



Psychometric Properties of the Persian Version of Cognitive Fusion Questionnaire-Chronic Illness in Multiple Sclerosis

Esmail Soltani^{1*}, Sadegh Izadi², Pardis Sharifi³ and Maryam Poursadeghfard²

¹Research Center for Psychiatry and Behavioral Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

²Clinical Neurology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

³School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

*Corresponding author: Research Center for Psychiatry and Behavioral Sciences, Shiraz University of Medical Sciences, Shiraz, Iran. Email: ssoltani65@gmail.com

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Abstract

Background: Cognitive fusion is a substantial variable of acceptance and commitment therapy (ACT). Recently, various instruments have been developed to assess cognitive fusion, including a version relevant to medical illness referred to as the Cognitive Fusion Questionnaire-Chronic Illness (CFQ-CI).

Objectives: This study aimed to assess the validity and reliability of the Persian version of CFQ-CI in multiple sclerosis (MS) patients.

Methods: In a cross-sectional study, the Persian version of CFQ-CI and several other measures that assessed self-compassion, depression, and social anxiety symptoms were administered on 195 MS patients in Shiraz Emam Reza Clinic. Exploratory factor analysis (EFA), internal consistency, and convergent validity were used for data analysis.

Results: EFA revealed a 1-factor model. The Cronbach α was 0.92. As to the convergent validity, CFQ-CI had positive associations with measures of depression and social anxiety and negative associations with self-compassion.

Conclusions: Overall, this research supports the psychometric properties of the Persian version of CFQ-CI.

Keywords: Acceptance and Commitment Therapy, Chronic Illness, Cognitive Fusion, Validity and Reliability

1. Background

Multiple sclerosis (MS) is defined as an idiopathic, inflammatory disease of the central nervous system characterized by demyelination and axonal loss. The common symptoms of these patients include numbness, weakness, vision problems, balance problems, vertigo, urinary urgency, fatigue, and depression (1). MS is an autoimmune, multifactorial, and heterogeneous disease influenced by genetic and environmental factors. Due to high treatment costs, poor job expectations, and MS patients' job dropout, this disease imposes significant costs on society (2). MS is 3.13 times more common in women than in men (3). A previous systematic review and meta-analysis estimated the prevalence of MS in Iran to be 29.3 per 100 000 people (4). It has been shown that patients with MS may have different psychological disorders, including depression and anxiety (5-9). Depression and anxiety in MS patients are associated with reduced treatment adherence (10) and quality of life (11). The effectiveness of psychological therapies, such as cognitive-behavioral therapy (CBT), in reducing psychological problems has been shown by empirical research in MS patients (12, 13). However, negative illness beliefs and dis-

stress may be realistic in specific medical conditions such as MS at certain times (14). Accordingly, there has been an increase in the use of other psychotherapies, such as acceptance and commitment therapy (ACT), for chronic disorders, and some studies have shown the effectiveness of such therapies for MS (14-17). In contrast to CBT that aims to directly change negative beliefs, in ACT, the focus is on accepting thoughts and feelings and creating behaviors based on values (18).

ACT is a third-wave behavioral therapy that creates psychological flexibility (19). Psychological flexibility is a behavioral pattern defined based on 6 processes, decreasing or increasing the treatment model (20). Cognitive fusion is one of these processes, playing a role in different psychological disorders, including depression and anxiety (21, 22). In ACT, cognitive fusion is the dominance of cognitive events over one's personal experience, inability to observe cognitive events from a different perspective, tendency toward showing emotional reactions to thoughts, overregulation of behavior under the dominance of cognitive events, attempt to control thoughts, over-analysis of situations, and making judgments about the content of

one's thoughts (23). Given the importance of cognitive fusion in psychopathology, different researchers have examined this construct in MS patients. They have shown the role of cognitive fusion in psychological distress, such as anxiety and depression, as well as in the psychological well-being and quality of life of these patients (24-27). The Cognitive Fusion Questionnaire (CFQ) has recently been designed to assess this concept. The results showed that CFQ had a 1-factor structure and revealed its discriminant validity, sensitivity to treatment, stability over time, and reliability (23). CFQ was translated and validated in Iran (28). CFQ was designed to measure cognitive fusion in mental disorders and non-clinical samples, but some researchers (29) have recently designed a Chronic Illness version of the CFQ referred to as CFQ-CI in inflammatory bowel disease (IBD).

2. Objectives

CFQ-CI was designed for chronic illness, and a review of the literature showed that currently, there is no psychometrically validated instrument to assess cognitive fusion in the context of MS. It seems that creating a questionnaire to assess this concept in MS patients can help us to accurately assess the psychological characteristics of this disease. Therefore, the present study aimed to examine the psychometric properties of CFQ-CI in MS patients.

3. Methods

3.1. Participants and Procedure

The sample included 200 patients with a definite diagnosis of MS according to McDonald's criteria in the Emam Reza Clinic affiliated with Shiraz University of Medical Sciences in 2020. Based on Munro's Statistical Methods for Health Care Research (30), a ratio of at least 10 participants for each variable is desirable to generalize the sample to a larger population. We selected 200 subjects according to the number of variables and the possibility of generalization. The participants were selected using the convenience sampling method. After explaining the purpose of the research and obtaining informed consent, demographic information was received by the researcher and neurologist, and then the questionnaires were completed by the participants. The inclusion criteria were being diagnosed with MS by a neurologist at least 6 months ago, not being in the relapse or end-stage of the disease or profound cognitive impairment, being able to read and write, and being 16 - 65 years old. The exclusion criteria were the use of psychiatric drugs and the presence of a comorbid autoimmune disorder. Among the initial participants, 198 patients completed

the questionnaires, of whom 46 were male (23%), and 150 were female (76%). Two participants did not report the gender (1%). The age range of the participants was 15 - 61 years (mean age in years of 32.67, $SD = 7.08$). In terms of marital status, 83 participants were single (42%), 110 were married (66%), and 5 did not report their marital status (2%). In addition, 3 participants did not complete one of the questionnaires, so they were excluded from the analysis. The present research was approved by the Ethics Committee of Shiraz University of Medical Sciences. The objectives of the research were explained to the participants, and after obtaining informed consent, the measures of the study were administered.

3.2. Measurement

3.2.1. Cognitive Fusion Questionnaire-Chronic Illness

The original 7-item CFQ-CI assesses cognitive fusion in patients with chronic illness. CFQ-CI was designed based on CFQ (23). The items are based on a Likert-type scale ranging from "totally incorrect" to "totally correct." Higher scores indicate higher cognitive fusion. CFQ-CI has good psychometric properties (29). CFQ is suitable for adolescents as well (31). The Iranian original version of the CFQ has good reliability (eg, Cronbach $\alpha = 0.86$; test-retest $r = 0.86$) and validity (eg, $r = 0.66$ and 0.48 when correlated with the Acceptance and Action Questionnaire-second version [AAQ-II] and the Social Interaction Anxiety Scale [SIAS], respectively) (28). Present questions were modified based on the original Persian version to match the Chronic Illness version (for example, "I tend to get very entangled in my thoughts" to "I tend to get very entangled in my thoughts about my illness and/or symptoms).

3.2.2. The Self-compassion Scale

The 26-item version of the Self-compassion Scale (SCS) assesses the following aspects of self-compassion: human commonalities vs isolation, self-kindness vs self-judgment, and mindfulness vs over-identification. SCS items are rated on a Likert-type Scale ranging from "almost never" to "almost always." Higher scores show higher levels of self-compassion (32). SCS is suitable for adolescents as well (33). SCS has good reliability (eg, Cronbach $\alpha = 0.78$) and validity (eg, $r = -0.36$ when correlated with the Spielberger State-Trait Anxiety Inventory [STAI] and 6-factor structure) in Iran (34).

3.2.3. Beck Depression Inventory-Second Edition

The Beck Depression Inventory-Second edition (BDI-II) has 21 items assessing mental and physical symptoms of depression; items range from the absence of depression symptoms to the presence of depression, and the total

score ranges from 0 to 63 (35). BDI-II is suitable for adolescents as well (36). BDI-II has good reliability (eg, test-retest $r = 0.93$) and validity (eg, $r = -0.87$ when correlated with the Brief Symptom Inventory [BSI]) in Iran (37).

3.2.4. Social Phobia and Anxiety Inventory

The Social Phobia and Anxiety Inventory (SPAI) has 45 items assessing the symptoms of social phobia and agoraphobia. The items are rated on a 7-point Likert-type scale, ranging from “never” to “always.” Turner et al. reported a test-retest reliability of 0.86 for the scale (38). SPAI is suitable for adolescents as well (39). SPAI has good reliability (eg, Cronbach $\alpha = 0.99$; test-retest $r = 0.95$) and validity (eg, $r = 0.86$ when correlated with the social anxiety) in Iran (40). In the present study, 32 items of the SPAI related to social phobia were used.

4. Results

All CFQ-CI items had normal limits skew and kurtosis (skew values < 3 and absolute kurtosis values < 8). Moreover, corrected item-total correlations (CITCs) were satisfactory. Exploratory factor analysis (EFA) was conducted using the principal components analysis with Varimax rotation. The values of the KMO coefficient (0.92) and Bartlett's test of sphericity (930.278, $P < .001$) provided sufficient evidence to conduct EFA. The results revealed CFQ-CI as a general factor. The eigenvalue greater than 1.0 was used to determine the number of factors; the results showed that the questionnaire explained 68.61% of the variance of the respective variable (eigenvalue = 4.80). Examination of the scree plot also confirmed the presence of 1 factor. Communalities and factor loadings are presented in Table 1. Communalities were acceptable.

A Cronbach α of 0.92 was found for CFQ-CI, indicating a good level of internal consistency (Table 2). Table 3 shows the correlations between CFQ-CI and other measures. There was a negative, significant association between CFQ-CI and SCS and its subscales. In addition, CFQ-CI was positively correlated with BDI-II and SPAI.

5. Discussion

The aim of the current study was to examine the validity and reliability of the Persian version of CFQ-CI in MS patients. The results of EFA revealed a 1-factor structure. This finding is consistent with the original version showing the 1-factor structure in patients with IBD (29). Given the nature of the medical illness, we used EFA, the results of which were largely in line with our predictions. These studies confirmed the definition of proposed cognitive fusion

(23) in MS patients. In other words, the 1-factor structure of CFQ-CI in non-clinical English-speaking populations, populations with mental disorders, and Portuguese patients with IBD is also applicable to the Iranian population. It shows the thoughts related to the patients' experiences of MS symptoms and MS as a chronic disorder.

The internal consistency of CFQ-CI, assessed by the Cronbach α coefficient, was found to be good. This finding agrees with our predictions and the findings of the original version (29), reporting high internal consistency estimates. However, in contrast to the results of IBD (29), test-retest reliability was not assessed in the present study.

CFQ-CI was positively related to depression and social anxiety symptoms and negatively related to SCS and its subscales. These results are consistent with the original version (29), showing the concurrent validity of CFQ-CI. The results showed a significant relationship of CFQ-CI with symptoms of IBD, psychological flexibility, chronic illness-related shame (CISS), and brooding (29). However, for the first time, we used the self-compassion construct to assess validity.

The results of the present study have clinical and theoretical applications. From the theoretical viewpoint, cognitive fusion is an important construct in ACT; the results of our factor analysis were consistent with those of non-clinical populations, patients with mental disorders, and patients with IBD. This provides early evidence of the extent of cognitive fusion in Iranian patients with MS. From the clinical viewpoint, our results can have implications for MS patients, and the questionnaire can be used to assess and monitor cognitive fusion during ACT.

This is the first study to assess the psychometric properties of CFQ-CI in MS patients; this can be seen as a strength of the present study. However, it also had some limitations. First, the data were collected using self-report questionnaires, which are vulnerable to certain biases. Second, a cross-sectional, descriptive design was used that cannot show causation. Third, we could only assess some types of validity and reliability. Therefore, further studies should be conducted to confirm the overall structure of the questionnaire, determine its association with other constructs, and assess the stability over time. Fourth, we did not use random sampling. Finally, the data were collected during the COVID-19 pandemic; therefore, due to fear of contracting COVID-19, some patients might avoid going to clinics, limiting the generalizability of our findings. Future studies are suggested to examine the association of CFQ-CI with symptoms of MS, other chronic illnesses, and related constructs in ACT, as well as to assess the test-retest reliability of CFQ-CI in MS patients.

Table 1. Item Means and Exploratory Factor Analysis Loadings for the Cognitive Fusion Questionnaire-Chronic Illness

| Items | Skew | Kurtosis | CITC | Factor loading | Communality |
|---|-------|----------|------|----------------|-------------|
| My thoughts about my illness cause me distress or emotional pain | -0.45 | -0.98 | 0.65 | 0.89 | 0.89 |
| Get so caught up in thoughts about my illness that I am unable to do the things that I most want to do | 0.14 | -1.34 | 0.85 | 0.87 | 0.87 |
| Over-analyze situations associated with my illness to the point where it is unhelpful to me | 0.14 | -1.36 | 0.72 | 0.84 | 0.84 |
| I struggle with my thoughts about my illness and/or symptoms | 0.16 | -1.35 | 0.81 | 0.83 | 0.83 |
| I get upset with myself for having certain thoughts about my illness | -0.10 | -1.38 | 0.73 | 0.80 | 0.80 |
| I tend to get very entangled in my thoughts relating to my illness and/or symptoms | 0.45 | -1.13 | 0.77 | 0.79 | 0.79 |
| It is such a struggle to let go of upsetting thoughts about my illness, even when I know that letting go would be helpful | 0.20 | -1.38 | 0.77 | 0.73 | 0.73 |
| Eigenvalue | | | | 4.80 | |
| Percentage of variance explanation | | | | 68.61 | |

Table 2. Internal Consistency and Other Psychometric Indices of Items of Cognitive Fusion Questionnaire-Chronic Illness

| Items | Values ^a | Correlated Whole Correction | Cronbach α by Removing Questions | Scale's Mean Score with Deleted Items | Squared Multiple Correlation |
|-------|---------------------|-----------------------------|---|---------------------------------------|------------------------------|
| 1 | 4.51 \pm 2.03 | 0.65 | 0.92 | 21.56 | 0.46 |
| 2 | 3.62 \pm 2.12 | 0.85 | 0.90 | 22.44 | 0.73 |
| 3 | 3.60 \pm 2.16 | 0.72 | 0.91 | 22.46 | 0.55 |
| 4 | 3.66 \pm 2.17 | 0.81 | 0.90 | 22.40 | 0.67 |
| 5 | 3.99 \pm 2.18 | 0.73 | 0.91 | 22.07 | 0.54 |
| 6 | 3.09 \pm 2.03 | 0.77 | 0.91 | 22.97 | 0.64 |
| 7 | 3.60 \pm 2.20 | 0.77 | 0.91 | 22.46 | 0.61 |

Abbreviation: CITC, corrected item-total correlations.

^a Values are expressed as mean \pm SD.

Table 3. Correlations Between CFQ-IC and Other Constructs^a

| Variables | CFQ |
|---------------------|---------|
| Compassion | -0.49** |
| Kindness | -0.23** |
| Judgment | -0.41** |
| Human commonalities | -0.25** |
| Isolation | -0.41** |
| Mindfulness | -0.22** |
| Over-identification | -0.40** |
| Depression | 0.54** |
| Social phobia | 0.50** |

^a **P < 0.01, *P < 0.05.

5.1. Conclusions

Overall, the results of the present study confirm the validity and reliability of CFQ-CI in MS patients, and it can be concluded that the questionnaire can be used for research

or clinical purposes in this group of patients.

Footnotes

Authors' Contribution: All authors contributed to the study concept and design. Data were collected by Pardis Sharifi; analyses were performed by Esmail Soltani, who wrote the first draft of the manuscript. All authors contributed to, reviewed, and approved the final manuscript.

Conflict of Interests: There is no conflict of interest.

Ethical Approval: The present research was approved by the Ethics Committee of Shiraz University of Medical Sciences.

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Informed Consent: All the participants signed written informed consent.

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