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# Translation and Validation of the Japanese Version of the Family Sense of Coherence Scale-Short Form in Nurses

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## Abstract

**Purpose:** The purpose of this study was to translate the Family Sense of Coherence Scale-short form (FSOC-S) into a Japanese version (J-FSOC-S) for Japanese nurses and to evaluate its reliability and validity. **Methods:** First, we obtained permission to translate the FSOC-S from the original author and translated it into Japanese using the translation/back translation technique. Second, the J-FSOC-S was reviewed by a panel of experts in nursing research and practice, then, a validation survey was conducted. The internal consistency of the J-FSOC-S was assessed using Cronbach's $\alpha$ coefficient. Test-retest reliability was examined through intra-class correlation coefficients (ICC). Construct validity was investigated by measuring the correlation coefficients between the J-FSOC-S and Sense of Coherence (SOC) Scale (concurrent validity) and the Family Adaptability Partnership, Growth, Affection, and Resolve Index (Family APGAR) (convergent validity). **Results:** A total of 374 nurses (valid response rate = 58.6%) were recruited from seven hospitals. Thirty-four participants completed the questionnaire twice at an interval of 2 - 4 weeks to test the reliability. The mean age of the participants was 35.0 years (SD = 7.6, range = 25 - 59). The mean years of experience as a registered nurse were 11.0 years (SD = 7.1, range = 5 - 36). Of the total number of participants, 53.7% had children. The J-FSOC-S showed good internal consistency (Cronbach's $\alpha$ = 0.85) and test-retest reliability (ICC = 0.77). The J-FSOC-S correlated positively with the SOC Scale (r = 0.41, p < 0.01) and the Family APGAR (r = 0.62, p < 0.01). **Conclusions:** The J-FSOC-S is a reliable and valid instrument for measuring family sense of coherence in Japan.

## Keywords

Family Sense of Coherence, Psychometric Testing, Nurses

## 1. Introduction

Sense of coherence (SOC) reflects a person's ability to cope with stressful situations in life. SOC is defined as the perception that various events and immediate environments that arise in a person's life are coherent, and is composed of the subordinate concepts of meaningfulness, manageability, and comprehensibility [1]. The international scale for SOC has been translated into over 30 languages and is widely used [2]. The concept of SOC applies not just to people, but also to social units in the form of groups, such as cities, nations, organizations, and even families [1]; however, research on the SOC of groups is still in development [3]. Family Sense of Coherence (FSOC) is an adaptation of Antonovsky's concept of SOC to families. FSOC reflects the ability of families to cope with stress that they face as a group, and the FSOC Scale is used, for example, as a metric in interventional studies of protective factors against childhood obesity for low-income preschool children [4] and of families with a critically ill family member [5], and is also used as a buffering factor for internalized stigma and health-related quality of life (QOL) in schizophrenia [6]. The original FSOC Scale is comprised of 26 items, and a short version with 12 items (FSOC-S) rated on a 7-point scale has also been developed [7]. The total score in the short version ranges from 12 to 84 and a higher score reflects better perceptions of the coherence of family. The FSOC has been translated into Chinese [8], Turkish [9], and Norwegian [10] and its validity has been confirmed.

Nurses' ability to cope with stress is a factor that influences their QOL and has been reported in many studies internationally [11]-[15]. SOC has also been reported to be a predictor of nurses' QOL [16]. Furthermore, mid-career nurses often take on many roles within their family, such as caring for children, making work-family conflict (WFC) an issue. Especially in Asia, strong value is placed on family roles. In an international comparative study of the QOL of nurses in Japan, Singapore, and Malaysia, SOC was, as with social support, a predictor of nurses' QOL [17]. WFC has an impact on the mental and physical health of Japanese nurses and SOC is a buffering factor for WFC-related stress [18]. Accordingly, the development of a Japanese language version of a scale that can easily measure the SOC of families might contribute to the development of this field of research. The purpose of this study was to translate the FSOC-S [7] into a Japanese version (J-FSOC-S) for Japanese nurses and to evaluate its reliability and validity.

## 2. Methods

### 2.1. Translation and Back-Translation of the Family Sense of Coherence Scale

We obtained permission to translate the FSOC-S from the original author, Dr. ShifraSagy. After that, we translated the FSOC-S from English into Japanese and then used the back-translation technique to translate it back into English [19]. The cultural equivalence of the J-FSOC-S was verified by an expert panel com-

posed of an academic researcher in family nursing who received a Ph.D. in the United States, a translator specializing in medicine, and five academics with nursing experience in Japan. The Japanese version was back-translated into English by a translation specialist who never saw the original English version. We compared the back-translated version to the original version and Dr. Sagy also checked the back-translated version and requested revision to one item. We then conducted a pilot test on a convenience sample of 20 licensed nurses. These 20 nurses found some of the questions or response choices difficult to understand (items 1, 2, 5, 9, 10). Therefore, we altered these items to more closely match the original English version. Dr. Sagy approved the final version of the J-FSOC-S.

## 2.2. Validation Survey

We conducted a cross-sectional study in regional hospitals in Japan using a self-administered questionnaire to evaluate the reliability and validity of the J-FSOC-S. The reliability of the J-FSOC-S was assessed for internal consistency and test-retest reliability. A 2- to 4-week interval was used for test-retest reliability to assess the stability of the scale. Construct validity was examined by testing the correlation between the J-FSOC-S and conceptually related measures, including the SOC Scale [20], and the Family Adaptability Partnership, Growth, Affection, and Resolve Index (Family APGAR) [21]. Positive correlations were expected between J-FSOC-S scores and scores of the SOC Scale and the Family APGAR. Nurses who experienced a strong sense of difficulty with their role of caring for children in their family were also subject to an examination of known-groups validity based on the hypothesis that the family's FSOC was low.

## 2.3. Participants

We recruited nurses from seven medical facilities in Japan between January and February 2018. The inclusion criterion was nurses with more than 5 years of clinical experience. The exclusion criteria were nurses in a managerial position, foreign nationals, and nurses on maternity leave, childcare leave or nursing care leave. We asked representatives of the seven facilities to select participants who met the inclusion criteria, and to distribute and collect the questionnaires.

## 2.4. Ethical Considerations

This study was approved by the Institutional Review Board of Osaka University (No. 17269). All participants were informed in writing about the purpose of the study, that all responses were anonymous, that individual participants could not be identified, that they could drop out at any time without penalty, and that there was no disadvantage to choosing not to participate or leaving blank answers in the questionnaire.

## 2.5. Measures

The questionnaire contained items on the participants' demographic characte-

ristics, as well as the J-FSOC-S, SOC Scale, and the Family APGAR. Demographic characteristics of the participants consisted of sex, age, the number of years of clinical experience, experience as an administrator, family nursing experience, the number of years of family nursing, presence of a partner, presence of children, difficulty with childcare, experience caring for a family member and educational background.

### 2.5.1. Japanese Version of the Family Sense of Coherence Scale

The FSOC-S is a short version of the 26-item FSOC [22] and was designed to assess the degree to which the family views their environment as comprehensible, manageable, and meaningful [7]. It consists of 12 semantically different items rated on a 7-point scale. Total scores range from 12 to 84, with higher scores indicating a family's stronger perception of the coherence of family life.

### 2.5.2. Sense of Coherence Scale

The SOC Scale consists of 29 items designed to assess an individual's global view that their environment is comprehensible, manageable, and meaningful [20]. A 13-item version of the SOC has been developed and translated into several languages, with good internal consistency, test-retest reliability, and construct and criterion validity [2] [20]. Each item is scored on a 7-point semantic differential with two anchoring phrases. Total scores range from 13 to 91, with higher scores reflecting a stronger SOC. The Japanese version of the 13-item SOC has shown satisfactory reliability (Cronbach's $\alpha = 0.81$) and validity [23].

### 2.5.3. Family APGAR

The Family APGAR was developed by Smilkstein in 1978 [24]. It is a reliable, validated, utilitarian instrument to measure a subject's satisfaction with five components of family function: adaptation, partnership, growth, affection, and resolve. Higher scores indicate higher family functioning. Reliability and validity of this instrument have been reported previously [25]. The Japanese version of the Family APGAR was used in this study [21].

### 2.5.4. Data Analysis

Descriptive statistics for all variables were calculated by using SPSS ver.24 for Windows. The internal consistency of the J-FSOC-S was assessed by Cronbach's $\alpha$ coefficient. The test-retest reliability between the initial questionnaire and follow-up questionnaire 2 to 4 weeks later was calculated using the intra-class correlation coefficient (ICC). The construct validity of the scale was examined by calculating Spearman's rank correlation coefficient between the J-FSOC-S and the SOC Scale (concurrent validity) and the Family APGAR (convergent validity). Results were considered to be statistically significant where $p < 0.05$.

## 3. Findings

### 3.1. Participant Characteristics

Questionnaires were distributed to 638 nurses from seven medical facilities and

480 nurses responded (response rate = 75.2%). The seven medical facilities were located in cities ranging in population size from 2.7 million people to provincial cities of 35,000 people. One facility was an advanced treatment hospital. The mean number of beds was 585 (range: 199 - 1063). The nurses' affiliated departments are as shown in Table 1. The majority of "Other" departments were mixed wards. Valid responses were received from 374 nurses (valid response rate = 58.6%). Only 100 nurses from one facility were asked to participate in the test-retest and 34 participants completed the test-retest reliability study. The characteristics of participants are shown in Table 1. The mean age of the participants was 35.0 years (SD = 7.6, range = 25 - 59 years). The majority of the participants (93.0%) were female. The mean length of clinical experience was 11.0 years (SD = 7.1, range = 5 - 36 years). In addition, 53.7% were nurses currently providing child care, approximately 80% of whom experienced child care-related difficulties.

## 3.2. Score Distribution and Acceptability

The average scores ± SD of the J-FSOC-S items are shown in Table 2. The J-FSOC-S showed signs of a ceiling effect in items 1 and 8. Homogeneity was explored by corrected item-total correlations. Item-total correlations of the 12 items ranged between 0.41 - 0.71, which indicated satisfactory homogeneity of the items. Figure 1 shows a histogram of total score distribution of the J-FSOC-S.

## 3.3. Reliability and Validity

Cronbach's *a* coefficient of the J-FSOC-S was 0.85, indicating adequate internal consistency. The intra-class correlation coefficient was 0.77, indicating satisfactory stability of the J-FSOC-S over a 2- to 4-week period (Table 3).

The mean score of the J-FSOC-S was 58.0 (SD = 11.2). The J-FSOC-S scores correlated positively with the SOC Scale (r = 0.41, p < 0.01) and the Family APGAR (r = 0.62, p < 0.01) (Table 3). These results indicate the construct validity of the J-FSOC-S.



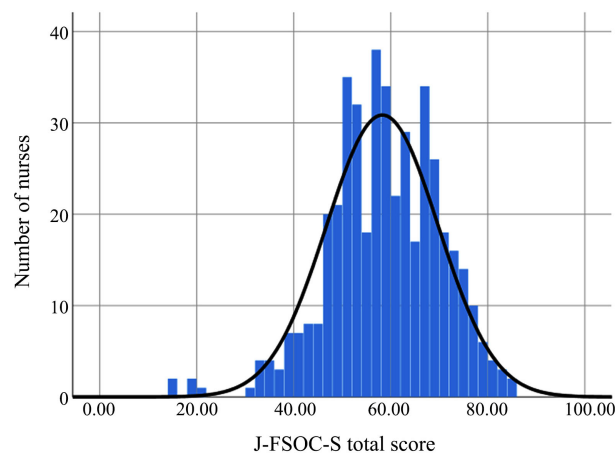**Figure 1.** Total score distribution of the J-FSOC-S.

Table 1. Participant characteristics (N = 374).

|  | n, % or mean ± SD (range) |
|---|---|
| Mean age ± SD (years) | 35.0 ± 7.6 (25 - 59) |
| Sex |  |
| Male | 26 (7.0%) |
| Female | 348 (93.0%) |
| Mean clinical experience (years) | 11.0 ± 7.1 (5 - 36) |
| Experience as a nurse manager |  |
| Yes | 54 (14.4%) |
| No | 320 (86.5%) |
| Presence of a partner |  |
| Yes | 206 (55.1%) |
| No | 168 (44.9%) |
| Presence of children |  |
| Yes | 201 (53.7%) |
| No | 173 (46.3%) |
| Difficulty with childcare |  |
| Very difficult | 51 (25.4%) |
| Difficult | 111 (55.2%) |
| Not difficult | 32 (15.9%) |
| None | 7 (3.5%) |
| Educational background |  |
| 2-year diploma program | 36 (9.6%) |
| 3-year diploma program | 207 (72.7%) |
| Junior college | 19 (5.1%) |
| University | 83 (22.2%) |
| Graduate school | 5 (1.3%) |
| Other | 24 (6.4%) |
| Affiliated department |  |
| Outpatient department | 31 (8.3%) |
| Obstetrics department | 26 (7.0%) |
| Emergency department | 23 (6.1%) |
| Gastrointestinal department | 20 (5.3%) |
| Intensive care unit | 18 (4.8%) |
| Neonatal intensive care unit | 18 (4.8%) |
| Surgery department | 18 (4.8%) |
| Orthopedic surgery department | 17 (4.5%) |
| Operating room | 16 (4.3%) |
| Cardiovascular department | 14 (3.7%) |
| Internal medicine department | 14 (3.7%) |
| Neurosurgery department | 14 (3.4%) |
| Respiratory department | 13 (3.5%) |
| High care unit | 10 (2.7%) |
| Pediatric department | 10 (2.7%) |
| Other | 112 (29.9%) |

SD: standard deviation.

**Table 2.** J-FSOC-S items and scores.

| Item No. | | J-FSOC-S score (mean ± SD) | I-T Correlation |
|---|---|---|---|
| 1 | To what extent do you think that you have influence on what happens to your family? | 5.73 ± 1.43 | 0.53** |
| 2 | When you need to do things that require collaboration from all family members, your feeling is …? | 5.54 ± 1.24 | 0.67** |
| 3 | Up to now, your family life has been …? | 4.67 ± 1.60 | 0.67** |
| 4 | To what extent do you think that your family's rules and norms are clear? | 3.91 ± 1.57 | 0.41** |
| 5 | When your family has a big problem, your feeling is …? | 4.11 ± 1.40 | 0.48** |
| 6 | Your family life is …? | 4.18 ± 1.56 | 0.70** |
| 7 | To what extent do you see a clear future for your family and how do you expect to see your family in 3 years? | 4.03 ± 1.65 | 0.62** |
| 8 | Do you feel that your family treats you fairly? | 5.93 ± 1.40 | 0.57** |
| 9 | When you think about your family, your feeling is …? | 5.55 ± 1.34 | 0.71** |
| 10 | The activities you do as part of your family responsibilities cause you …? | 5.39 ± 1.36 | 0.70** |
| 11 | Do you sometimes feel that you don't have a clear idea of what is going to happen in your family? | 4.28 ± 1.73 | 0.64** |
| 12 | Has a family member you trusted ever disappointed you? | 4.91 ± 1.70 | 0.59** |

SD: standard deviation; I-T Correlation: item-total correlation. ** $p < 0.01$.

**Table 3.** Internal consistency, test-retest correlation, and correlations of the J-FSOC-S with the SOC Scale and Family APGAR Index.

| J-FSOC-S | Cronbach's $\alpha$ | ICC | SOC Scale | Family APGAR Index |
|---|---|---|---|---|
| Total sample (N = 374) | 0.85 | 0.77** | 0.41** | 0.62** |

J-FSOC-S: Japanese version of the Family Sense of Coherence Scale-Short Form; SOC Scale: Sense of Coherence Scale, Family APGAR Index: Family Adaptability Partnership, Growth, Affection, and Resolve Index; ICC: intra-class correlation coefficient. ** $p < 0.01$.

Of the 374 nurses, the 201 nurses currently providing child care were subject to an examination of known-groups validity. A one-way analysis of variance was used to compare the nurses organized into three groups based on their level of child care-related difficulty (very difficult, difficult, and not difficult + none). The results showed significant differences in the J-FSOC-S score ($F_{(2,199)} = 8.035$, $p < 0.01$). A multiple comparison test revealed that nurses who responded with "very difficult" or "difficult" in relation to child care-related difficulty had significantly lower J-FSOC-S scores than nurses who had no difficulty. This validated the hypothesis that a low J-FSOC-S score is associated with a poorer ability of families to cope with child care-related stress as a group and a greater sense of child care-related difficulty.

## 4. Discussion

We translated the FSOC-S into Japanese, and analyzed its validity and reliability. Cronbach's $\alpha$ coefficient was calculated as a measure of internal consistency, and

a value between 0.7 and 0.9 is generally considered to indicate good internal consistency. The results of the present study indicate a high level of similarity among the items. The stability of the J-FSOC-S analyzed with test-retest was found to be good. The ICC in the present study 0.77 was similar with Ngai's study of the Chinese version 0.75 [8] and with Moen's study of the Norwegian version 0.85 [10] and Cecen's study of the Turkish version 0.85 [9].

The J-FSOC-S was positively correlated with the SOC Scale, demonstrating that the J-FSOC-S contained concurrent validity. This result is congruent with previous studies that found a significant association between family and individual SOC [7] [10] [26]. The J-FSOC-S was also positively correlated with the Family APGAR. Previous studies measured the correlation between the FSOC and various family functioning measures, such as the Medical Outcome Study Family and Marital Functioning Measures [8] and Family Assessment Device [9] [10], to investigate the convergent validity. These previous studies indicate similar findings to the present study, indicating that the J-FSOC-S is a valid tool to evaluate family function.

The results of this study support the reliability and validity of the J-FSOC-S. This scale can be used to evaluate family SOC in Japanese nurses. The mean age of the participants was 35.0 years (SD = 7.6, range = 25 - 59). This was similar to the age of the participants in Ngai's study [8], in which an FSOC scale was developed for Chinese childbearing couples. The participants of the present study were nurses, half of whom were providing child care. Considering that a person's SOC develops until they are in their 30s [1], FSOC may also be expected to develop as families overcome the challenges associated with child care. The J-FSOC-S developed in the present study could be used in research that will contribute to the mental and physical health of Japanese nurses.

## 5. Conclusion

We developed a Japanese version of the FSOC Scale, which we trialed in 374 Japanese nurses. This study had one limitation. A ceiling effect was seen in item 1, "To what extent do you think that you have influence on what happens to your family?" and in item 8, "Do you feel that your family treats you unfairly?" which correspond to the subordinate concept of "sense of manageability" of the FSOC. Moreover, because half of the Japanese nurses working as mid-career nurses in this study were in the process of providing child care, these nurses had an influential presence in their family, thus causing bias in the distribution. Despite the aforementioned limitation, the study results demonstrated the reliability and validity of the J-FSOC-S. This scale can, therefore, be used to evaluate family SOC in Japanese nurses.

## Acknowledgements

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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