaSCS (Fernie et al. 2019) and provides evidence to support the cross-cultural validity of the metacognitive model.

In terms of psychometric properties, MaSCS is more comprehensive and has high reliability. Although MaSCS-R is easy to administer, it has controversial data and low reliability. Therefore, MaSCS-R needs to be investigated in different illnesses, taking into account comorbidities. Furthermore, the negative relationships between metacognitions about symptom control and health outcomes in the current study support the S-REF model (Wells and Matthews 1994, 1996). Therefore, it is important to consider metacognitions about symptom control in chronic disease management. Finally, MaSCS provides a new method for identifying cross-cultural targets for psychological interventions aimed at reducing psychological distress in CPI.

This study has several limitations. First, the study was cross-sectional However, longitudinal studies are needed to understand whether metacognitions change at different stages of the illness. Second, metacognitions were measured using self-report scales. Therefore, the variables were susceptible to response bias (social desirability, recall ability), which may increase error variance. Furthermore, metacognitions about symptom control require meta-awareness. As in other studies (Fernie et al. 2015), it is questionable whether we measured the intended constructs. More reliable results could be obtained by using the Ecological Momentary Assessment method (Kollmann et al. 2016) in future studies. Third, the small sample size may have affected the power of the analyses. Fourth, individuals with different CPIs participated in this study. The heterogeneity of the sample may have reduced the validity findings of a potentially diagnosis-specific scale. Fifth, approximately 36% of the sample in both studies had at least one comorbidity. It may be useful in future studies to measure in samples with a single diagnosis. Sixth, the determination of whether participants had a mental disorder was based on self-report. In future studies, it would be more appropriate to assess participants using a psychological assessment interview. Seventh, although consistent with the hypothesis of gender differences in chronic illness (Boerner et al. 2024), the fact that the majority of the sample consisted of women (66 women for MaSCS, 65 women for MaSCS-R) may limit generalisability. Finally, the year of diagnosis of the sample varied from 6 months to 39 years. As the SF-36 assesses symptoms in the last month, symptom severity may have been underestimated (Fernie et al. 2015). Despite these limitations, the psychometric properties of the Turkish version of the scale are at an acceptable level. Although more studies are needed for MaSCS-R, MaSCS has better reliability and validity, and will allow studies to be conducted to understand the mechanisms of psychological distress associated with different chronic diseases in Türkiye.

Conclusion

Although the study indicates that the Turkish versions of both MaSCS and MaSCS-R are valid and reliable, it can be said that MaSCS has better validity and reliability. The scale is expected to allow the measurement of metacognitions about symptom control in Turkey, as well as the testing of metacognitive models in chronic illness. Future studies can extend the validity and reliability results by comparative analyses of the scales across different diagnoses. Also, re-evaluating of the scales in a sample with a single chronic disease and using exploratory factor analysis may serve to better understand and measure metacognitions about symptom control. Testing the scales with different socio-demographic variables may also be recommended. Finally, as metacognitions about symptom control are transdiagnostic and cross-cultural, researchers can test the scales cross-culturally.

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Addendum 1. The Metacognitions about Symptom Control Scale (17 and 8 item forms)-Turkish Version

The Metacognitions about Symptom Control Scale (17 and 8 item forms)-Turkish Version

Instruction

This scale is about how people with Chronic Fatigue Syndrome experience symptoms and how they cope. Listed below is a set of beliefs that people express. Please read each item and indicate how much you agree overall by circling an appropriate number. There are no right or wrong answers. Please answer all items..

		Katılmıyorum (1)	Biraz Katılıyorum (2)	Orta derecede katılıyorum (3)	Tamamen katılıyorum (4)
1.	**Belirtileri deneyimlerken başka bir şeye odaklanmak imkansızdır.**				
2.	Belirtiye odaklanırsam, daha iyi olmak için uygun adımları atabilirim.				
3.	Belirtilerim hakkında uzun uzadıya düşünmek onlarla nasıl başa çıkacağımı bulmam konusunda bana yardımcı olur.				
4.	Belirtilerim hakkında düşünmek kendimi engellenmiş hissetmeme neden olur.				
5.	Belirtilerime dikkat etmezsem, kendimi çok fazla zorlayabilirim.				
6.	**Belirtilerimi izlemek onların nasıl gelişeceğini tahmin etmeme yardımcı olur.**				
7.	Belirtilerim hakkında düşünmek beni olumsuz ve çökmüş hissettirir.				
8.	**Fiziksel sınırlarımı anlayabilmek için belirtilerimi izlerim.**				
9.	**Belirtilerim hakkında düşünmek beni tükenmiş hissettirir.**				
10.	**Belirtilerimi izlemek onları daha iyi kontrol etmemi sağlar.**				
11.	Belirtilerime odaklanmak beni kaygılı ve stresli hissettirir.				
12.	**Belirtilerimi izlemek gelebilecek zararlardan kendimi korumama yardım eder.**				
13.	**Belirtilerim hakkında düşünmeye bir kere başladım mı bunu durduramam.**				
14.	Belirtilerime odaklanarak, ne zaman daha iyiye gittiğimi fark edebilirim.				
15.	Belirtilerime dikkat etmemek, hastalığımın kötüleşmesine sebep olabilir.				
16.	Belirtilerime odaklanmak beni çökmüş hissettirir.				
17.	**Belirtilerim hakkında düşünmek onları daha kötü hale getirebilir.**				

The short form consists of bolded items.

MaSCS-R (8 item) Scoring

The short form consists of bolded items.

Items belonging to the "positive metacognitions about symptom hypervigilance": 6, 8, 10, 12

Items belonging to the "negative metacognitions about the uncontrollability and physical repercussions of engaging in symptom focus, rumination, and/or worry": 1, 9, 13, 17

MaSCS (17 item) Scoring

The long form consists of all items.

Items belonging to the "positive metacognitions about symptom control": 2, 3, 5, 6, 8, 10, 12, 14, 15

Items belonging to the "negative metacognitions about symptom control":1, 4, 7, 9, 11, 13, 16, 17

In both forms, two subscale score is obtained from the sum of responses to all items. Higher scores indicate stronger metacognitions about symptom control.