Factor Structure of the Japanese Version of the Coping Inventory for Stressful Situations: Reclassification of Coping Styles and Predictive Power for Depressive Mood

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Abstract
This study attempted to determine, using a sample of Japanese university students (n=507), the best factor structure for the Coping Inventory for Stressful Situations (CISS). An exploratory factor analysis conducted on a randomly split half of the sample yielded a five-factor structure. The robustness of this structure was confirmed by a confirmatory factor analysis on the other half of the sample, as compared to three- and four-factor models. The factors Task Solution, Social Diversion, and Distraction were encompassed by the higher-level factor, Action-oriented Coping. The factors Rumination and Aggression were represented by the higher level factor, Emotion-oriented Coping. Emotion-oriented Coping significantly predicted depressive mood five weeks later in a prospective study of the same sample, while Action-oriented Coping predicted significantly reduced depressive mood. These results suggest that the five-factor structure of the Coping Inventory for Stressful Situations is valid for Japanese young adults and adolescents, and that action-oriented coping is an adaptive coping strategy.

Keywords: CISS; Exploratory factor analysis; Confirmatory factor analysis; Depressive mood; Japanese adolescent

Introduction
The relationship between coping styles and mental health has been extensively studied over the last three decades. This has resulted in the development of coping theory and the codification of different coping styles, along with the instruments to assess coping [1]. All of the models and measures in this area share certain common denominators. Coping theory generally posit that there are two or three main coping strategies, which are measured with specific assessments. These theory driven instruments are, however, not without flaws, including factor structures that are frequently unstable, as well as low reliability [1]. An exception to this general trend is the Coping Inventory for Stressful Situations (CISS) [2,3]. The CISS seems to be largely free from the psychometric limitations of most other instruments in its class [4], with its utility in measuring coping strategies demonstrated in a variety of samples and contexts. Studies have shown that task oriented coping contributes self-control [5], emotion oriented coping preoccupies people’s mind into a negative situation emotionally [6], and avoidance oriented coping was literally related to cognition of a threatening situation [7]. Overall, task oriented coping is considered having positive function and emotion and avoidance oriented copings having a negative function [8-10].

However, despite the positive qualities of the CISS, researchers have not yet reached consensus regarding the instrument’s factor structure. Originally, the CISS was believed to consist of three factors [11]. Task-oriented Coping, Emotion-oriented Coping, and Avoidance-oriented Coping. Task-oriented Coping ideals directly with the stressful situation, Emotion-oriented Coping refers to emotional reactions to the stressful event, and Avoidance-oriented Coping is characterized by the use of escape strategies.

Conducting a Principal Component Analysis (PCA) on the Japanese version of the CISS, Furukawa et al. [12] upheld the three-factor structure that was reported by Endler and Parker [2].

In contrast, Endler and Parker [2] used separate factor analyses to extract two subscales, Distraction (eight items) and Social Diversion (five items), from the 16 CISS items dealing with Avoidance-oriented coping. These subscales were tested with adult, college student, and psychiatric patient samples. Endler and Parker [13] later used PCA to study of college students (n=832) and adults (n=483), comparing the factor structures from these two populations with those from a previous study [11]. Although similar in terms of congruence coefficients, only the second study [13] allowed the 16 avoidance-oriented items to be classified under the components of social diversion and distraction, as in their 1990 study (above). This four-factor structure was also reported by McWilliams et al. [14]. Using a sample of patients with depression, they compared three-, four-, and six-factor structures using PCA and found that only the four-factor structure (with a few items categorized differently from that in the original four-factor structure) was clinically interpretable.

Furthermore, Cosway et al. [15] conducted PCA on the CISS items, using a sample of Scottish doctors and farmers and confirmed the three-factor structure reported by Endler and Parker [13]. While Emotion-oriented Coping was significantly associated with Avoidance-oriented Coping, Task-oriented Coping was associated with neither Emotion- nor Avoidance-oriented Coping. Moreover, by conducting PCA on the 16 Avoidance-oriented Coping items, they again obtained two factors corresponding to Social Diversion and Distraction. On the basis of this repeated evidence, they proposed that coping styles

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divided into two groups, Task-oriented and Non-task-oriented, with Non-task-oriented Coping further divided into Emotion-oriented and Avoidance-oriented Coping. Avoidance-oriented Coping could be subdivided into Distraction and Social diversion.

The above studies have several methodological limitations. First, the goodness-of-fit of the CISS structure models was tested using confirmatory factor analysis (CFA). Cook and Heppner [16] studied 329 undergraduate students and compared the goodness-of-fit of the three- and four-factor CISS models. They found that the four-factor model (in which Avoidance-oriented coping is subdivided into Distraction and Social Diversion) yielded a better fit than the three-factor model (composed of Task-, Emotion-, and Avoidance-oriented coping). However, unsatisfactory goodness-of-fit indexes for both models (Comparative Fit Indices=0.735 and 0.825, respectively) suggested to them that more complex models might be warranted. Using a different index for goodness-of-fit (the root mean square error of approximation; RMSEA), Rafnsson et al. [17] failed to demonstrate superiority for either the three- or the four-factor model. This evidence suggested that the CISS items could be divided into Task-oriented and Non-task-oriented categories, but questions remained as to how to further subdivide non-task-oriented items.

Second, most studies used PCA as a form of exploratory factor analysis (EFA). However, PCA is not an appropriate method of factor analysis [18]; exploratory factor analysis is based on the common factor model [19] and assumes that each measured variable is a linear function of one or more common factors and one unique factor, while PCA does not differentiate between common and unique variance [20]. Accordingly, we studied the factor structure of the Japanese version of the CISS using both EFA, by maximum likelihood estimation, and CFA. The primary goal of this study was to determine the most relevant model of the CISS for Japanese population.

Third, there are few longitudinal studies on the predictive validity of the CISS. The factor structures of coping styles should be evaluated in terms of not only their fit with the data and their statistical robustness, but also their predictive validity. Coping styles have tremendous clinical implications, as individuals can reduce or amplify the effects of adverse life events and conditions, by employing different coping styles. Previously, relationships between the CISS and measures (depression and anxiety) were explored using cross-sectional study design [14,15], but such methods do not clarify whether coping style is a cause or an effect of mental health states. Therefore, the factor structures of coping styles identified in aforementioned studies should be verified by testing the relationship between identified coping styles and reactions to stressful events, using a prospective study design. To do this, we tested whether the factor structures we observed in a sample of Japanese university students would show clinically meaningful links with stress reactions.

Method

Participants

Data were obtained from a prospective longitudinal study on the contribution of psychosocial factors to depressive mood in a sample of Japanese university students. We recruited undergraduate students from two universities in Kumamoto, Japan, for a nine-wave questionnaire survey, spanning nine weeks. Each week, questionnaires were distributed to students during class. Participation was voluntary and anonymous. Students were assured that they could refuse to participate in the study at any time without any negative consequences. As we were interested in the factor structure of the CISS and its predictive validity, we used the data from the first wave (during which the CISS was distributed) and the sixth wave, five weeks later, when the Zung Self-Rating Depression Scale [21] was distributed. The CISS was completely filled out by 507 students (114 male and 393 female), whose data were used for factor analysis. The mean age was 19 years (SD=1.5), with no difference in mean age by gender. The majors of participants were nursing and psychology separately and the number of female participants was larger than men.

Measures

Coping Inventory for Stressful Situations (CISS): The CISS is a self-report measure designed to assess coping styles. It consists of 48 items scored on a five-point Likert-type scale (1=not at all, 5=very much). Participants were asked to rate how much they engage in each activity when they encounter a difficult, stressful, or upsetting situation. Sample items for each of the three subscales include “Think about how I have solved similar problems” (Task-oriented Coping), “Blame myself for not knowing what to do” (Emotion-oriented Coping), and “Watch TV” or “Phone a friend” ( Avoidance-oriented Coping). The CISS was translated from English to Japanese, and back-translated by a specialist to ensure comprehension and comparison with the original form [12].

Self-rating Depression Scale (SDS): The SDS is a 20-item self-report measure designed to screen depression, items are scored on a four-point Likert-type scale from 0=”never” to 3=”almost always”. A three-factor (Affective, Cognitive, and Somatic) structure was reported for a sample of Japanese university students [22]. The present study used only the seven items from this scale pertaining to the Affective factor because Kitamura et al. [22] also suggested that the scale should be used each subscale score separately rather than a total score in the Japanese population. There are some researchers using these subscales independently such as affective subscale [23-35]. Mean values were substituted for a missing item only when at least five out of seven items were answered.

Procedure

Questionnaires were distributed and collected by a class lecturer every week during the study period. Prior to distributing the questionnaire, the lecturer reminded students that they had the right to refrain from participating in any wave, and that this would not result in any academic disadvantages. This information was also written on the face sheet. While anonymity was assured, students were asked to create a unique nickname and use it whenever they answered a questionnaire to track individuals through the multiple waves of testing. The Ethical Committee of the Kumamoto University Graduate School of Medical Sciences approved this project.

Statistical analysis

We first calculated the means and SDs of all CISS items submitted. Including items with a low base rate in an EFA may give rise to a distorted structure, so we excluded items from analyses if their means were less than 1.4. This value was chosen because 1.4 is one-tenth above the lowest possible score for questions with a four-point response range (Table 1).

After randomly dividing the students into two groups, we performed a series of EFAs on the original CISS items by using data from one group of students (n=259). Each factor was extracted using the maximum likelihood extraction method. All factors were considered to be dependent upon each other. The factor solution was sought after
In order to confirm the stability of the factor structures obtained from the above EFA, we performed a series of CFAs, using another randomly generated subset of students (n=248) and compared the goodness-of-fit of four models. These included the original three-factor model [11], two different four-factor models derived from previous studies using EFA [13,15], and a model extracted from the present EFA.

### Table 1: Means, SDs, and factor structure of the CISS items (Group 1, n=259)

| Item | Original category | Mean (SD) | Factor | 1 | 2 | 3 | 4 | 5 |
|------|-------------------|-----------|--------|---|---|---|---|---|
| 26   | Act immediately   | 2.63 (1.10) | 0.76   | -0.16 | -0.01 | -0.12 | 0.09 |
| 47   | Try to be organized | 2.92 (1.21) | 0.73   | 0.06  | -0.12 | 0.08  | 0.03 |
| 27   | Think about and learn from my mistakes | 3.04 (1.24) | 0.72   | 0.01  | -0.07 | -0.06 | -0.03 |
| 10   | Determine priorities | 3.02 (1.25) | 0.70   | -0.16 | -0.06 | 0.10  | -0.09 |
| 43   | Consider different solutions to the problem | 3.12 (1.12) | 0.69   | 0.11  | -0.02 | -0.14 | -0.16 |
| 24   | Understand the situation | 3.16 (1.21) | 0.64   | 0.23  | -0.03 | -0.06 | -0.16 |
| 39   | Change priorities | 2.51 (1.16) | 0.60   | -0.14 | -0.03 | 0.00  | 0.21 |
| 21   | Decide course of action | 2.83 (1.17) | 0.60   | 0.10  | 0.18  | -0.02 | -0.12 |
| 36   | Analyze the problem | 2.92 (1.15) | 0.56   | 0.00  | 0.02  | 0.18  | 0.07 |
| 01   | Use my time better | 2.53 (1.06) | 0.46   | 0.08  | -0.08 | 0.07  | -0.06 |
| 15   | Consider similar problems | 2.88 (1.23) | 0.44   | 0.09  | 0.17  | -0.01 | -0.07 |
| 06   | Take best course of action | 2.92 (1.29) | 0.47   | -0.29 | -0.05 | 0.07  | 0.05 |
| 41   | Get control of things | 1.81 (0.94) | 0.42   | 0.02  | -0.02 | 0.00  | 0.27 |
| 08   | Blame myself for the situation | 3.05 (1.30) | 0.01   | 0.80  | 0.04  | 0.10  | -0.11 |
| 14   | Become tense | 2.76 (1.35) | -0.02  | 0.73  | -0.02 | 0.06  | 0.01 |
| 05   | Blame myself for wasting time | 2.54 (1.24) | -0.03  | 0.69  | -0.13 | 0.06  | 0.03 |
| 22   | Blame myself for not having a solution | 2.23 (1.25) | 0.00   | 0.64  | -0.01 | 0.04  | 0.10 |
| 30   | Worry about next step | 2.63 (1.26) | -0.06  | 0.61  | 0.06  | 0.11  | -0.03 |
| 25   | “Freeze” | 2.35 (1.28) | -0.12  | 0.61  | 0.13  | -0.12 | -0.23 |
| 34   | Focus on myself | 2.91 (1.28) | 0.15   | 0.59  | 0.08  | -0.14 | 0.04 |
| 28   | Wish that I could change | 3.08 (1.27) | 0.16   | 0.50  | -0.05 | 0.09  | 0.03 |
| 17   | Blame myself for being too emotional | 2.03 (1.14) | 0.13   | 0.29  | 0.16  | -0.18 | 0.24 |
| 03   | Think about good times | 3.01 (1.13) | 0.16   | 0.24  | 0.18  | 0.02  | 0.01 |
| 29   | Seek company | 2.72 (1.21) | -0.05  | -0.03 | 0.77  | -0.21 | 0.09 |
| 37   | Phone someone | 2.70 (1.46) | -0.04  | -0.10 | 0.76  | -0.01 | 0.04 |
| 35   | Talk to someone | 3.37 (1.38) | 0.12   | 0.17  | 0.59  | 0.03  | -0.10 |
| 31   | Be with a special person | 2.38 (1.38) | 0.01   | 0.58  | 0.10  | -0.04 |
| 04   | Be with others | 2.95 (1.24) | -0.10  | 0.07  | 0.48  | 0.03  | 0.04 |
| 23   | Go to a party | 1.37 (0.77) | -0.02  | -0.02 | 0.36  | 0.06  | 0.03 |
| 33   | Tell myself “it will never happen again” | 1.89 (1.10) | 0.14   | 0.09  | 0.27  | 0.03  | 0.06 |
| 20   | Go shopping | 2.74 (1.26) | -0.05  | -0.03 | 0.16  | 0.77  | -0.02 |
| 12   | Treat myself to a nice snack | 2.65 (1.29) | -0.10  | 0.18  | -0.07 | 0.68  | -0.05 |
| 09   | Window shop | 2.40 (1.22) | 0.02   | -0.11 | 0.23  | 0.55  | -0.11 |
| 11   | Get some sleep | 3.41 (1.28) | 0.00   | 0.10  | -0.15 | 0.52  | 0.04 |
| 18   | Go out for a meal | 2.13 (1.29) | -0.04  | -0.18 | 0.29  | 0.51  | 0.02 |
| 48   | Watch TV | 3.39 (1.35) | -0.04  | 0.13  | -0.12 | 0.44  | 0.20 |
| 44   | Take time off | 3.13 (1.25) | 0.21   | 0.04  | -0.13 | 0.41  | 0.21 |
| 32   | Go for a walk | 2.16 (1.20) | 0.12   | -0.01 | 0.17  | 0.29  | -0.10 |
| 40   | Catch a movie | 2.14 (1.17) | 0.12   | -0.05 | 0.18  | 0.26  | 0.13 |
| 38   | Become angry | 2.07 (1.20) | -0.07  | -0.04 | 0.04  | -0.05 | 0.02 |
| 19   | Get upset | 2.65 (1.29) | -0.02  | 0.10  | 0.00  | 0.33  | 0.06 |
| 45   | Take it out on others | 2.15 (1.22) | -0.16  | 0.14  | 0.05  | 0.14  | 0.56 |
| 46   | Use the situation to prove myself | 1.89 (0.96) | 0.32   | -0.04 | 0.00  | 0.11  | 0.35 |
| 16   | Tell myself “it’s really not happening” | 1.42 (0.75) | 0.05   | 0.10  | 0.05  | 0.04  | 0.21 |
| 07   | Preoccupied with minor ashes | 1.57 (0.94) | 0.00   | 0.14  | 0.03  | -0.02 | 0.17 |

T: Task-oriented items; E: Emotion-oriented items; A: Avoidance-oriented items; SD: Social Deviation items; D: Distraction items

In order to confirm the stability of the factor structures obtained from the above EFA, we performed a series of CFAs, using another randomly generated subset of students (n=248) and compared the goodness-of-fit of four models. These included the original three-factor model [11], two different four-factor models derived from previous studies using EFA [13,15], and a model extracted from the present EFA.

applying a promax rotation, (a diagonal rotation), and the number of factors was determined using a scree plot [26]. We included items that showed a high specific factor loading (>0.40), the same criterion used by Endler and Parker [11] in the research leading to the original construction of the CISS model. Items loading at >0.20 on two or more factors were excluded to avoid conceptual confusion of factors.
The fit of each model with the data was examined in terms of the chi-squared statistic (CMIN), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). According to conventional criteria, a good fit is indicated by CMIN/df<2, GFI>0.95, AGFI>0.90, CFI>0.97, and RMSEA<0.05, while an acceptable fit is indicated by CMIN/df<3, GFI>0.90, AGFI>0.85, CFI>0.95, and RMSEA<0.08 [27]. The Akaike information criterion (AIC) was used to compare different models; a model with an AIC at least two points lower than alternative models is regarded as a better model.

To gauge the predictive validity of the CISS, we used SDS scores from wave six as an external validator. In a path model using IBM SPSS Amos software, we posited that the subscales of the Japanese CISS identified in the above CFA would predict depression scores at wave six after controlling for depression scores in the first wave.

All statistical analyses were conducted using the Statistical Package for Social Science (SPSS) Version 19.0 and Amos 7.0.

**Results**

The means and SDs of all CISS items in Group 1 are shown in Table 1. Item 23 had a mean of 1.37, so this item was excluded from further EFAs. An EFA using the data from Group 1 revealed five factors (Table 1). The first factor consists of 11 items (item 1, 2, 10, 15, 21, 26, 27, 36, 42, and 47), the second factor 8 items (item 5, 8, 13, 14, 22, 28, 30, and 34), the third factor 4 items (item 4, 31, 35, and 37), the fourth factor 4 items (item 11, 12, 20, and 48), and the fifth factor 3 items (item 19, 38, and 45). The CISS items in each factor were extracted from that showed a factor loading of at least 0.4 on one factor and no more than 0.2 on other factors. The CISS items that showed high specific factor loading (>0.40, and >0.20 for other factors) on the first, second, third, and fourth factors were originally categorized as Task-oriented, Emotion-oriented, Social Deviation, and Distraction Coping, respectively. Four of the five CISS items with a high specific factor loading on the final factor were those originally categorized as Emotion-oriented Coping. Eighteen items (items 3, 6, 7, 9, 16, 17, 18, 23, 24, 25, 29, 32, 33, 39, 40, 41, 44, and 46) failed to show a high factor loading on any of the five factors or had ambiguous factor loading.

The factor structure derived from the present EFA was differed from the factor structures derived from previous studies, in that the Emotion-oriented Coping items were divided into two subcategories: Rumination and Aggression. Rumination items reflected introspective and repetitive concerns, and included items such as “Worry about not being able to cope”, “Blame myself for the situation”, and “Blame myself for wasting time”. Aggression items reflected hostile feelings, and included items such as “Become angry”, “Get upset”, and “Take it out on others”. Each factor had acceptable internal consistency. Chronbach’s alpha was 0.88 for Task Solution, 0.86 for Rumination, 0.71 for Distraction, and 0.72 for Social Deviation, and 0.77 for Aggression.

Using the other half of the study group we compared the goodness-of-fit of the four CISS factor structure models. These included a three-factor [11], two types of four-factor [13,15], and five-factor (extracted from the present EFA) models. For the three-factor model, we hypothesized covariance between the three latent variables; Task-oriented, Emotion-oriented, and Avoidance-oriented Coping. Any upper factors were not set in the model. Similarly, we hypothesized covariance between the three latent variables: Task-oriented, Emotion-oriented, and Avoidance-oriented Coping in the first four-factor model [13]. However, in Endler and Parker’s model [13], Avoidance-oriented Coping was thought comprise two latent variables, Social Diversion and Distraction-oriented Coping. In the second four-factor model [15], the latent variable Non-task-oriented Coping was hypothesized to compose Emotion-oriented Coping and Avoidance-oriented Coping, with the latter being further composed of Social Diversion and Distraction-oriented Coping. Finally, in the five-factor model, we hypothesized an upper factor, Action-oriented Coping, which would encompass Task Solution Coping, Social Deversion, and Distraction-oriented Coping. Emotion-oriented Coping was hypothesized to compose Rumination and Aggression. We set covariance between Action-oriented and Emotion-oriented Coping (Figure 1).

The three-factor, the first-four-factor, and the second-four-factor model showed relatively low except for RMSEAs (three factor model; CMIN/df=2.489, GFI=0.778, AGFI=0.743, CFI=0.759, RMSEA=0.078, AIC=1126.613; first four-factor model; CMIN/df=2.384, GFI=0.790, AGFI=0.756, CFI=0.777, RMSEA=0.075, AIC=1083.709; second four-factor model; CMIN/df=2.384, GFI=0.790, AGFI=0.756, CFI=0.777, RMSEA=0.075, AIC=1083.709) as compared to standard [27]. However, acceptable model fit was obtained in the five-factor model except for GFI and AGFI (CMIN/df=1.646, GFI=0.861, AGFI=0.829, CFI=0.900, RMSEA=0.051, AIC=794.344). Furthermore AIC indicated that the five-factor model was best of all models (Table 2).

In order to examine the predictive validity of the CISS items, we first calculated the correlations between depression scores from wave six with each of the CISS subscales. After determining the effects of depression scores from wave one, the partial correlation coefficients of depression scores from wave six were -0.07 (n.s.) for Task Solution, -0.08 (n.s.) for Social Diversion, -0.04 (n.s.) for Distraction, 0.29 (p<0.001) for Rumination, and 0.20 (p<0.05) for Aggression. We then conducted a path analysis which depression score from wave six was set as the dependent variable and the CISS factors were the independent variables (Figure 2). Here we predicted that the latent variables Action-oriented Coping would share covariance with depression scores from wave six. We also posited that Emotion-oriented Coping would share covariance with depression scores from wave one and Action-oriented Coping (Figure 2).

The prediction model showed good fit with the data. Both depression scores from wave one and Emotion-oriented Coping predicted depression scores in wave six. Action-oriented Coping, in contrast, predicted reduced depression scores from wave six.

**Discussion**

Through EFA and CFA, the present study found that the CISS is best represented with a five-factor model for coping styles in Japanese adolescents. This finding is strengthened by the fact that we conducted EFA in half of our sample, then confirmed the robustness of the factor structure in the other half using CFA to compare our data with the three- and four-factor models reported in previous studies. While all factor structure models failed to fit the data, the five-factor model acceptably fit.
The five-factor structure of the CISS items differs from previous models in that Emotion-oriented Coping was divided into Rumination and Aggression. Nolen-Hoeksema et al. [28] defined Rumination as thoughts and behaviors that focus the depressed individual's attention on his or her symptoms and on their possible causes and consequences. The second factor in this study comprised CISS items such as "Worry about not being able to cope", "Blame myself for the situation, wasting time, and not having a solution", "Become tense", and "Focus on myself", which correspond to the concept of Rumination. People with a ruminative coping style were found to be more likely to be depressed after controlling for other confounders in a sample of bereaved adults [29]. Rumination also predicted renewed onset of depression and anxiety [30,31] and longer durations of depressive episodes [28,32].

The final factor in this study, Anger, was associated with CISS items such as "Become angry" and "Get upset". These suggested feelings of anger in the participants. Anger is distinctly different from Rumination. It is a psychological response provoked when people face threats [33]. "Fight or flight" is a classical coping behavior used by animals in response to a dangerous situation. Anger is a spontaneous response to alert signals that warn of imminent danger to the individual.

In the current five-factor model of the CISS, it was assumed that another latent factor, Action-oriented Coping, contributed to both Task-oriented and Avoidance-oriented Coping (i.e., Distraction and Social Diversion) in the original factor structure. These coping strategies facilitate taking action and generally serve an adaptive function in diverse contexts. For instance, if a student fails an examination, it would be adaptive to study more for the next examination, a Task Solution coping. Similarly, a student distract him or herself from the stress of studying by taking a break to chat with friends; Distraction or Social Diversion forms of Avoidance-oriented coping thereby preserve psychological health and serve an adaptive function (in moderation).

In the path model, we showed that Emotion-oriented Coping (including Rumination and Aggression) was subsequently related to higher rates of depression. Results suggest that emotion-oriented coping may predict subsequent as well as current depression. In contrast, Action-oriented Coping reduced subsequent depression despite there being no significant correlation between the factors of Action-oriented Coping (Task Solution, Social Diversion, and Distraction) and subsequent depression. Therefore, Action-oriented Coping facilitated recovery from depression when each factor is utilized (Task Solution, Social Diversion, and Distraction). These findings are consistent with the rationale of current behavioral treatments, which encourage the use of positive reinforcement to relieve depression [34]. Coping mechanisms that provide positive reinforcement can be associated with recovery, regardless of whether they actually solve the problem or simply reduce negative emotional cycles (i.e., Rumination).

A limitation of the present study is the use of a healthy student population; additional studies should be conducted to confirm applicability to other populations, especially as a clinical population may have a different CISS structure. Further, it should be noted that, while the five-factor structure showed acceptable model fit, some model fit criterion were relatively low. Further replication and possible reselection of the CISS items may result in a model with a better fit to the data.

Despite these limitation, we believe that the five-factor structure of CISS items may be appropriate for use among Japanese adolescent and young adult populations.

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