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# Psychometric Properties of the Persian Version of Modified Short Form of Changes in Outlook Questionnaire Following Disaster for Injured Athletes

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Original Article

## Abstract

**Introduction:** This study addresses the psychometric properties of the Persian version of the Changes in Outlook Questionnaire (CiOQ) questionnaire following disaster for injured athletes. CiOQ has been designed to measure both positive and negative changes following disaster. The aim of this study is to translate the short form of the questionnaire (CiOQ-S) into Persian and examine its validity and reliability in a sample of the injured athletes.

**Materials and Methods:** The 10-item English version of CiOQ was translated into Persian and completed along with the Hospital Anxiety and Depression Scale (HADS) in a sample of injured athletes deprived of competition (n = 207). Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to evaluate the construct validity. In addition, the Cronbach's alpha and split-half coefficients were applied to measure reliability. Moreover, the convergent validity was measured using the Pearson's correlation coefficient.

**Results:** The Persian version of CiOQ demonstrated a similar factor structure to that of the English version, high internal consistency, and convergent validity with measures of anxiety and depression support. The reliability obtained using the Cronbach's alpha and split-half coefficients were higher than 0.7 for both positive and negative changes. There was a negative correlation between positive change and depression ($P < 0.001$). However, there was a positive correlation between negative changes with anxiety and depression ($P < 0.001$).

**Conclusion:** Data indicated that the the Persian version of CiOQ is a reliable and valid measure for assessing positive and negative changes following an adversity.

**Keywords:** Outlook; Adversity; Athletes; Development; Assessment

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## Introduction

There is growing experimental evidence showing that positive psychological changes can result from stressful and traumatic events such as disasters (1), illnesses (2), rape and sexual harassment (3), military warfare (4), loss (5), injury (6), and recovery from substance addiction (7). The issue of progress through hardship and adversity has been considered in most experimental (8) and theoretical (9) studies.

In the background of recent psychological studies, the positive changes observed following highly stressful events have been variously described as post-traumatic growth, stress-related growth (11), prosperity (12), and hostile growth (9).

The positive and negative Changes in Outlook Questionnaire (CiOQ) is a tool designed to investigate positive and negative responses to stressful events (13). The long form of this questionnaire contains 26 items, 11 of which evaluating positive changes (CiOP). For example, one of the positive items is "I value my relationships more now" and the other 15 items evaluate negative changes (CiON), for instance, "I am no longer looking forward to the future." Each item is answered using a 6-point Likert scale, which varies from strongly disagree to strongly agree with scores ranging from 1 to 6, respectively. This questionnaire has been applied in studies with a wide variety of participants who had suffered from trauma, hardship, and adversity (14,15). Although the long form of CiOQ is a useful tool, it is relatively long with 26 items. Short forms save time and participants are more motivated to fill out the short forms than the long ones. Accordingly, the short form of the CiOQ

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questionnaire was designed, consisting of 10 items with 5 items measuring positive changes and 5 items measuring negative changes (16).

In previous studies, the psychometric properties of the short form of CiOQ have been confirmed. In these studies, it has been found that CiOQ consisted of two factors corresponding to the scales of changes in positive outlook and changes in negative outlook. Additionally, the internal consistency (IC) of both subscales of changes in the positive outlook and changes in the negative outlook was good (16,17).

The concurrent validity of CiOQ was calculated and confirmed by measuring the correlation of this questionnaire with the Hospital Anxiety and Depression Scale (HADS) (18), Impact of Event Scale-Revised (IES-R) (19), and the General Health Questionnaire-28 (GHQ-28) (20) (16,17).

The validity and reliability of this questionnaire was assessed for individuals who had experienced a traumatic event such as a severe accidents, fires or large explosions, violent crimes, natural disasters, unwanted sexual experiences, and war (16), as well as earthquake survivors (17). However, the validity and reliability of this questionnaire have not been evaluated for athletes who have been deprived of participating in a competition for which they have worked hard for years due to injuries. On the other hand, the capability of the questionnaires to be used in other geographical areas is subject to the approval of its psychometric properties in those areas (17). Therefore, the present study is conducted aiming to translate the short form of CiOQ into Persian and to examine its factor structure, validity, and reliability among injured athletes.

## Materials and Methods

The present study was a psychometric cross-sectional study in which the data were collected in spring and summer 2017 in Isfahan, Iran. Among experts, there is a discrepancy in the sample size for factor analysis, but it is suggested that 10 participants be studied for each item in factor analyses (21). Accordingly, 100 participants (for the 10 items of the questionnaire) were sufficient for the present study.

The study participants included 207 (68 girls and 139 boys) injured athletes who were excluded from participating in a competition due to injury (between 4-25 months after the injury). These athletes were from different sports (football, futsal, handball, basketball, hockey, volleyball, taekwondo, karate, kung fu, wrestling, gymnastics, cycling, and skating) with the age range of 15-29 years. The athletes were selected in such a way that the coaches of the various sports who worked at the championship level were asked to identify the athletes who had been excluded from the competitions due to injury. Then, an arrangement was made by phone with the athletes to participate in the study and an appointment was made. All participants completed their consent form to participate in the study and the research plan was approved by the Ethics Committee, Isfahan (Khorasgan) Branch, Islamic Azad University, with the code IR.IAU.KHUISF.REC.1398.090.

*Measurement tool:* In the present study, two questionnaires were used. One of the questionnaires was the short form of CiOQ developed by Joseph et al. This form includes 10 items and two subscales of positive changes and negative changes, with each subscale containing 5 items scored on a 6-point Likert scale from strongly disagree to strongly agree as 1 to 6, respectively. Thus, the range of scores of each subscale varies between 5 and 30, with higher scores indicating more positive and negative changes. Using a clinical sample, Joseph et al. reported satisfactory IC characteristics for both subscales as 0.76 and 0.83, respectively. They also reported that higher scores on the "negative change" scale were associated with higher scores on the "post-traumatic stress disorder sign" scale, and that positive changes were positively associated with the "post-traumatic growth list" (16).

Another instrument applied was HADS designed by Zigmond and Snaith as a very appropriate and practical self-report tool to examine anxiety and depression (18). This questionnaire is comprised of 14 terms and two subscales of anxiety and depression, which measure 7 items of anxiety and 7 items of depression. The questionnaire is scored on a 4-point Likert scale, with a score of 0-3 for each item. Higher scores indicate high levels of anxiety or depression. The score range for each subscale is between 0-21. The test-retest reliability of this questionnaire was 0.81 and 0.77 for anxiety and depression, and the Cronbach's alpha coefficient was 0.92 and 0.91 for anxiety and depression, respectively, indicating the reliability of this tool. Moreover, this tool is capable of distinguishing between healthy and unhealthy subjects (22).

*Method of implementation:* Once the project was approved in the ethics committee of Islamic Azad University of Isfahan (Khorasgan Branch) with the code IR.IAU.KHUISF.REC.1398.090 and permission was obtained from the original designer of the questionnaire, the short form of CiOQ (16) was translated into Persian and it was translated into English again to confirm its accuracy. This is one of the minimum requirements for intercultural adaptation of scales (17). The disputed translations were discussed and the discrepancies were resolved by two English speakers fluent in English. The translated version of

CiOQ was read to five athletes (17) and they could discuss the items without assistance, which indicated their correct understanding of them (17).

The 207 injured athletes (68 girls and 139 boys) who were disqualified from participating in the competitions due to injury were asked to complete the consent form, the Persian version of CiOQ, and HADS (18). The questionnaires were orally explained to the participants by the author and it was emphasized that all questionnaire items focused on the injury as a traumatic event to ensure that the variables were relevant to the exposure to injury. Furthermore, the items were rewritten according to the injury. For example, the statement "I will value my relationships more from now on," was rewritten as "After the injury, I value my relationships more."

In the present study, exploratory factor analysis (EFA) was employed to assess the construct validity and factor structure was investigated using confirmatory factor analysis (CFA). Besides, the Cronbach's alpha and split-half coefficients were utilized to determine the reliability and in both cases, a value of more than 0.7 was considered acceptable. Furthermore, the Pearson correlation test was exploited to evaluate concurrent validity. The calculations were performed using SPSS software (version 23, IBM Corporation, Armonk, NY, USA) and AMOS version 22 (Analysis of Moment Structures, IBM Corporation, North Castle, New York, USA).

The measurement model was assumed based on the EFA results and factor loads above 0.4 were considered desirable. In addition, the item correlation above 0.3, relative $\chi^2$ index between 1 and 5, and Tucker-Lewis index (TLI), comparative fit index (CFI), and parsimony normed fit index (PNFI) above 0.9 were considered to be appropriate. Moreover, the parsimony comparative fit index (PCFI) was considered above 0.6 and the root mean square error of approximation (RMSEA) was the most important index of overall fit (23). If the value of this index was less than 0.05, the model fitness was good, and if it was between 0.05 and 0.08, the fitness of the model was in the moderate level.

## Results

The demographic information of the participants is summarized in table 1.

**Table 1.** Demographic characteristics of participants

| Personal characteristics | | n (%) |
|---|---|---|
| Gender | Female | 68 (32.8) |
| | Male | 139 (67.1) |
| Type of sports | Volleyball | 9 (4.3) |
| | Basketball | 18 (8.6) |
| | Football | 37 (17.8) |
| | Futsal | 13 (6.2) |
| | Hockey | 16 (7.7) |
| | Taekwondo | 14 (6.7) |
| | Karate | 15 (7.2) |
| | Kung Fu | 16 (7.7) |
| | Wrestling | 11 (5.3) |
| | Handball | 9 (4.3) |
| | Skating | 28 (13.5) |
| | Cycling | 9 (4.3) |
| | Gymnastics | 12 (5.7) |
| | Mean ± SD | |
| Age (year) | Female | 4.14 ± 22.78 |
| | Male | 5.78 ± 24.64 |

To perform EFA, first the quality of the correlation matrix of the scale propositions as well as the sampling capability were examined. The value of the Bartlett's test of sphericity was equal to 901.537 which was significant at the level of 0.001. The Kaiser-Meyer-Olkin (KMO) coefficient for this analysis was 0.734. Thus, the information in the data matrix was significant and the sample size was suitable for factor analysis.

Based on the EFA results, using the principal components method and orthogonal rotation, two factors with eigenvalues greater than one were extracted, which in total, explained 56.49% of the variance of the whole scale. The first and second factors explained respectively 32.15 and 24.35% of the variance of the scale and the eigenvalues in each factor were confirmed as 3.64 and 2.08, respectively. The results of EFA and the items of the CiOQ questionnaire are given in table 2.

**Table 2.** Factor loads and the level of commonalities of the change in outlook items

| Items | Factor and propositions | Factor load | Commonalities |
|---|---|---|---|
| Factor 1: Negative change | | | |
| 1 | I am no longer looking forward to the future. | 0.876 | 0.753 |
| 2 | Life has no meaning for me anymore. | 0.898 | 0.832 |
| 7 | I trust less in others now. | 0.913 | 0.869 |
| 8 | I often feel skeptical. | 0.651 | 0.875 |
| 9 | I have little self-confidence now. | 0.660 | 0.888 |
| Factor 2: Positive change | | | |
| 3 | I know the value of life now. | 0.867 | 0.773 |
| 4 | I value my relationships more now. | 0.778 | 0.716 |
| 5 | I am now a more patient and understanding person. | 0.738 | 0.654 |
| 6 | I do not expect anything in vain. | 0.782 | 0.715 |
| 10 | I value others more now. | 0.748 | 0.721 |

As shown in table 2, in all items, the factor loads were greater than 0.4, additionally, the level of commonalities or correlation of the items was in the range of 0.654-0.888.

The measurement model based on the EFA results is demonstrated in figure 1.

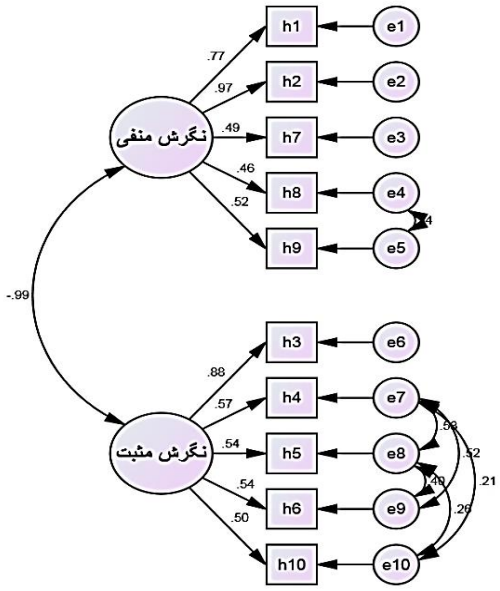


**Figure 1.** Confirmatory factor analysis (CFA) pattern of change of outlook

The general indices of pattern fit are presented in table 3.

**Table 3.** Fit indicators for pattern of measuring change of outlook

| Fitting indices | | Value |
|---|---|---|
| Absolute | $X^2$ | 142.586 |
| | DF | 41 |
| | P | |
| | Modified GOF index | 0.001 |
| Adaptive | TLI | 0.890 |
| | CFI | 0.899 |
| Parsimony | PCFI | 0.641 |
| | Relative $\chi^2$ | 3.47 |
| | RMSEA | 0.07 |

DF: Degree of freedom; GOF: Goodness of fit; TLI: Tucker-Lewis index; CFI: Comparative fitness index; PCFI: Parsimony comparative fit index; RMSEA: root mean square error of approximation

The results presented in table 3 indicate that in the model of measuring the change in outlook, the fit indices became desirable.

As it can be observed in this table, in the measurement model to evaluate CFA, all factor loads of the items were higher than 0.4 and significant and in all statements, $P < 0.001$.

The CFA results are given in table 4. As can be seen in the table, in the measurement model to investigate CFA, all factor loads of the items are higher than 0.4 and significant, and $P < 0.001$ in all statements indicates the desirability of the factor load is in all items.

**Table 4.** Results of confirmatory factor analysis (CFA) in the items of the Changes in Outlook Questionnaire (CiOQ)

| Statements | Standard estimation | Critical value | P |
|---|---|---|---|
| 1 | 0.772 | - | - |
| 2 | 0.973 | 16.51 | 0.001 |
| 7 | 0.485 | 10.42 | 0.001 |
| 8 | 0.462 | 6.69 | 0.001 |
| 9 | 0.516 | 7.57 | 0.001 |
| 3 | 0.881 | | |
| 4 | 0.571 | 11.52 | 0.001 |
| **5** | 0.538 | 9.95 | 0.001 |
| 6 | 0.537 | 9.88 | 0.001 |
| 10 | 0.504 | 6.98 | 0.001 |

The descriptive results of CiOQ and two-dimensional correlation are shown in table 5.

The reliability of the instrument used in the study using the Cronbach's alpha and split-half coefficients is indicated in table 6.

As can be seen in table 6, the reliability values obtained using the Cronbach's alpha and split-half coefficients for both positive and negative outlooks changes are higher than 0.7.

Table 7 displays the correlation between positive and negative changes with anxiety and depression.

## Discussion

This study was carried out to validate the "Short Form of CiOQ" in Persian to be used by experts who work with the Iranian population in the field of change of outlook after injury, misery, and trauma. Examination of the fit indices of the questionnaire showed that in general, the pattern of change of outlook had a good fit.

**Table 5.** Descriptive findings and correlation between negative and positive changes

| Dimensions | Mean ± SD | Minimum | Maximum | Correlation | P |
|---|---|---|---|---|---|
| Negative change | 11.82 ± 4.32 | 5 | 24 | 0.794 | 0.001 |
| Positive change | 23.65 ± 4.61 | 10 | 30 | | |

**Table 6.** Reliability coefficients of Changes in Outlook Questionnaire (CiOQ)

| Scale | Number of items | Cronbach's alpha | Split-half coefficient |
|---|---|---|---|
| Negative change | 5 | 0.837 | 0.656 |
| Positive change | 5 | 0.889 | 0.752 |

Given the findings, the factor load was desirable in all questions. Additionally, the two-component structure (positive changes and negative changes) of the questionnaire and thus, the construct validity of the questionnaire were confirmed. This finding is consistent with the findings of previous studies showing that CiOQ consists of two factors (13,16,17) and is in agreement with the scales of changes in positive outlook and changes in negative outlook.

**Table 7.** Correlation between positive and negative changes with anxiety and depression

| | Study variables | Anxiety | Depression |
|---|---|---|---|
| | | R | r |
| 1 | Positive change | 0.06 | -0.17* |
| 2 | Negative change | 0.34** | 0.63** |

*P < 0.050, **P < 0.010

The convergent validity was measured by measuring the relationship between positive and negative changes with anxiety and depression. The results revealed that negative changes in the individual's perspective following sports injury had a positive and significant correlation with anxiety and depression. Moreover, the results showed that positive changes in the individual's outlook after sports injury had a significant negative correlation with depression. Considering the contrasting nature of the positive and negative changes, it can be claimed that the negative and significant correlation coefficient between the two dimensions is indicative of a favorable divergent validity between the two dimensions of the questionnaire. This finding is consistent with the findings of a previous study that measured concurrent validity through the correlation between CiOQ and HADS (17).

Negative changes due to trauma have been found to be associated with post-traumatic stress (24). In a survey of 911 terrorist attacks in the United States, the negative changes measured by CiOQ were the most powerful predictors of increased depression and decreased mental health after the attack (25). From this finding, it can be inferred that sometimes with misfortunes, the individual's assumptions about himself, life, and the world are challenged and changed negatively, and this change can be one of the most destructive effects of experiencing misery (24). Furthermore, studies have shown that sometimes misfortunes can cause positive changes (8). Positive changes after injury and trauma make people feel better about themselves and others. These positive changes can occur in at least five ways (improving communication with others, identifying new possibilities for one's life, greater perception of personal development, psychological transformation, and greater knowledge of life) and contribute to better mental health (8). These results also confirm the idea that positive changes may help the individual to make a meaning for the traumatic event (24). The negative correlation found between positive change and depression in this study is consistent with the findings of previous studies (17,26,27). Besides, the finding of this study regarding the lack of a correlation between positive changes and anxiety is consistent with the previous review study (28).

Another finding of this study suggested that IC of both subscales of the questionnaire (positive and negative change) is good. This finding is in line with the findings of previous studies, which showed a good IC for these subscales (16-17).

## Limitations

Samples were selected using the convenience sampling method, which may not be ideal for a psychometric study.

## Recommendations

The short form of CiOQ can be applied in longitudinal studies to assess the relationship between positive and negative changes and psychological and physical performance indicators. The short form of CiOQ has been designed for researchers and clinicians to use it to examine the effectiveness of treatment techniques in creating positive changes in people with trauma. In this study, the psychometric properties of this questionnaire for injured athletes who failed to compete were confirmed. It is suggested that in order to use this questionnaire more widely, its psychometric properties be examined for other samples as well.

## Conclusion

Overall, the findings of this study indicate that the short form of CiOQ is a valid and reliable scale for assessing positive and negative changes after adversities and traumas. This questionnaire can be applied to assess positive and negative changes in the attitudes of individuals who have been injured as a result of sporting events.

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## Authors' Contribution

Rokhsareh Badami: Study design and ideation, executive services of the study, data analysis, statistics services, manuscript preparation, verification and submission of the article, responsibility for responding, and financing the study.

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## Conflict of Interest

There was no conflict of interest.

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