Relationship between Stage of Change and Self-Efficacy for Stress Management Behavior in Korean University Students

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Summary: This study was conducted for two purposes. The first purpose was to develop a Korean language version of Pro-Change’s self-efficacy measure for stress management behavior (PSSM). The second purpose was to examine the relationship between stage of change and self-efficacy for stress management behavior in Korean college students. For the purposes of this study, stress management behavior was defined as activities meant to reduce perceived stress, such as regular relaxation, physical activity, talking with others, and/or engaging in social activity. The total number of participants was 228 male and 517 female college students. Questionnaires on the stage of change and self-efficacy for stress management behavior, and depressive mood were administered to the participants. The questionnaire on self-efficacy was administered again after an interval of two weeks. Through a series of factor analyses, the Korean language version of the PSSM was developed with acceptable reliability and it consisted of 9 items. Self-efficacy was inversely related to depressive mood as expected, supporting validity of the Korea language version of the PSSM. Self-efficacy was significantly higher in the maintenance than in the other stages, supporting partially the application of the transtheoretical model to stress management behavior in Korean university students.

Key words: self-efficacy, stage of change, stress management behavior, transtheoretical model

INTRODUCTION

Stress has adverse effects on the economy as well as people’s mental and physical health1, 2. It is important to make efforts in order to manage stress in everyday life through various types of stress management behaviors. Despite the adverse effects of stress, approximately 29.6% Korean university students do not effectively practice stress management behaviors3. Behavioral science models of behavioral change provide theoretical frameworks to conduct suitable interventions.

The transtheoretical model (TTM) of behavior change4–6 is one of the leading frameworks for behavioral change in the field of health science. The TTM consists of four constructs: stage of change, processes of change, decisional balance, and self-efficacy. Stage of change refers to current behavior practice and the intention to go to action
for the healthy behavior. The TTM differentiates people into five stages, including precontemplation, contemplation, preparation, action, and maintenance.

Processes of change refer to the covert and overt activities that individuals perform to progress to the next stage. Prochaska and DiClemente\(^4\) found that specific processes of change are related to specific stages of change, with experiential processes being most often used in the early stages and behavioral ones in the later stages. Decisional balance reflects the relative perceived weight of the advantages (pros) and disadvantages (cons) of performing the targeted behavior. Finally, self-efficacy represents the situation-specific confidence to practice the healthy behavior.

The TTM has been applied to many behaviors such as physical activity, adherence to medication, healthy eating, and smoking cessation. The advantage of the TTM as a framework for interventions is that it provides guidance to formulate stage-matched interventions. Stage-matched health behavior interventions have been proven to be more effective than action-oriented interventions\(^2, 7, 8\). The TTM has also been found to be an effective framework in planning population-based interventions.

The application of the TTM to effective stress management behavior recently began in Korea. Previous stress management intervention study with the TTM\(^2\) have reported that TTM-based interventions have succeeded in enabling effective stress management. Thus, one can conclude that the TTM is a useful framework for intervening in or encourage in stress management behaviors. Regrettably, the applicability of the model to stress management behavior has only been systematically examined in Western societies.

Velicer et al.\(^9\) suggest four steps to apply the TTM to a new type of health behavior: definition of TTM variables, development of measures, examination of relationships between the variables, and development of TTM-based interventions. Only one intervention study has been reported, while the majority of previous studies have been conducted for developing measurements and/or examining relationships between constructs\(^10-17\) in the United States. Such studies have not been largely conducted outside the United States. Most studies conducted in other countries have aimed to develop measures for stage of change and/or clarify stage distributions\(^18-20\). Only Padlina et al.\(^20\) examined the relationships between stage of change, processes of change, and self-efficacy among the Swiss population.

Recently, in Korea, we applied one of the four constructs, stage of change, to stress management behavior\(^2\). We defined stress management behavior as healthy behaviors to manage stress, such as regular relaxation, physical activity, talking with others, and/or engaging in social activity for at least 20 min. This definition has been featured in the Pro-Change’s TTM-based stress management manual\(^25\). To further empirically test the applicability of the TTM to stress management behavior in Korea, it is necessary to develop measures for other constructs and confirm whether the relationships between the constructs are revealed as theoretically expected. Developing a Korean measure of self-efficacy for stress management behavior and confirming theoretically expected patterns between stage of change and self-efficacy for stress management behavior are some of the empirical tests of the TTM needed for its application to stress management behavior in Korea.

In this study, we focused on using Pro-Change’s self-efficacy measure for stress management behavior\(^2\) (PSSM) and examining the relationship between stage of change and self-efficacy. The PSSM has been used in Pro-Change’s TTM-based stress management intervention study\(^2\). This is a single scale with 10 items. One factor structure of the PSSM has been confirmed to be as follows: comparative fit index (CFI)=0.85. Internal consistency was also confirmed\(^10\) as follows: Cronbach’s alpha coefficient was 0.89. This measure lists up to 10 specific situations, which may make it difficult to maintain stress management behavior, and asks respondents to
rate how confident they feel in each situation.

According to the TTM, it is assumed that self-efficacy for stress management behavior increases as people progress from one stage to the next stage. Confirming theoretically expected patterns between stage of change and self-efficacy for stress management behavior is among the steps taken to test the applicability of the TTM to stress management behavior. Several previous studies have been conducted to examine these relationships\textsuperscript{10, 14, 17). For example, a later stage of change for stress management behavior correlated significantly with greater confidence to manage stress in HIV-positive people\textsuperscript{16). These previous studies have reported patterns that are consistent with the TTM. However, the relationship between self-efficacy and the stage of change has been examined primarily in Western societies, not in Korea. Furthermore, potential gender differences have not been explored.

The first purpose of this study was to test the PSSM on a Korean population and examine its reliability and structural validity. The second purpose was to examine the relationship between stage of change and self-efficacy for stress management behavior in Korean college students. From findings of previous studies\textsuperscript{10, 14, 17), it was hypothesized that self-efficacy for stress management behavior would increase with stage advancement.

\textbf{STUDY 1: DEVELOPMENT OF THE KOREAN LANGUAGE VERSION OF THE PSSM METHOD}

1. Measure translation

We translated 10 items of the PSSM into Korean (Table 1). The translation was permitted by Pro-Change Behavior Systems, Inc. The factor structure was assumed to be a one-factor structure. We list 10 specific situations that may make it difficult to maintain stress management behavior. These specific situations include, for example, “When I am in poor health,” “When I am depressed,” “When I am frustrated,” and “When I have problems in a relationship.” Each respondent rated the degree of confidence to manage his or her stress in these specific situations on a 5-point Likert scale ranging from 1=not at all confident to 5=very confident.

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If things are not going the way I want.</td>
<td>0.63</td>
</tr>
<tr>
<td>2. If I am in poor health.</td>
<td>0.47</td>
</tr>
<tr>
<td>3. If I am frustrated.</td>
<td>0.68</td>
</tr>
<tr>
<td>4. If I am anxious.</td>
<td>0.75</td>
</tr>
<tr>
<td>5. If I am depressed.</td>
<td>0.72</td>
</tr>
<tr>
<td>6. If I have deadlines to meet.*</td>
<td></td>
</tr>
<tr>
<td>7. If I have financial problems.</td>
<td>0.33</td>
</tr>
<tr>
<td>8. If I have problems in a relationship.</td>
<td>0.71</td>
</tr>
<tr>
<td>9. If a friend or family member is upset with me.</td>
<td>0.64</td>
</tr>
<tr>
<td>10. If I have experienced increased workload at work/school.</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Variance explained (%) 38.7

* Item 6 was removed. * ©2004. Pro-Change Behavior Systems, Inc. All Rights Reserved.
based on procedures of previous studies on exercise self-efficacy\textsuperscript{26} and coping self-efficacy\textsuperscript{27}.

3. Statistical analysis
Through an exploratory factor analysis using the maximum-likelihood method with promax rotation, we determined the factor structure of the Korean language version of the PSSM. We considered that items represented a factor if their factor loadings were at or above 0.3. Considering the factor structure of the original measure and its interpretability, we assumed that the structure of the Korean measure showed a one-factor structure. All items were expected to share the same component, that is, self-efficacy to manage stress.

Then a confirmatory factor analysis was conducted to confirm whether the structure determined was valid. We evaluated the model fitness using the following indices: goodness of fit index (GFI), adjusted goodness of fit index (AGFI), root mean square error of approximation (RMSEA), and CFI. As Byrne\textsuperscript{28} described, we considered that a higher GFI (>0.9), a higher AGFI (>0.8), a lower RMSEA (<0.1), and a higher CFI (>0.9) reflected a desirable fit. When the fit indices did not match the above-mentioned criteria, we examined the modification indices. If these modifications presented an improved model fit, we fixed the corresponding correlations between the error items.

The reliability of the Korean language version was examined in terms of temporal stability and internal consistency. Pearson’s correlation coefficient between the scores from two surveys was calculated. Cronbach’s alpha coefficient was calculated for internal consistency.

Study 1: Results

1. Exploration of factor structure
An exploratory factor analysis using the maximum-likelihood method with promax rotation helped identify two factors. The results were, however, problematic. The commonality of item 6 (If I have a deadline to meet.) exceeded item 1. Item 6 (If I have deadlines to meet.) and item 7 (If I have financial problems.) were loaded on the first factor. Item 6 was especially loaded. On the other hand, the other items, except item 2 (If I am in poor health.), were highly loaded on the second factor. These two factors were statistically identifiable but not interpretable. Considering a case of an abnormal commonality, we removed item 6 and then conducted an exploratory factor analysis with the maximum-likelihood method and promax rotation, which identified one factor (Table 1). All 9 items were highly loaded (>0.3). Thirty-eight point seven percent of the variance was explained. We regarded this model consisting of 9 items, except item 6, as the Korean language version of the PSSM.

2. Confirmation of the factor structure
We submitted the Korean language version of the PSSM for a confirmatory factor analysis. The results of the standardized path coefficients were very similar to those of the exploratory factor analysis in that all path coefficients were higher than 0.3. The GFI, AGFI, RMSEA, and CFI met the criteria (GFI=0.94, AGFI=0.91, RMSEA=0.09, and CFI=0.92). Thus, one factor structure was confirmed.

3. Reliability
Pearson’s correlation coefficient was 0.52 ($p<0.01$) between the two surveys. Cronbach’s alpha coefficient was 0.84.

STUDY 2: MEASURE VALIDITY ANALYSIS METHOD

1. Respondents
We recruited 68 male and 147 female students from a Korean university. Data collection was conducted in the same university as in Study 1. The respondents completed the Korean language version of the PSSM and some questionnaires on topics including stage of change, stress, and coping, during or after lectures of psychology. The mean ages of the respondents were 21.9 years for males and 21.6 years for females. This survey was conducted in May 2009.
2. Measurements

1) Depressive mood

The integrated Korean version of the Center for Epidemiologic Studies Depression Scale29) (CES-D) was used to measure the level of the respondents’ depressive mood. This is a one-dimensional scale and consists of 20 items. The higher the score reflects the higher the level of the depressive mood.

2) Self-efficacy

The 9 items from Study 1 were also used in Study 2.

3. Procedure and statistical analysis

To validate the Korean language version of the PSSM against depressive symptoms measured by the integrated Korean version of the CES-D29), we examined the relationship between self-efficacy for stress management and the level of depressive mood. Based on the results of Norman et al.14), it was expected that self-efficacy for stress management behavior would be inversely related to the level of depressive symptoms.

Study 2: Results

We calculated the Pearson’s correlation coefficient between self-efficacy for stress management and the level of depressive symptoms and found it to be –0.21. As expected, self-efficacy for stress management behavior correlated inversely with the level of depressive mood, which partially supported the validity of the Korean language version of the PSSM.

STUDY 3: RELATIONSHIP BETWEEN STAGE OF CHANGE AND SELF-EFFICACY METHOD

1. Respondents

Data from Study 1 and Study 2 were combined to examine the relationship between stage of change and self-efficacy for stress management behavior. The total number of respondents in both study 1 and study 2 were 228 males and 517 females.

2. Measurements

1) Stage of change

The stage of change was assessed by using the Korean language version of Pro-Change’s staging algorithm23). First, we provided the definition of stress management behavior to participants: “Stress management behavior is any form of activity that is practiced to reduce the perceived stress, such as regular relaxation, physical activity, talking with others, and/or engaging in a social activity for at least 20 min.” Then, we asked them whether they practice stress management behavior in everyday life and asked them to select one of the five items representing the stage of change: 1) “No. I have no intention to begin in the next six months.” (precontemplation stage); 2) “No. But I have the intention to begin in the next six months.” (contemplation stage); 3) “No. But I have the intention to begin in the next month.” (preparation stage); 4) “Yes. I have been practicing for less than six months.” (action stage); and 5) “Yes. I have been practicing for at least six months.” (maintenance stage). To exclude respondents who did not experience stress, the item “No. I have not been stressed.” was also included.

2) Self-efficacy

The Korean language version of the PSSM developed in Study 1 and Study 2 was used.

3. Statistical analysis

The total score of the Korean language version of the PSSM was calculated. Differences in mean values for self-efficacy for stress management behavior across stages of change were examined using a one-way analysis of variance (ANOVA) with Tukey’s post-hoc tests with stage of change as an independent variable. The 10 male and 14 female students who had not experienced stressful situations in the previous month were excluded from the analysis.

Study 3: Results

1. Distribution of stage of change

Table 2 shows the distribution of stage of change
for stress management behavior in 214 male and 507 female students. The distribution of male students was 19.6% precontemplation, 15.0% contemplation, 33.2% preparation, 12.1% action, and 20.1% maintenance stage. The distribution of female students was 10.3% precontemplation, 18.5% contemplation, 32.7% preparation, 17.9% action, and 20.5% at the maintenance stage.

2. Relationship between stage of change and self-efficacy

Table 3 indicates means and standard deviations of self-efficacy scores according to stage of change. Figure 1 shows the relationship between self-efficacy and stage of change for stress management behavior. The ANOVA revealed a significant main effect for stage \[ F(4,711)=7.35, p<0.01 \]. Tukey’s post-hoc test revealed that the score of self-efficacy for stress management behavior was significantly higher in maintenance than in the other four stages (precontemplation, contemplation, and preparation; \( p<0.01 \); versus action, \( p<0.05 \)). The score was significantly higher in preparation than in precontemplation (\( p<0.01 \)). Neither the main effect of gender \( [F(1,711)=0.61, \text{n.s.}] \) nor the interaction effect \( [F(4,711)=0.26, \text{n.s.}] \) was significant.

DISCUSSION

1. Development of the Korean language version of the PSSM

The first purpose of this study was to develop the Korean language version of the PSSM. Testing a short, reliable, and valid measurement was among the steps necessary to develop the TTM-based intervention. Through a series of factor analyses, we developed a shortened 9-item Korean language version of the PSSM. The result of the factor analysis indicated that the Korean language version of the PSSM consists of one factor.

We assessed the reliability of the Korean language version of the PSSM in terms of internal consistency and temporal stability. Internal consistency was evaluated using Cronbach’s alpha coefficient, while temporal stability was examined

Table 2. Distribution of stage of change for stress management behavior

<table>
<thead>
<tr>
<th>Stage of change</th>
<th>Male</th>
<th>Percent</th>
<th>Female</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>42</td>
<td>19.6</td>
<td>52</td>
<td>10.3</td>
</tr>
<tr>
<td>Contemplation</td>
<td>32</td>
<td>15.0</td>
<td>94</td>
<td>18.5</td>
</tr>
<tr>
<td>Preparation</td>
<td>71</td>
<td>33.2</td>
<td>165</td>
<td>32.5</td>
</tr>
<tr>
<td>Action</td>
<td>26</td>
<td>12.1</td>
<td>91</td>
<td>17.9</td>
</tr>
<tr>
<td>Maintenance</td>
<td>43</td>
<td>20.1</td>
<td>105</td>
<td>20.7</td>
</tr>
<tr>
<td>Total</td>
<td>214</td>
<td></td>
<td>507</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Means and standard deviations of self-efficacy scores according to stage of change

<table>
<thead>
<tr>
<th>Stage of change</th>
<th>Male Mean (SD)</th>
<th>Female Mean (SD)</th>
<th>Total Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>24.8 (6.18)</td>
<td>24.9 (5.27)</td>
<td>24.8 (5.67)</td>
</tr>
<tr>
<td>Contemplation</td>
<td>25.8 (6.48)</td>
<td>26.1 (5.80)</td>
<td>26.0 (5.96)</td>
</tr>
<tr>
<td>Preparation</td>
<td>27.3 (5.23)</td>
<td>26.9 (6.54)</td>
<td>27.1 (6.17)</td>
</tr>
<tr>
<td>Action</td>
<td>28.1 (8.01)</td>
<td>26.7 (5.70)</td>
<td>27.1 (6.28)</td>
</tr>
<tr>
<td>Maintenance</td>
<td>29.2 (5.96)</td>
<td>29.3 (6.34)</td>
<td>29.3 (6.21)</td>
</tr>
</tbody>
</table>

* ( )=SD.
by calculating Pearson’s correlation coefficient between the two surveys. Both indices were within the tolerance levels.

These results suggest that the Korean language version of the PSSM is a reliable questionnaire with an acceptable structural validity for the Korean student population. With a few items, the measure may be useful in future research on TTM-based stress management among Korean students. The full measure may be more appropriate for adults.

2. Stage of change and self-efficacy

The second purpose of this study was to examine the relationship between stage of change and self-efficacy for stress management behavior. One of the steps involved in testing the applicability of the TTM to stress management behavior in a new population is confirming theoretically expected patterns between stage of change and self-efficacy for stress management behavior. Based on the TTM, it was hypothesized that self-efficacy for stress management increases as each stage progresses. Self-efficacy for stress management behavior was significantly higher in maintenance than in the other four stages. We also found that this relationship was independent of gender.

These results were consistent with the hypothesis and replicated the results of previous studies conducted in Western societies that examined the relationship between the two. These results also reflect the construct validity of the measure. Based on the findings of this study and previous studies, it is evident that there is a close relationship between self-efficacy and stage of change for stress management behavior. Therefore, this study has added empirical evidence to partially support the applicability of the TTM to stress management behavior.

3. Limitations

This study had several limitations. First, the sample size of the study was relatively small, especially the sample of male university students. It is necessary to replicate the present results in the future with a larger sample size. Second, we recruited college students from limited areas in Korea. So it is unknown that the 9 item Korean language version of the PSSM is appropriate for different populations. Therefore, in future studies, it will be necessary to examine the validity of factor structure in different samples. Third, this study was cross-sectional, and the causal relationship between
stage of change and self-efficacy for stress management behavior could not be explored. Self-efficacy for managing stress is expected to mediate future attempts of stress management behavior. A longitudinal study would enable us to explore the causal relationship; therefore, it is suggested that future studies be longitudinal.

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韓国大学生のストレスマネジメント行動の変容ステージと自己効力感との関連性

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要 約

本研究は2つの目的を達成するために行われた。第1の目的は、Pro-Change’s self-efficacy measure for stress management behavior（PSSM）韓国語版を開発することであった。第2の目的は、韓国の大学生において、ストレスマネジメント行動の変容ステージとセルフエフィカシーとの関連性を検討することであった。本研究ではストレスマネジメント行動を定期的にリラクセーションする、運動する、他者と話をすること、あらゆる社会的活動に参加するなど、ストレスを緩和するための活動を1日に少なくとも20分間行うことと定義した。参加者は228名の男子大学生と517名の女子大学生である。参加者はストレスマネジメント行動の変容ステージとセルフエフィカシー、および抑うつに関連する質問紙に回答した。セルフエフィカシーに関しては2週間後にも回答した。因子分析の結果、9項目からなり、受容可能な信頼性を有するPSSM韓国語版が開発された。自己効力感は抑うつと負の相関を示したことから、PSSM韓国版の妥当性が一部支持された。ストレスマネジメント行動のセルフエフィカシーは、その他の変容ステージに属する者と比較して、維持期に属する者で高く、多理論統合モデルをストレスマネジメント行動に適用できる可能性が支持された。

キーワード：セルフエフィカシー、変容ステージ、ストレスマネジメント行動、多理論統合モデル