The Development of the Revised Version of Solution Building Inventory Japanese version

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**ABSTRACT.** Solution Building Inventory, developed by Smock et al. (2010), was to assess how focus on solution in daily life, and was 14-items, 5-point Likert scale. The purpose of this study was to develop the revised version of Solution Building Inventory Japanese version (SBI-R) and to examine reliability and validity of SBI-R. A total of 800 people completed SBI-R, DHS, and LOT-R. As a result, exploratory factor analysis found that SBI-R had one factor structure and was consisted 14-item. Confirmatory factor analysis had an acceptable fit to one factor model. The Cronbach's alpha of SBI was .92 and internal consistency. Moreover, SBI-R was positively correlated with DHS and LOT-R. These results indicated that SBI-R had good reliability and validity as a measure of Solution Building concept.

**KEY WORDS:** Solution-Focused Brief Therapy, Solution Building Inventory, Reliability, Validity

**Introduction**

Solution-Focused Brief Therapy (SFBT) is a help model established by de Shazer et al. (1986). The origin of SFBT is at Brief Family Therapy Center (BFTC) in Milwaukee. De Shazer and Berg has been developing help methods to improve people’s lives through theoretical research (e.g., de Shazer, 1994) and empirical research (e.g., Gingerich et al., 1988) at BFTC. In the practice, SFBT emphasizes solution building rather than cause analysis of problems. Solution building consists of the client’s clearly identifying their solution (De Jong & Berg, 2013), increasing the client’s awareness of exceptions to their problem(s) (De Jong & Berg, 2013; de Shazer, 1991), and the client developing hope for their future (Berg & Dolan, 2001).

Smock et al. (2010) developed Solution Building Inventory (SBI) to measure the central construct of SFBT. The SBI is a 14-items English instrument measure that uses a 5-point Likert scale (Smock et al., 2010). Although the literature describes solution building as possessing three components, factor analysis yielded one factor scale (see Smock et al. (2010) for details). The SBI has been found to be a reliable ($\alpha= .88$) and valid measure on both clinical (Smock, 2013) and non-clinical (Smock et al., 2010) populations.

Takagi et al. (2015) has developed a Japanese version Solution Building Inventory (SBI-J).
SBI-J showed high reliability ($\alpha=.89$) and validity: correlation with Dispositional Hope Scale (DHS) and Life Orientation Test (LOT-R). However, the SBI-J is different from SBI in one item was dropped after the factor analysis procedure. It is possible that the item contents of SBI-J created from the procedure of back translation may have become unnatural as Japanese expression and be difficult to understand. It is necessary to examine the possibility that unnatural Japanese of SBI-J influenced the composition of the scale.

The purpose of this study was to develop the SBI-J Revised (SBI-R) and examine its factor structure, reliability, and validity. DHS and LOT-R scales were used to test the convergent validity of the SBI-R. SBI-R will be consisted of the same number of items as original version of SBI.

Methods

1. Data Collection Japanese

In November 2018, researchers conducted a Web survey targeting university students and working peoples between 20’s and 50’s through research company (Cross Marketing Inc.). 400 university students (200 males, 200 females) and 400 working peoples (200 males, 200 females) completed a survey containing the SBI-R, the DHS, and LOT-R. The average age of university students was 21.00 years old ($SD=1.72$), and the average age of working peoples was 40.23 years old ($SD=10.96$).

2. Questionnaires

1) SBI-R: Researchers revised the 14-items of SBI-J (Takagi et al., 2015). The development of the SBI-R included: (i) SBI-J items revised by one university professor and one graduate student specialized in SFBT. (ii) two university professors who specialized in SFBT, not involved in the revised process, confirmed that the items of SBI-R are natural Japanese and measure solution building. The final items of SBI-R are given in Table 1. The revised points were shown in Table 2.

The SBI-R is 14-items instrument using a 5-point Likert scale. Participants were asked for respond by number from 1 to 5 (1 = Strongly disagree, 5 = Strongly agree).

2) DHS: According to Smock et al. (2010), the concept of solution building, measured by the SBI, possess an aspect of hope. We used a Japanese version of the DHS, developed by Kato and Snyder (2005) to measure hope, to

| Table 1: 14-item of Revised SBI-R |
|-----------------------------------|
| SBI-R 1  | 私は、解決策を生み出せることができる |
| SBI-R 2  | 私は、人生で起こって欲しいことに意識を向ける能力がある |
| SBI-R 3  | 私は、これまで自分に良い変化をもたらした出来事について考えることができる |
| SBI-R 4  | 私は、たとえ少しからでも、それほど面倒でない自分の状況に意識を向けることができる |
| SBI-R 5  | 私は、人生における困難に上手く対処できるときがある |
| SBI-R 6  | 私は、自分自身、他者の、自分の状況における、良いことに気づくことができる |
| SBI-R 7  | 私は、人生における数々の試練に立ち向かってきた |
| SBI-R 8  | もし、明日目覚めたときに、私の人生にないか新しい機会が起きていたら、きっと自分や他者に変化に気づくことができそう |
| SBI-R 9  | 私は、自分が起こした、小さい肯定的変化に気づいている |
| SBI-R 10 | 私は、自分が困難な状況に対処できることを、実に誇りに思うときがある |
| SBI-R 11 | 私は、これまで過去における試練を上手く乗り越えてきた |
| SBI-R 12 | 私は、人生をよくするための、一つ歩を踏み出してきた |
| SBI-R 13 | 私は、自分の状況が改善的にはとても困難に思えても、良い面に目を向けることができる |
| SBI-R 14 | 問題を考えすぎることが、解決策を見つけるのに最適な方法だとは限らない |
test convergent validity. The DHS is a 12-items instrument using a 4-point Likert scale.

3) LOT-R: Smock et al. (2010) also used the LOT-R to test convergent validity. We used Sakamoto and Tanaka’s (2002) Japanese version of LOT-R to measure goal setting and confidence in goal attainment. The Japanese version of the LOT-R contains 10-items using a 5-point Likert scale.

### Results

1. Fundamental statistics

We show fundamental statistics of SBI-R in Table 3. We tested for any ceiling or floor effects in 14-item SBI-R scale. No effects were found.

2. Exploratory factor analysis

An exploratory factor analysis was run in SPSS on the SBI-R by major factor method, fixing the number of the factors to 1 in accordance with the factor structure of SBI-R.

### Table 2 Revised points of SBI-R

| SB1-J | SB1-R |
|-------|-------|
| item 1 | 解決策を生み出す | 解決策を生み出す |
| item 2 | 責任感を集中する | 責任感を集中する |
| item 3 | No revision | No revision |
| item 4 | 自分の状況がそれほど倒されていないとき | それほど倒されていない自分の状況 |
| item 5 | 上手く対処できるとき | 上手く対処できるとき |
| item 6 | 自分の状況の中にある | 自分の状況の中にある |
| item 7 | 人生における数々の挑戦に取り組んでくることができた | 人生における数々の挑戦に立ち向かってきた |
| item 8 | 自分の人生になかか奇跡が起こっていたなら | 私の人生になかか奇跡が起こっていた |
| item 9 | 自分が生み出した | 自分が生み出した |
| item 10 | 自分が困難な状況に直面したときに | 自分が困難な状況に対処できることが、実に誘導に |
| | 連続して考えようとするときがある | 考え続けようとする |
| item 11 | 過去に困難な状況を乗り越えてきました | これまで過去に困難な状況を乗り越えてきました |
| item 12 | 過去の困難を乗り越えてきた | 過去の困難を乗り越えてきた |
| item 13 | 過去の困難を乗り越えてきた | 過去の困難を乗り越えてきた |
| item 14 | 最後の方法ではないかもしれません | 最後の方法ではないかもしれません |

### Table 3 Fundamental Statistics of SBI-R

| item | Mean | Median | SD |
|------|------|--------|----|
| SBI-R 1 | 3.15 | 3 | 0.93 |
| SBI-R 2 | 3.09 | 3 | 0.93 |
| SBI-R 3 | 3.28 | 3 | 0.96 |
| SBI-R 4 | 3.10 | 3 | 0.86 |
| SBI-R 5 | 3.14 | 3 | 0.97 |
| SBI-R 6 | 3.28 | 3 | 0.94 |
| SBI-R 7 | 3.25 | 3 | 1.00 |
| SBI-R 8 | 3.19 | 3 | 0.92 |
| SBI-R 9 | 3.01 | 3 | 0.94 |
| SBI-R 10 | 3.09 | 3 | 0.99 |
| SBI-R 11 | 3.16 | 3 | 0.97 |
| SBI-R 12 | 3.16 | 3 | 0.95 |
| SBI-R 13 | 3.08 | 3 | 0.96 |
| SBI-R 14 | 3.42 | 4 | 0.95 |

5-point Likert scale (N=800)

### Table 4 Factor Analysis (by major factor method)

| item | factor 1 |
|------|----------|
| SBI-R 13 | 0.76 |
| SBI-R 5 | 0.76 |
| SBI-R 12 | 0.75 |
| SBI-R 3 | 0.73 |
| SBI-R 4 | 0.73 |
| SBI-R 1 | 0.72 |
| SBI-R 2 | 0.71 |
| SBI-R 10 | 0.70 |
| SBI-R 9 | 0.70 |
| SBI-R 6 | 0.69 |
| SBI-R 11 | 0.68 |
| SBI-R 7 | 0.63 |
| SBI-R 8 | 0.61 |
| SBI-R 14 | 0.40 |
(Table 4). Any items with factor loading less than .30 were dropped from SBI-R. As a result, all items were adopted as SBI-R.

3. Reliability analysis
A reliability analysis was conducted on the SBI-R in SPSS. The Cronbach’s alpha of SBI-R was $\alpha = .92$.

4. Confirmatory factor analysis
In order to confirm the data-driven 14-item model of SBI-R, a confirmatory factor analysis was conducted using Amos (Fig. 1). The results indicated that the data-driven 14-item model met the criteria for a good model fit, GFI=.94 (> .90), AGFI=.91 (> .90), CFI=.92 (> .90), RMSEA=.07 (< .10), RMR=.03 (< .10).

5. Validity of the SBI-R
In order to investigate the convergent validity of the SBI-R, correlations between the composite score of the SBI-R, the DHS, and the LOT-R were calculated (Table 5). A correlation matrix shows that the DHS ($r = .419$) and the LOT-R ($r = .418$) were moderately, yet significantly, correlated with the SBI-R. Composite scores of the DHS and the LOT-R were also significantly correlated with one another ($r = .236$).

| Table 5 Correlations of SBI-R, DHS, and LOT-R |
|----------------|----------------|----------------|
| Scale          | SBI-R          | DHS            |
| LOT-R          | .418***        | .236***        |
| DHS            | .419***        | -              |

6. Differences between generations and gender
In order to investigate intergenerational and gender difference of SBI-R, two-way factorial

| Table 6 Two way factorial analysis of variance of SBI-R |
|----------------|----------------|----------------|
| SBI-R           | generation    | gender      |
| generation      | gender        | n | Mean | SD | Mean | SD | Mean | SD |
| student         | Men           | 200 | 3.19 | 0.76 | 2.97 | 0.72 | 3.16 | 0.61 |
|                  | Women         | 200 | 3.22 | 0.61 | 3.11 | 0.77 | 3.18 | 0.66 |
| 20-29           | Men           | 50  | 2.97 | 0.72 | 3.16 | 0.61 | 3.18 | 0.66 |
|                  | Women         | 50  | 3.11 | 0.77 | 3.16 | 0.63 | 3.16 | 0.63 |
| 30-39           | Men           | 50  | 3.01 | 0.54 | 3.01 | 0.54 | 3.16 | 0.63 |
|                  | Women         | 50  | 3.01 | 0.54 | 3.16 | 0.63 | 3.20 | 0.68 |
| 40-49           | Men           | 50  | 3.30 | 0.61 | 3.30 | 0.61 | 3.30 | 0.61 |
|                  | Women         | 50  | 3.30 | 0.61 | 3.30 | 0.61 | 3.30 | 0.61 |
| 50-59           | Men           | 50  | 3.30 | 0.61 | 3.30 | 0.61 | 3.30 | 0.61 |
|                  | Women         | 50  | 3.30 | 0.61 | 3.30 | 0.61 | 3.30 | 0.61 |
| generation      |                | 1.49 | n.s. |      |      |      |      |
| gender          |                | 1.75 | n.s. |      |      |      |      |
| generation×gender |               | 0.75 | n.s. |      |      |      |      |
analysis of variance was conducted with generation and gender as independent variable and SBI-R as dependent variable (Table 6). As result, interaction was not significant ($F=0.75$, $p>.10$, $\eta^2=.004$). Also, neither generation nor gender main effects were not significant ($F=1.49$, $p>.10$, $\eta^2=.002$; $F=1.75$, $p>.10$, $\eta^2=.002$).

**Discussion**

1. The reliability and validity of SBI-R

In this study, the items of SBI-J were corrected to natural Japanese expression. And two university professors who familiar with SFBT confirmed that the items of SBI-R are natural Japanese and measure solution building. Reliability and validity of SBI-R was examined by Web survey targeting university students and working peoples between 20’s and 50’s.

High reliability of SBI-R was confirmed by Statistical analysis. Confirmatory factor analysis of the SBI-R found that this measure has one factor scale. And all items assumed as SBI-R were adopted. Then SBI-R consisted of the same number of items as original version of SBI. In addition, the SBI-R possess a high internal consistency ($\alpha=.92$). This finding is consistent with the original SBI measure (Smock et al., 2010).

SBI-R show high convergent validity. Smock et al. (2010) indicated that the DHS and LOT-R are significantly correlated with SBI. SBI-R was also significantly correlated with DHS and LOT-R. Therefore, the SBI-R has sufficient validity.

2. Differences between generations and gender

Two-way factorial analysis of variance found that generation and gender doesn't have any effect on score of SBI-R. This result indicates that SBI has high generality.

3. Directions for future research

This study found that the SBI-R is a valid and reliable measure of solution building. Smock (2014) validated the SBI with a clinical sample and future research on the SBI-R is expected to confirm these findings on a Japanese speaking clinical sample. In addition, future research on the SBI-R will investigate how to increase SBI.

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