

The relationships among stages of change for stress management, stress responses, self-efficacy, and frequency of stress-management behavior in Japanese university students

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[Received February 9, 2009 ; Accepted December 8, 2009]

It is important for university students to learn how to manage their stress, but many students are not interested in doing so. Therefore, they need support to become interested in stress management as a healthy lifestyle behavior. The Transtheoretical Model (TTM) of behavior change, which has been applied in the clarification of the acquisition of many health behaviors, will help to develop health promotion programs. The stage of change is one of the components of the TTM. In this study, I measured the stage of change for stress management in Japanese university students, and examined whether stages are associated with stress-related variables. In Study 1, a total of 228 university students participated in a questionnaire survey. The one-week test-retest ($n = 99$) reliability was sufficiently high. When asked to describe their stress management behaviors freely, exercising was the most common response. On the other hand, cognitive-focused coping was scarcely mentioned. Examining the relationships among stages and stress responses and self-efficacy, significant relationships with the stages of change were recognized in stress responses. In Study 2, a total of 186 university students answered a questionnaire. One-way analyses of variance showed the frequency of engaging stress management behaviors in the maintenance stage was significantly higher than those in precontemplation and contemplation stages. However, no differences were observed among stages and self-efficacy. Results suggest reliability, validity, and some characteristics of stages of change for stress management behavior of Japanese university students.

Keywords: stress management, transtheoretical model, stages of change, university students

[School Health Vol.5, 24-30, 2009]

1. Introduction

It has become increasingly necessary for Japanese university students to acquire knowledge of stress and develop stress management skills. Because university life involves a variety of stressors (Kato, 2007) and because university students are in the late stage of adolescence, during which they are prone to mental insecurity (Kato et al., 2000), it is considered useful for such individuals to learn skills that enable them to deal with the various stressors they encounter. For preparing to go out into the real world, learning of workplace stress-related issues (e.g., workplace stress, employees depression) may function as a

primary prevention strategy for university students that will help them lead healthier working lives after graduation from university (Hori & Shimazu, 2007; Oikawa & Sakamoto, 2007; Sakamoto & Nishimawa, 2002). Based on these considerations, it is important to assist university students in developing lifestyles which enable them to manage stress effectively.

In this study, the transtheoretical model (TTM) of behavior change (Prochaska & DiClemente, 1983) was employed to explain the development of stress-management behaviors in university students. The use of an one-fits-all intervention model to a group containing individuals willing to acquire healthy behaviors and individuals not willing to do so leads

to the high rates of participant withdrawal. On the other hand, the TTM intervention programs are suitable for individual degrees of readiness, based on analyses of factors related to differences in each individual's readiness for behavior change. TTM has been applied to various health behaviors, including smoking cessation, safe sex, alcohol or drug abuse, dietary behaviors, use of sunscreen, mammography screening, and medical compliance. In such behaviors, the efficacy of TTM has been verified (Bridle et al., 2005).

In TTM, the processes of acquisition and habit-formation of health behaviors are classified according to individual degrees of readiness for behavior change. Classified degrees are defined as stages of change. The following 5 stages are often set as stages of change: Precontemplation, the stage in which the individual has no intention of taking action for the foreseeable future (usually 6 or more months); Contemplation, the stage in which the individual has an intention to start taking action someday (usually within 6 months); Preparation, the stage in which the individual is intent upon taking an action soon (usually within 1 month); Action, the early stage following the start of action (usually within 6 months from the start of action); and Maintenance, the stage in which the individual continues to take action at a certain level or higher for an extended period (usually for 6 months or longer). TTM also reveals relations between stages of change and variables such as self efficacy (which increases as one proceeds towards Maintenance), process of change (cognitive processes are important in stages prior to Action; and behavioral processes are important in the Action and Maintenance Stages), and decisional balance (which means pros and cons balance with pros increasing and cons decreasing as one proceeds towards Maintenance) in order to develop or evaluate intervention program (Prochaska & Velicer, 1997).

In the late 1990s, preventive behaviors for stress management in daily life was first studied as stress management behavior with use of TTM (Evers et al., 2006; Mauriello et al., 2007). However, there is not yet sufficient information concerning Japanese university students. This study on the stress management behaviors of university students was conducted in order to investigate the distribution of the stages of change, to reconfirm the reliability of the scale of stages of change, examine validity of the scale of stages of change, and to investigate the

relationship between the stages of change and self-efficacy.

Researchers attempting to verify the validity of the classification of the stages of change in stress management generally employ the following two methods. The first method is to verify the hypothesis that the closer an individual comes to Maintenance, the higher the frequency with which stress management behaviors are implemented becomes (Riley et al., 2000; Padlina et al., 2001; Riley & Fava, 2003). The second method is to verify the hypothesis that individuals in Maintenance are in healthier physical/mental condition than those who belong other stages, which is based on the speculation that individuals maintain healthier lifestyle habits as they proceed towards Maintenance (Padlina et al., 2001). Considering these methods, verification of the validity of the scale was conducted in this study by comparing stages in terms of the frequency of stress management behavior implementation and indexes of psychological health.

2. Study 1

2.1. Subjects and procedures

A questionnaire survey was carried out on 234 students at 3 universities [valid respondents: 228 (male: 94, female: 134; mean age: 20.0±2.3 years)]. One week later, stages of change were measured again in 132 students of 2 of the 3 universities [valid respondents: 99 (male: 53, female: 46; mean age: 19.7±1.8 years)].

2.2. Measures

(1) Stages of change of stress management behaviors: Employing items used in earlier studies (Laforge, et al., 1999; Nigg et al. 1999; Nakamura et al., 2002), questionnaire items were selected to measure stages of change in the implementation of stress management behaviors following an evaluation of the expressions to be used in question items utilizing a preliminary survey of 45 university students. The questionnaire required participants to indicate one of the 5 stages of change in terms of stress management habits in daily life for each item. **Table 1** shows details of the 5 stages.

(2) Descriptive explanations of stress management behaviors: participants were asked to provide

Table 1 Questionnaire Items Used to Measure Stages of Change

Question	
"Have you attempted to reduce the amount of stress in your daily life? Select the most appropriate response and mark the corresponding number."	
Response	
Precontemplation	1) No. I am not doing anything, and I am not planning to do anything in the future either.
Contemplation	2) No. But, I am going to start something in the near future (within 6 months).
Preparation	3) No. But, I am going to start soon (within 1 month).
Action	4) Yes. But it is only within 6 months from the start of action.
Maintenance	5) Yes. It has been 6 months or longer from the start of action.

descriptions of their stress management behaviors in response to the question, "Have you attempted to reduce the amount of stress in your daily life? Please describe what, if anything, you do or would like to do."

(3) Stress responses: Using subscales for "Anxiety/Depression" in the Stress Response Scale-18 developed by Suzuki et al. (1997), participants were asked to rate their feelings over the previous 1 week on a 4-point scale. The higher the total point value for 6 items, the stronger the anxiety/depression of respondents (0-18 points).

(4) Self efficacy: Concerning one item ("I can reduce stress occurred in my daily life"), participants were asked to rate their confidence in reducing stress in daily life on a scale of 10 scales (0: Not at all, -50: Yes and no, -100: Yes, I can). The higher the point value, the stronger the confidence was about stress management (0-100 points).

2.3. Results

Numbers of subjects in the respective stages of change were 82 (36.0%) in Precontemplation, 20 (8.8%) in Contemplation, 19 (8.3%) in Preparation, 18 (7.9%) in Action, and 89 (39%) in Maintenance. As shown, the majority of the university students were polarized into Precontemplation and Maintenance.

Regarding free description on stress management behaviors, 189 responses were collected from 140 subjects (See **Table 2**). Of these, the most common answer was engagement in physical activities. When these responses were examined by stage, the behaviors described were largest in number and variety in the subjects who were in Maintenance. For the other subjects, behaviors were smaller in number

and were mostly limited to physical activities.

An analysis of variance was conducted for the respective factors with the use of stage of change as an independent variable, and stress response and self-efficacy as dependent variables (See **Table 3**). As a result, a statistically significant main effect of stage of change was recognized in stress response [$F(4, 223) = 5.26, p < .001$]. Further, Tukey's HSD revealed that stress response was significantly higher in Preparation and Action than in Precontemplation ($p < .01$). Regarding self-efficacy, the main effect of stage of change revealed a significant tendency [$F(4, 223) = 2.18, p = .07$] and the result of Tukey's HSD was not significant. Self-efficacy tended to be lower in Precontemplation and Preparation than in Maintenance, but it wasn't significant ($p = .14$).

In order to verify the re-test reliability of stages of change, Kappa coefficient (κ) was calculated for the values of stage of change in the first and second stage measurements. The result of the calculation was $\kappa = .70$ ($p < .001$). From this, the re-test reliability of stage of change was considered to be satisfactory. **Table 4** shows the stage distribution of the subjects. As shown, change was the largest in Contemplation.

3. Study 2

3.1. Subjects and procedures

A questionnaire survey was conducted on 186 students of 2 universities [valid respondents: 181 (male: 60, female: 121; mean age: 20.4 ± 2.2 years)].

3.2. Measures

(1) Stages of change of stress management

Table 2 Content of Free Description^a and the Frequency of Each Description^b (%) [n = 140]

	Contemplation	Preparation	Action	Maintenance
1 Physical activities	15 (71.4)	7 (33.3)	8 (47.1)	17 (13.1)
2 Personal interests (except for physical activities)	2 (9.5)	7 (33.3)	2 (11.8)	37 (28.5)
3 Relaxation (sleeping, bathing, aromatherapy, etc.)	0 (0.0)	1 (4.8)	3 (17.7)	22 (16.9)
4 Play/ Chat with friends	1 (4.8)	2 (9.5)	1 (5.9)	15 (11.5)
5 Other	3 (14.2)	4 (19.1)	3 (17.7)	39 (30.0)
Total	21 (100.0)	21 (100.0)	17 (100.0)	130 (100.0)

^a Respondents in Precontemplation Stage did not answer in free description.

^b Due to the multiple responses by each respondent, the frequency of each description and number of respondents do not match.

Table 3 Average Values for Stages of Change^a and SD [n = 228]

	PC	C	P	A	M	Tukey HSD ^b
Stress response	5.7(4.4)	6.5(5.2)	9.9(4.6)	9.7(5.2)	6.7(4.6)	PC < A**, P**
Self-efficacy	49.5(23.7)	50.0(19.1)	44.2(20.6)	52.2(21.0)	57.6(23.2)	

^a PC: Precontemplation; C: Contemplation; P: Preparation; A: Action; M: Maintenance, ^b*** p < .01.

behaviors: Measurement was conducted with the same items used in the study 1.

(2) Frequency of stress management behavior engagement: Items were based on the behaviors defined by previous studies (Evers et al., 2006; Prochaska et al., 2008) as stress management behaviors (physical activities, relaxation, and conversation), items that were adopted in stress management programs for Japanese university students (getting flexible cognitive viewpoints: Oikawa & Sakamoto, 2007; Sakamoto & Nishimawa, 2002), and the results of the preliminary survey of 45 university students (activities related to personal interests). Regarding engagement, subjects rated their frequencies of 5 activities during a typical one-week period during the previous month on a 4-point scale [0: 0 time (not engaged), 1: 1-2 times, 2: 3-4 times, and 3: 5 times or more (almost every day)]. Total scores were calculated. A higher score meant a higher frequency of engagement.

The expressions of the questionnaire items were as follows: physical activities (e.g., walking, dog-walking, gym visit, stretching, yoga, sports), relaxation (e.g., breathing method, autogenic training, meditation), personal interests except for physical activities (e.g., reading, use of the Internet except for the purpose of studying, listening music), conversation/ chat (e.g., talks with family/friends),

and cognitive restructuring of thinking (e.g., trying to see positive sides of things, trying to forget worrying, seeing things from different viewpoints).

3.3. Results

The numbers of subjects in the respective stages of change were 58 (32.0%) in Precontemplation, 16 (8.8%) in Contemplation, 14 (7.7%) in Preparation, 17 (9.4%) in Action, and 76 (42.0%) in Maintenance. As shown, a majority of the subjects were polarized into Precontemplation and Maintenance.

An analysis of variance was conducted on the respective factors using stage of change as an independent variable and stress management behavior as dependent variable (See **Table 5**). A statistically significant main effect of stage of change was observed [$F(4, 176) = 4.77, p < .01$]. As a result of Tukey's HSD, frequency of stress management behavior engagement was significantly higher in Maintenance than in Precontemplation/Contemplation. Calculation of a Spearman's rank-correlation coefficient for stage and frequency, revealed a weak positive correlation (Spearman's $r = .29$).

Table 4 Number of Stage Distribution of the Subjects for the 1st and 2nd Measurements (%) [n = 99]

		1st Measurement					Total
		Precontemplation	Contemplation	Preparation	Action	Maintenance	
2nd Measurement	Precontemplation	29 (87.9)	9 (64.3)	0 (0.0)	0 (0.0)	1 (2.9)	39
	Contemplation	1 (3.0)	3 (21.4)	0 (0.0)	0 (0.0)	1 (2.9)	5
	Preparation	1 (3.0)	1 (7.1)	6 (75.0)	1 (11.1)	1 (2.9)	10
	Action	0 (0.0)	0 (0.0)	0 (0.0)	8 (88.9)	0 (0.0)	8
	Maintenance	2 (6.1)	1 (7.1)	2 (25.0)	0 (0.0)	32 (91.4)	37
Total		33 (100.0)	14 (100.0)	8 (100.0)	9 (100.0)	35 (100.0)	

Table 5 Average Values for Stages of Change^a and SD [n = 181]

	PC	C	P	A	M	Tukey HSD ^b
Frequency of stress management behavior engagement	6.9(2.0)	6.7(2.0)	6.9(1.8)	7.4(1.7)	8.4(2.4)	PC, C < M*

^aPC: Precontemplation; C: Contemplation; P: Preparation; A: Action; M: Maintenance, ^b** p < .05.

4. Discussion

TTM has been successfully applied in resolving problems related to the engagement of stress-management behaviors in populations (e.g., few members of a group are interested in engaging such behaviors; many participants of a one-fits all type stress-management program withdraw from the program). After collecting information on stages of change in university students for stress management behaviors, this study revealed stage distribution, the reliability/ validity of the scale and the relation between stage and self-efficacy.

The results of study 1 and 2 revealed the same distributions of stages of change, which demonstrates that a majority of Japanese university students were either in Precontemplation or Maintenance. Previous studies on the general population have also shown a polarized stage distribution; that is, most participants were either in Precontemplation or Maintenance (Evers et al., 2006; Laforge et al., 1999; Mauriello et al., 2007; Nigg et al., 1999; Prochaska et al., 2008). This is assumed to be a characteristic of stage distribution in stress-management behaviors.

In study 1, behaviors adopted as stress management strategies. The most common behavior adopted was physical activities. In a previous study, physical activities, relaxation, and social support were shown as effective habitual behaviors for stress management (Prochaska et al., 2008). In addition

to these behaviors, activities related to personal interests were also adopted by Japanese university students. Meanwhile, few of the effective cognitive copings (e.g., alteration of ways of thinking), which were mentioned in stress-management programs for university students (Oikawa & Sakamoto, 2007; Sakamoto & Nishimawa, 2002), were given by the students as questionnaire responses (Precontemplation: 1, Preparation: 1, Action: 1, and Maintenance: 2; these responses were classified into "other" in the tabulation). Considering such results, it is supposed to be helpful to promote university students to actively learn behaviors useful for stress management and to adopt them in their daily lives as an addition to the means of stress management they have already acquired.

Among the university students surveyed, the stress response of those who were in the Preparation or Action Stages was the highest. Students who responded, "I would like to start taking action soon," or "I started just recently," seemed to be in the high-risk group that needs stress-related support. In a previous study conducted on individuals with stress, the rate of population in Preparation was also high (Pardrina et al., 2001). In a study on stage of change related to stress management behaviors in elderly Japanese (Nakamura et al., 2002), the stress response was the highest in those who were in the Preparation. In many TTM-based stress-management studies, analyses were conducted on the relations between

stages of change and other constructs of TTM (e.g., self-efficacy, pros/cons balance) only. However, the results of this study suggest that further investigations should be performed from the viewpoint of stress theories (e.g., stressors, coping behaviors, stress responses).

While no other studies has verified re-test reliability, this study was revealed that the re-test reliability of the scale was high. Among the stages examined by the first and second surveys, it was the Contemplation stage that was the most unstable. This result supports the hypothesis of TTM that the stages from Contemplation to Action are the most unstable and changeable (Prochaska et al., 1997).

On the hypothesis that the frequency of engagement of stress-management behaviors became higher as the individual proceeds towards Maintenance validity was suggested from the significantly higher frequency in Maintenance than in Precontemplation/Contemplation and the weakly significant positive correlation that was observed between frequency and stages. In an earlier study on 126 females testing HIV positive (Rily & Fava, 2003), a weakly significant positive relation was recognized between stages of change and stress management habits (Spearman's $r = .215$). The corresponding relation shown in this study can be viewed as similar to that in the previous study. To validate the hypothesis that those in the Maintenance stage are in a healthier condition, Padlina et al. (2001) examined differences in total score of stress symptoms. As a result, it was demonstrated that the total score was lower in Maintenance than in Action. In this study, as well, stress response in the stage of Maintenance was low, which partially supported the hypothesis that the longer an individual maintains stress-management habits, the better mental health that individual becomes.

In TTM, self-efficacy is measured from two aspects; namely, confidence about the continuation of healthy behaviors despite various barriers and temptation to conduct unhealthy behaviors (which is rated as reverse scoring in analyses; Prochaska & Velicer, 1997). It has been shown in TTM studies that self-efficacy increases with the progression of stage of changes (Prochaska & Velicer, 1997). In this study, no relation between self-efficacy and stages was clarified. This may be due to the potential insufficiency of single-item measurement of confidence.

From the results of this study, the reliability and

validity of the measurement of stages of change related to a single item in Japanese university students have been partially confirmed. In future studies, it is necessary that the measurement of self-efficacy will be improved, that other construct of TTM, such as pros and cons, that the process of change will be clarified, and that intervention programs for the respective stages based on study results will be developed.

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