1. Introduction

Emotions are often expressed in many ways, and many studies have shown that suppressing emotions can cause illness. Both patients and physicians have recently considered emotions in the treatment process. For the basic human emotions, theoreticians have commonly put forward “fear”, “anger”, “dislike”, “grief”, “joy”, and “surprise”; nevertheless, a few more emotions have been added by subsequent new theories.

However, there is some difficulty in explaining feelings in terms of East Asian culture and society because of the Western origin of these theories. Korean researchers have begun to study emotional awareness and the acceptance of emotions for both patient and physician treatment. Yoon et al. pointed out that there was a connection between the emotions, physical organs, and diseases caused by emotions in the oriental medicine literature, but no specific study has been conducted on how this works. Sung revealed seven emotions known as Chiljeong: joy, anger, thought, depression, sorrow, fear, and fright. It is interesting that the list of oriental emotions contains “thoughts”, which are not regarded as emotions in the West. Since it is hard to explain personality disorders using the oriental view of Chiljeong, it is necessary to properly grasp Chiljeong. In terms of oriental medicine, Lee et al. defines human emotions centered on Chiljeong as they appear in the Dongguk Bogam. In addition, each emotion was linked to certain physical impairments. There is a need to develop a standardized...
questionnaire that can measure Chiljeong from an oriental point of view.

Lee et al.\(^{10}\) conducted a preliminary study to develop a core emotional evaluation scale based on oriental medicine’s concept of Chiljeong. First, six people formed an advisory committee and an expert panel, and the operational definitions of the seven emotions (Chiljeong) were set through a literature survey and consultation with the expert group. Afterward, Korean medicine experts in neuropsychiatry developed a questionnaire consisting of 100 items based on a predeveloped questionnaire for measuring emotions. Several studies have identified the emotional characteristics of patients with panic disorder,\(^{11}\) insomnia,\(^{12}\) cancer,\(^{13}\) and facial paralysis\(^{14}\) using the core emotional assessment tool. Although the reliability and usability of this questionnaire were high, the number of items limited clinical use. Therefore, the purpose of this study was to develop and evaluate the reliability and validity of the short form of the Core Seven Emotions Inventory (CSEI).

2. Participants and methods

2.1. Participants

The participants were third-grade students from the College of Korean Medicine W University. They were studying to become preliminary a Korean Medicine Doctor. We used convenience sampling methods and a voluntary based approach. The participants were informed of the reason for developing the CSEI short form (CSEI-s) for Korea. We excluded students who had a conflict of interest with the researchers. Rewards were made based on Institutional Review Board standards. We proceeded with the study with the approval of the IRB (WMCSB7302-201603) of W University OO Hospital.

2.1.1. CSEI-s

First, the original CSEI instrument was used to develop and identify factors via an exploratory factor analysis. Second, 30 items of the CSEI were selected based on the items extracted by the exploratory factor analysis, and 50 items were selected by two Korean psychiatrists. Third, the internal consistency coefficient was calculated to verify the reliability of the short form CSEI. After excluding two items with low factor loadings, a correlation analysis was conducted between the short form CSEI and the visual analogue scale (VAS) to verify the validity of the Korean version of the CSEI-s. Finally, verification of the differences between factors was performed to investigate the differences between the factors in each of the configuration factors.

As a preliminary evaluation item, we used the core emotional evaluation scale developed by Lee et al.\(^{10}\) on 200 people. Afterward, the VAS was used to ensure the validity of the measurement instrument.

2.2. Data analysis procedure

In this study, an exploratory factor analysis applying factor extraction using principal axis factoring and the factor rotation method using the varimax technique was conducted to re-examine the factor structure of the original CSEI. Through the exploratory factor analysis, factor extraction criteria were set as a factor loading of 0.4 or more and a commonality of 0.6 or more. This led to the removal of items with a very low factor loading and those that were ambiguously distributed across multiple factors.\(^{15}\)

The Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) was used as an index for the analysis results.

Statistical analyses were completed using SPSS 22 (IBM Corp., Armonk, NY, USA). The missing values were excluded using a listwise deletion equation.

3. Results

A 178 among 200 initial participants were included in the analysis after excluding 22 inappropriately responding participants.

### Table 1

| Item          | 1        | 2        | 3        | 4        | 5        | 6        | 7        | Commonality |
|--------------|----------|----------|----------|----------|----------|----------|----------|-------------|
| Fright 4     | 0.89     | 0.09     | 0.10     | 0.05     | -0.00    | 0.08     | 0.16     | 0.85        |
| Fright 9     | 0.89     | 0.09     | 0.16     | 0.04     | 0.04     | 0.11     | 0.16     | 0.88        |
| Fright 2     | 0.87     | 0.16     | 0.04     | 0.10     | -0.01    | 0.01     | 0.11     | 0.80        |
| Fright 7     | 0.84     | 0.16     | 0.13     | 0.03     | 0.07     | -0.05    | 0.21     | 0.80        |
| Sorrow 9     | 0.15     | 0.86     | 0.12     | -0.06    | 0.18     | 0.23     | -0.03    | 0.85        |
| Sorrow 4     | 0.09     | 0.82     | 0.11     | -0.01    | 0.18     | 0.11     | 0.11     | 0.73        |
| Sorrow 10    | 0.22     | 0.80     | 0.19     | 0.02     | 0.16     | 0.11     | 0.04     | 0.76        |
| Sorrow 12    | 0.10     | 0.74     | 0.01     | -0.07    | 0.29     | 0.25     | 0.01     | 0.71        |
| Anger 10     | 0.07     | -0.04    | 0.87     | 0.05     | 0.12     | 0.09     | 0.06     | 0.79        |
| Anger 6      | 0.07     | 0.12     | 0.86     | 0.14     | -0.02    | 0.06     | -0.03    | 0.78        |
| Anger 14     | 0.18     | 0.09     | 0.80     | 0.09     | 0.15     | 0.11     | 0.12     | 0.73        |
| Anger 15     | 0.13     | 0.25     | 0.65     | -0.04    | 0.06     | 0.21     | -0.08    | 0.55        |
| Joy 17       | 0.08     | -0.06    | 0.02     | 0.84     | -0.09    | 0.04     | -0.07    | 0.72        |
| Joy 4        | 0.11     | 0.08     | 0.03     | 0.77     | -0.08    | 0.00     | 0.12     | 0.63        |
| Joy 12       | -0.03    | 0.07     | 0.18     | 0.75     | -0.23    | -0.16    | 0.03     | 0.68        |
| Joy 14       | 0.02     | -0.26    | 0.01     | 0.75     | -0.12    | 0.13     | -0.19    | 0.71        |
| Depression 2 | 0.05     | 0.19     | 0.00     | -0.14    | 0.77     | 0.06     | -0.01    | 0.69        |
| Depression 8 | -0.11    | 0.15     | 0.28     | -0.16    | 0.74     | 0.10     | 0.11     | 0.69        |
| Depression 1 | 0.17     | 0.18     | -0.08    | -0.04    | 0.74     | 0.04     | 0.18     | 0.67        |
| Depression 10| -0.061   | 0.25     | 0.21     | -0.21    | 0.70     | 0.02     | 0.05     | 0.63        |
| Thought 7    | 0.04     | 0.10     | 0.03     | 0.07     | 0.07     | 0.83     | -0.05    | 0.67        |
| Thought 2    | -0.07    | 0.29     | 0.29     | -0.18    | -0.04    | 0.69     | 0.27     | 0.75        |
| Thought 4    | 0.03     | 0.25     | 0.33     | -0.10    | 0.07     | 0.69     | 0.33     | 0.76        |
| Thought 6    | 0.09     | 0.22     | 0.11     | 0.10     | 0.10     | 0.65     | 0.18     | 0.52        |
| Fear 2       | 0.17     | 0.04     | -0.03    | -0.04    | -0.05    | 0.02     | 0.79     | 0.64        |
| Fear 6       | 0.15     | 0.03     | 0.10     | 0.16     | 0.09     | 0.28     | 0.73     | 0.67        |
| Fear 1       | 0.21     | 0.10     | 0.02     | -0.12    | 0.17     | 0.06     | 0.64     | 0.49        |
| Fear 10      | 0.20     | -0.23    | 0.01     | -0.11    | 0.33     | 0.35     | 0.52     | 0.61        |
| Eigenvalue   | 6.72     | 3.68     | 2.77     | 2.19     | 1.92     | 1.45     | 1.01     | 1.04        |
| Explained variance | 23.99    | 13.14    | 9.90     | 7.82     | 6.84     | 5.17     | 3.60     | 70.46       |
| Cumulative explained variance % | 23.99    | 37.13    | 47.02    | 54.85    | 61.69    | 66.85    | 70.46    |             |
Leaving out the two participants who did not state their gender, 106 respondents were men (59.6%) and 70 were women (39.3%), together possessing a mean age of 24.47. The exploratory factor analysis of the 28 items of the seven factors of the CSEI-s showed that the factor loadings were as high as 0.64 to 0.89, excluding the tenth item of fear (0.52). Additionally, the fitted model also had a good confirmatory factor analysis result (Table 1).

Table 2 shows the results of the reliability verification. Cronbach α values of all seven subscales of the short form CSEI scale were reported as 0.7 or higher, and the overall reliability was 0.83. The descriptive statistics applied in this study were the mean as the local measurement, standard deviation as the dispersion measurement, and skewness and kurtosis as the degrees of distortion of the normal distribution. When skewness for satisfying normality was based on the absolute value 3 and kurtosis was based on 7, this inventory satisfied normality (Table 2). The correlation analysis with the VAS evaluated the validity as 0.86–0.94, indicating that more than 80% of the variance could be explained and was statistically significant (Table 3).

### 4. Discussion

The purpose of this study was to develop a short form of the CSEI to improve the clinical usage of the CSEI. In the end, 28 items with high loadings were selected by factors based on the factor loadings and cumulative distribution explanations. The reliability and validity of the short form of the CSEI was high for measuring the core emotions.

The limitations of this study and suggestions for future research are as follows. First, selection bias may exist because the participants were students and not clinical patients. As such, future studies should consider investigating clinical patients. Second, screening tests were conducted by an oriental medicine neurologist, a clinical counselor, and a scale development expert in order to extract and simplify the items of the CSEI. Therefore, a procedure should be developed to collect the opinions of experts who will use the CSEI in clinical practice. Third, the CSEI was developed by Korean medical experts, but future studies should consider the application of this inventory to Western medical clinical practice.

In conclusion, CSER-s may use as a tool to measure the key emotions more easily and effectively in clinical practice.

### Supplementary

Supplementary 1 is the actual questionnaire for the Core Seven Emotions Inventory Short Form. Supplementary 2 is an example of a clinical graphical representation of the results.

### Funding

This study was supported by the research program of the Korea Institute of Oriental Medicine (K18900) and the Korea Health Industry Development Institute (HB16C0021).

### Availability of data

To access the data, please send an email to sasayayou@naver.com.

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Table 2
**CSEI-s Reliability Analysis and Technical Statistics of the Main Factors**

| Factors  | Items         | Item number | Cronbach α | M    | SD  | Skewness | Kurtosis |
|----------|---------------|-------------|------------|------|-----|----------|----------|
| Joy      | 4, 12, 14, 17 | 4           | 0.814      | 12.54| 3.57| -0.427   | -0.202   |
| Anger    | 6, 10, 14, 15 | 4           | 0.851      | 7.14 | 3.44| 1.215    | 1.402    |
| Thought  | 2, 4, 6, 7    | 4           | 0.818      | 12.20| 4.00| 0.013    | -0.790   |
| Depression| 1, 2, 8, 10  | 4           | 0.771      | 6.04 | 2.57| 1.177    | 1.074    |
| Sorrow   | 4, 9, 10, 12  | 4           | 0.898      | 9.36 | 4.00| 0.566    | -0.469   |
| Fear     | 1, 2, 6, 10   | 4           | 0.731      | 10.09| 3.67| 0.309    | -0.629   |
| Fright   | 2, 4, 7, 9    | 4           | 0.931      | 7.89 | 4.30| 1.106    | 0.399    |
| Total    |               |             |            | 28   |     | 0.860    |          |

Table 3
**Visual Analogue Scale (VAS) and Short Form CSEI Correlation Analysis**

|       | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1     | 1   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 2     | 0.12| 1   |     |     |     |     |     |     |     |     |     |     |     |     |
| 3     | -0.04| 0.38| 1   |     |     |     |     |     |     |     |     |     |     |     |
| 4     | -0.31| 0.20| 0.25| 1   |     |     |     |     |     |     |     |     |     |     |
| 5     | -0.11| 0.31| 0.46| 0.45| 1   |     |     |     |     |     |     |     |     |     |
| 6     | -0.08| 0.15| 0.41| 0.27| 0.16| 1   |     |     |     |     |     |     |     |     |
| 7     | 0.10| 0.26| 0.11| 0.12| 0.30| 0.39| 1   |     |     |     |     |     |     |     |
| 8     | 0.69| -0.07| -0.07| -0.3| -0.23| -0.22| -0.00| 0.23| 1   |     |     |     |     |     |
| 9     | -0.05| 0.28| 0.15| 0.07| 0.10| -0.03| -0.21| -0.11| 1   |     |     |     |     |     |
| 10    | -0.03| 0.22| 0.49| -0.05| 0.12| 0.09| -0.10| 0.00| 0.23| 1   |     |     |     |     |
| 11    | -0.41| 0.17| 0.35| 0.51| 0.59| 0.06| -0.03| -0.41| 0.28| 0.35| 1   |     |     |     |
| 12    | -0.23| 0.09| 0.21| 0.08| 0.43| 0.08| 0.03| 0.20| 0.14| 0.31| 0.50| 1   |     |     |
| 13    | 0.13| 0.27| 0.13| -0.06| 0.15| 0.29| 0.29| 0.17| 0.24| -0.01| 0.05| 0.21| 1   |     |
| 14    | 0.17| 0.32| 0.27| -0.10| 0.08| 0.30| 0.36| 0.22| 0.17| 0.18| 0.04| 0.24| 0.58| 1   |
| M     | 12.54| 7.14| 12.20| 6.04| 9.36| 10.09| 7.89| 6.46| 3.47| 6.86| 3.80| 2.49| 0.87| 1.40|
| SD    | 3.57| 3.44| 4.00| 2.57| 4.00| 3.67| 4.30| 1.77| 2.70| 2.13| 2.79| 2.58| 1.56| 2.10|

1. Joy; 2. Anger; 3. Thought; 4. Depression; 5. Sorrow; 6. Fear; 7. Fright; 8. VAS_Joy; 9. VAS_Anger; 10. VAS_Thought; 11. VAS_Depression; 12. VAS_Sorrow; 13. VAS_Fear; 14. VAS_Fright.

† p < 0.05.

1 p < 0.01.
Conflicts of interest

The authors declare that they have no conflicts of interest.

Acknowledgement

This study was supported by a grant from Wonkwang University and the research program of the Korea Institute of Oriental Medicine (K18900), and the Korea Health Industry Development Institute (HB16C0021).

Appendix I. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.imr.2019.04.003.

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