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ABSTRACT

This paper reports on a study to investigate the psychometric properties of the Japanese version of the academic self-concept scale of the Dimensions of Self Concept (DOSC). The original version was designed to assess the six dimensions of academic self-concept levels of aspiration; anxiety; academic interest and satisfaction; leadership and initiative; identification versus alienation; and stress. College students (N=158) attending a private university in Tokyo participated in the study. Analysis suggests that the Japanese version of the DOSC Scale Form H is a multidimensional scale measuring the six hypothesized constructs of academic self concept. As colleges and universities accept students from other countries, students will begin to assimilate to a new culture. Educators need to be aware of how assimilation can lead to a change in how students appraise themselves. The DOSC Scale Form H can serve as a useful tool to help understand student attrition. (Contains 32 references and 3 tables.) (JDM)

**PSYCHOMETRIC PROPERTIES OF A
JAPANESE VERSION OF AN ACADEMIC
SELF-CONCEPT SCALE FOR COLLEGE
STUDENTS**

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A Japanese Version of an Academic Self-Concept Scale

Abstract

The present study investigated the psychometric properties of a Japanese version of an academic self-concept scale titled the Dimensions of Self-Concept (DOSC). Confirmatory factor analysis served as a method of investigation. The original English version of the DOSC scale is a 96-item self-reporting questionnaire assessing six dimensions of academic self-concept: *Level of Aspiration, Anxiety, Academic Interest and Satisfaction, Leadership and Initiative, Identification versus Alienation, and Stress*. The rendition in Japanese comprised the same items representing the same six dimensions. A total of 158 college students attending a major private university in Tokyo, Japan participated in the study. Internal consistency reliability of scores on the six subscales ranged from .83 to .89. Confirmatory factor analysis performed on several alternative models rendered the best-fit indices in terms of χ^2 , χ^2/df , NNFI, NFI, and CFI to an oblique six-factor model, thus indicating the plausibility of the originally hypothesized six constructs.

Self-concept is an implicit set of beliefs that individuals have about themselves (Hattie, 1998). Such beliefs provide standards, plans, rules and scripts for individuals' behaviors in various aspects of their lives (Markus & Wurf, 1987). Researchers (Shavelson, Hubner, & Stanton, 1976; Shavelson, Bolus, 1982;

Song & Hattie, 1984) who investigated self-concept in the past have agreed on a hierarchical, multifaceted nature of self-concept. Each individual has a global perception of self (a general self-concept). Each individual also has more specific perceptions of self, such as a perception of self relating to school achievement (academic self-concept), relating to human relationships (social self-concept), and relating to physical appearance (physical self-concept). A model of the hierarchical, multifaceted self-concept presents general concepts at the apex of the hierarchy governing more specific self-concepts (academic, social, physical) underneath.

As a psychological construct guiding and mediating students' attitudes and behaviors toward learning and achievement, academic self-concept has attracted attentions of many researchers. As mentioned earlier self-concept is a salient belief and it is often translated into words and deeds of individuals. Students with a positive perception of self as learners will most likely display behaviors and attitudes leading to positive outcomes of learning, whereas students with negative perception of self will do otherwise. Studies investigating the causal relationship of self-

concept and academic achievement have so far failed to reach a conclusive answer as to a direction of causality; however, enough studies provide evidence of a significant relationship between the two (West, Fish, & Stevens, 1980; Wylie, 1979). Ways to identify students suffering from negative academic self-concept and foster positive self-concept among them, therefore, warrants attention of concerned educators.

Michael and his colleagues identified six patterns (or dimensions) of students' attitudes and behaviors associated with low or high academic self-concept: *Level of Aspiration* (ASP), *Anxiety* (ANX), *Academic Interest and Satisfaction* (AIAS), *Leadership and Initiative* (LAI), *Identification versus Alienation* (IA), and *Stress* (STR). These distinct six dimensions are hypothetically interactive as well, one strengthening or weakening the rest, and thus shaping a unique academic self-concept of an individual at a given time and place. Studies of Michael and his colleagues in the past have produced four different forms of an academic self-concept scale titled Dimensions of Self-Concept (DOSC), Form E, S, H, and W. Each of the four forms, essentially parallel in content, was developed for use by a specific population.

The DOSC scales, Form E, S, and H (Michael, Smith, & Michael, 1989) measure academic self-concept of students in elementary school, secondary schools, and higher education, respectively, and the Form W (Crowder and Michael, 1989a, 1989b, 1991) measures job-related self-concept of adults in the demanding, stressful workplaces.

The academic DOSC scales (E, S, H) as well as the workplace DOSC scale (W) embody a theory of multidimensional, interactive constructs of self-concept. The academic DOSC scales (E, S, H) comprise five subscales measuring the five hypothesized factor dimensions associated with academic self-concept: *Aspiration* (ASP), *Anxiety* (ANX), *Academic Interest and Satisfaction* (AIAS), *Leadership and Initiative* (LAI), and *Identification versus Alienation* (IA). The workplace DOSC scale (W) comprises six subscales: ASP, ANX, LAI, IA, Job Interest and Satisfaction (JIAS), and a sixth subscale representing the sixth hypothesized factor dimension labeled *Stress* (STR).

Extensive psychometric analyses employing exploratory and confirmatory factor analyses on the five-factor academic DOSC scales (E, S, H) in the past years yielded evidence for the

construct validity of scores on the five subscales (ASP, ANX, AIAS, LAI, IA) (Michael et al., 1989). Two studies (Foraker & Michael, 1994; Smith, Michael, & Gribbons, 1997) following the development of the DOSC, Form W (Crowder et al., 1989a, 1989b, 1991) also provided promising evidence for the construct validity of scores on the six subscales (ASP, ANX, JIAS, LAI, IA, STR). Several cross-cultural studies involving the two forms of the five-factor DOSC scales, Form H for college students (Al-Samarrai, Michael, & Hocevar, 1993; Villar, Michael, & Gribbons, 1995a, 1995b) and Form S for high school students (Chong & Michael, 1997; Paik & Michael, 1999) examined whether construct validity of the scores on the five subscales (ASP, ANX, AIAS, LAI, IA) could be realized in samples of students in different cultures. In general the results yielded a promising support for the construct validity of scores as those originally hypothesized in the English version of the five-factor DOSC scales, Form H and S.

The present investigation attempted to develop a Japanese version of academic DOSC scale, Form H for college students and provide information regarding its reliability and construct validity. An earlier study (Paik et al., 1999) involving a Japanese version of

the DOSC scale (Form S) for high school students provided a promising empirical support for a five-factor DOSC scale (Form S). For the present investigation a sixth subscale (STR) adapted from the original English version of the DOSC scale (Form W) for adults in the workplaces was replicated in a Japanese version of the DOSC scale (Form H) for college students. An impetus to include a sixth subscale, STR in the DOSC scale for college students was an assumption that college students burdened everywhere today with extra-curricular activities such as community work, sports, and part-time employment would most likely undergo stress similar to that experienced by adults in demanding workplaces.

The present study provides additional data and information regarding the reliability and construct validity of the DOSC scale, Form H contributing to a more parsimonious understanding of constructs of academic self-concept. It is also of interest from a cross-cultural perspective to ascertain whether the same constructs can be realized for Japanese college students as for their U.S., Arab, and Portuguese counterparts. Japan is reportedly moving toward more student-centered education recently (Shimahara, 1995). As concerned educators in Japan focus more on students'

feelings and attitudes aside from mere academic performance in the process of education, a reliable, valid instrument that would provide relevant information about such states becomes indispensable. The DOSC, Form H has the potential of becoming a diagnostic tool to identify students experiencing difficulty arising from poor self-concept.

Purpose

The primary purpose of this investigation was to present information regarding the reliability and factorial structure of a Japanese version of the DOSC, Form H hypothesized to represent six dimensions of academic self-concept. A secondary purpose was to investigate relationships, if any, between the scores on each of the six subscales (ASP, ANX, AIAS, LAI, IA, STR) and the three selected demographic variables (class, gender, and academic achievement). The results of previous studies (Al-Samarrai et al., 1991; Villar et al., 1995a, 1995b) on the DOSC scale, Form H involving Arab and Portuguese college students suggested that a relatively moderate to high degree of invariance exists across culturally diverse samples in the constructs of academic self-

concept as measured by the DOSC scale. The present study would provide further information on the reliability and construct validity of scores on the DOSC, Form H from another cross-cultural perspective. The present study might also lead to a reliable, valid instrument to diagnose students experiencing difficulty in colleges arising from poor self-concept in Japan.

Method

Participants

A sample of 158 college students enrolled in a science course at a major private university in Tokyo, Japan participated in this study. The university drew students from various regions of Japan and is considered highly competitive among both private and national universities (equivalent to state universities in the U.S.). Of 158 students participating in this study 60 were male and 98 were female. The sample included 52 freshman, 61 sophomores, and 42 juniors. There were no seniors. Three failed to indicate their class. Indicator of academic achievement employed in the present study was a self-reporting academic achievement. Those reported academic achievement to be in the top 20% were 23, bottom 20%

were 24, and neither top nor bottom 20% were 81. Thirty did not report their academic achievement.

Instrument

The researcher translated the original English version of the academic DOSC scale, Form H into Japanese. The rendition in Japanese consisted of six factor subscales including ASP, ANX, AIAS, LAI, IA, and STR. The sixth factor subscale (STR), adapted from the original English version of the job-related DOSC scale, Form W, was added after appropriately modifying wording to fit an academic environment of college students. For example the word 'supervisor' was replaced with 'instructor', and 'office' with 'classroom.' Two Japanese college students enrolled in a graduate school in a Los Angeles area completed the questionnaire as a pilot test to ascertain that the question items in the DOSC scale would pose no ambiguity to the respondents. They reported no ambiguity. A retired high-school principal in Japan, who was also familiar with the current practice of education in Japan checked the questionnaire items to ensure that the school-related practices and activities reflected in the DOSC scale apply to the culture of Japanese universities. He reported no conflicting practices and

activities. A Japanese-English bilingual person who had not seen the original English version of the DOSC scales back-translated the form into English. The researcher together with the author of the original English version of the DOSC scales checked the accuracy of the translation and judged it to be appropriate.

The Japanese version of the six-factor DOSC scale, Form H is a 96-item scale consisting of six subscales (ASP, ANX, AIAS, LAI, IA, STR) with 16 items per subscale. Each item is weighted on a 5-point *Likert* scale ranging from 1 (*Never*) to 5 (*Always*). A potential range of scores for each of the six subscales was from a minimum of 16 to a maximum of 80 with higher scores reflecting the greater manifestation of the hypothesized construct each subscale represented. In order to minimize the possibility of response sets, items were distributed in a cyclical manner throughout the DOSC scale so that every sixth item would form one factor subscale. The three demographic variables were included to investigate relationships, if any, between scores on each of the six factor subscales and the three selected demographic variables, that is, class, gender, and academic achievement. The following scores were assigned to the demographic variables:

Freshman (1), Sophomore (2), Junior (3), and Senior (4); Male (1) and Female (2); for academic achievement Top 20% (1), Middle (2); Bottom 20% (3).

Administration

The Japanese version of the six-factor DOSC scale, Form H is a self-reporting questionnaire requiring approximately 20 to 30 minutes to complete. Two hundred sets of questionnaire and answer sheet were mailed to a professor at a participating university. A letter accompanying the questionnaires provided the instructions for administration. The instructions included that students would answer anonymously, that there were no right or wrong answers, and that students were to choose only one answer that best describes his or her attitudes, feelings, or opinions. One hundred fifty-eight students completed the questionnaires. The completed questionnaires were collected in class on the same day and later mailed back to the researcher.

Data Analyses

The following psychometric analyses employing the SPSS (1990) and the EQS (Bentler, 1989) were performed in the present study.

1. The means, standard deviations, and intercorrelations of the six factor subscales were calculated.
2. Item analyses were carried out to determine the correlations of each of the 96 items with (a) the total score of the subscale of which it was intended to be a member and with (b) the total scores of the subscales of which it was not intended to be a member.
3. A coefficient alpha estimate of internal consistency was calculated for each of the six subscales.
4. ANOVA tests were performed to determine differences in the mean scores across the classes and academic achievement and between genders.
5. Confirmatory factor analyses (CFA) were performed to test the factor structure of the DOSC, Form H. In performing the CFA the present study followed a partial disaggregation model (Bagozzi and Heatherton, 1994) that portrays each factor dimension as a separate latent variable consisting of subsets derived from a larger set of test items. In the present study each of the six subscales were grouped into four subsets, each consisting of four items. The procedure yielded a total of twenty-four subsets from the six factor subscales. The scores on these subsets were subsequently intercorrelated and factor analyzed. The EQS program (Bentler, 1989) performed the CFA on the following alternative models: (i) a general factor model indicating a Japanese version of the DOSC scale, Form H is a uni-dimensional instrument, (ii) an oblique two-

factor model with one factor representing positive affect (ASP, AIAS, LAI, IA) and the other representing negative affect (ANX, STR), (iii) an oblique four-factor model with each of ANX, IA, STR factor and a composite of ASP, AIAS, and LAI, (iv) an oblique five-factor model with each of ASP, ANX, IA, STR and a composite of LAI and AIAS, and (v) an oblique six-factor model hypothesizing that the Japanese version of the DOSC scale, Form H is a six dimensional instrument measuring the six relatively discrete and interactive dimensions of academic self-concept, as was originally hypothesized. Previous studies on the various forms of the DOSC provided the rationales selecting and testing the alternative models.

Findings

Preliminary Statistics

Table 1 shows intercorrelations of the scores of the six factor subscales, internal-consistency (alpha) estimates of reliability, and subscale means and standard deviations.

Table 1

Means, Standard Deviations, and Intercorrelations of Scores on Six Factor Subscales of a Japanese Version of the DOSC Scale, Form H Including Internal-Consistency Estimates of Reliability of Scores Along the Principal Diagonal (N = 158)

DOSC Subscales	I	II	III	IV	V	VI	Mean	SD
Level of Aspiration	(89)	45	64	68	52	34	40.14	8.98
Anxiety	45	(87)	30	29	21	63	36.48	10.65
Academic Interest and Satisfaction	64	30	(86)	72	47	30	40.03	10.41
Leadership and Initiative	68	29	72	(88)	43	31	31.92	10.07
Identification vs. Alienation	52	21	47	43	(84)	14	41.19	8.98
Stress	34	63	30	31	14	(83)	37.86	9.45

Note: Decimal points have been omitted for factor subscales I through VI. The numbers in parentheses indicate internal consistency estimates of reliability.

Mean score and standard deviation for each of the six-factor subscales was 40.14 and 11.80 for ASP, 36.48 and 10.65 for ANX, 40.03 and 10.41 for AIAS, 31.92 and 10.07 for LAI, 41.19 and 8.98 for IA, and 37.86 and 9.45 for STR. Intercorrelations among the six sub-scales ranged from .14 to .72. The two highest correlation coefficients of .72 and .68 occurred between AIAS and LAI and between ASP and LAI, respectively. The lowest correlation coefficients of .14 occurred between the STR and IA subscales. Earlier studies involving various forms of the DOSC scale also reported rather high correlation coefficients between AIAS and LAI and the results of the present study were consistent with their findings. In the present study the correlation coefficients between the subscales representing negative affect (ANX, STR) and the positive affect (ASP, AIAS, LAI, IA) revealed low to moderate positive correlation. The range of correlation coefficient between ANX and each of the subscales representing positive affect was .21 to .45, with the highest correlation coefficient of .45 registered between the ASP and ANX subscales. In the same token the STR subscale ranged from .14 to .34, again with the highest correlation coefficient of .34 registered between the ASP and STR

subscales. Past studies (Al-Samarrai et al., 1993; Villar et al., 1995; Smith et al., 1997) equivocally reported low and often negative correlation in the cases just cited. The results of the present study were somehow incongruent to those reported in the past.

Internal Consistency Estimates of Reliability

As shown in Table 1 for each of the six-factor subscales (ASP, ANX, AIAS, LAI, IA, STR) the respective internal consistency estimate of reliability was .89, .87, .86, .88, .84, and .83. These coefficients were comparable to those reported in the earlier studies (Al-Samarrai et al., 1993; Villar et al., 1995; Smith et al., 1997) involving the various forms of the DOSC scale and higher than those obtained from the study of a Japanese version of a 70-item, five-factor DOSC scale involving 354 Japanese female high school students (Paik et al., 1999).

Within each of the six 16-item subscales (ASP, ANX, AIAS, LAI, IA, STR) the numbers of items that were correlated more highly with their intended subscale than with any other subscales was 16, 16, 16, 15, 16, and 15, respectively. In all but two instances an item was more highly correlated with its intended subscale than with any other subscales. This outcome was a hit-rate

of 98%. This result is comparable to that obtained in the study of a Japanese version of the academic DOSC scale, Form S for high school students, which reported a 96% “hit-rate”.

CFA

To examine the underlying factor structure of a Japanese version of the DOSC scale, Form H CFA was performed with the maximum likelihood (ML) method of estimation according to the procedures described in the EQS Structural Equations Program Manual (Bentler, 1989). CFA is a form of structural equation modeling (SEM). It is currently the predominant method of analysis found in the literature of validity studies, particularly when the internal factor structure of a newly developed test instrument is being validated. EQS provides several indices of an overall estimate of the closeness of fit of the models. Among such indices were χ^2 , χ^2/df (Joreskog and Sorborm, 1989), Non-normed Fit Index (NNFI) (Bentler & Bonnet, 1980), Normed Fit Index (NFI), and Comparative Fit Index (CFI) (Bentler, 1989). A goodness-of-fit χ^2 and χ^2/df both provide relative fits of different models. Smaller values of these two indices indicate a closer degree of fit between a given model and the observed data. The

values of NNFI greater than 1 (in other than a small sample) represent a good fit, and one less than zero a poor fit (Loehlin, 1998). The values of NFI fall in the range of 0 to 1 with values closer to 1 indicating a better fit. NFI describes the fit of a given model relative to a baseline model (a null model). When the fit is excellent, the NFI approach 1. CFI estimates how well a given model would fit in the population. It also falls in the range of 0 to 1 with values closer to 1 indicating a better fit between the observed sample data and the population. In selecting the competing factor models the results of the previous studies on the different forms of the DOSC scale were taken into consideration. In the present study initial calculation of intercorrelations among the six factor sub-scales showed high correlations among the ASP, AIAS, and LAI sub-scales. In light of this a four-factor model with ASP, AIAS, and LAI combined into one factor and the remaining factors, ANX, IA, and STR was also tested as an alternative model in addition to a one-factor model, a two-factor model, a five-factor model, and a six-factor model.

Table 2 summarizes the outcomes of the confirmatory factor analyses.

Table 2

Goodness-of-Fit Results for All Models ($N = 158$)

Model Description	Number of Test Variables	Number of Factors	Df	χ^2	χ^2/df	NFI	NNFI	CFI
One-factor model	24	1	250	1018.042	4.07	.600	.626	.662
Oblique 2-factor model F1=ASP/AIAS/LAI/IA; F2=ANX/STR	24	2	248	694.072	2.80	.727	.781	.803
Oblique 4-factor model F1=ASP/AIAS/LAI; F2=ANX; F3=IA; F4=STR	24	4	247	646.187	2.61	.746	.803	.824
Oblique 5-factor model F1=ASP; F2=AIAS/LAI F3=ANX; F4=IA; F5=STR	24	5	252	879.905	3.49	.654	.697	.723
Oblique 6-factor model	24	6	233	426.458	1.83	.832	.899	.915

Note. NNFI = non-normed fit index; NFI = normed fit index; CFI = comparative fit index

As evidenced by the goodness-of-fit indices in Table 2, the six-factor oblique model hypothesized to represent the six constructs of a Japanese version of the DOSC scale, Form H accounted for a greater amount of covariance in the matrix of the 24 subsets than any other competing model did. In the oblique six-factor model the intercorrelations varied from .21 to .82. The highest intercorrelation of .82 occurred between AIAS and LAI subscales and the lowest intercorrelation occurred between IA and STR subscales.

Comparison of Scores on the Subscales of the DOSC-Form H by Class, Gender, and Academic Achievement

Table 3 shows means and standard deviations of scores on the six factor subscales.

Table 3Means and Standard Deviations of Scores on the Six Factor DOSC Scale (N = 158)

		ASP	ANX	AIAS	LAI	IA	STR
Freshman	Mean	41.90	39.21	42.03	33.19	38.57	40.92
(n = 52)	SD	12.46	11.03	8.90	10.29	12.14	13.01
Sophomore	Mean	14.93	35.54	39.54	32.13	44.57	35.74
(n = 61)	SD	12.03	10.30	11.52	10.30	9.48	9.25
Junior	Mean	35.47	34.71	37.33	29.81	37.07	33.61
(n = 42)	SD	9.75	10.33	12.06	9.30	7.98	9.91
Male	Mean	39.47	37.18	39.43	32.49	37.72	39.54
(n = 59)	SD	13.32	12.61	10.31	11.32	8.75	10.96
Female	Mean	40.52	36.02	40.41	31.66	43.41	36.88
(n = 98)	SD	10.89	9.36	10.56	9.30	8.42	8.37
High GPA	Mean	42.26	36.34	42.00	33.52	44.52	36.57
(n = 23)	SD	15.57	13.28	13.74	12.68	12.56	11.91
Mid GPA	Mean	41.56	37.40	40.72	32.67	41.70	38.95
(n = 81)	SD	11.06	10.82	9.71	10.21	7.46	9.48
Low GPA	Mean	37.25	34.66	39.20	31.50	41.73	37.13
(n = 24)	SD	10.90	9.85	8.90	8.23	8.11	7.80
Total	Mean	40.14	36.48	39.77	31.92	40.41	36.90
(N = 158)	SD	11.80	10.65	10.86	10.07	10.53	11.07

Among the three demographic variables investigated in this study the class variable displayed a negative correlation with scores on the ASP, IVA, and STR factor subscales to a statistically significant degree as follows: $F(3, 153) = 3.221, p < .05$, $F(3, 150), p < .05$, and $F(3, 149), p < .05$, respectively. The differences of the scores observed between genders as well as across academic achievement were not statistically significant.

Discussion

The present paper investigated psychometric properties of a Japanese version of the DOSC scale, Form H for college students. The theoretical framework set forth by Michael and his colleagues in developing the original English version of the DOSC scale, Form H for college students as well as Form W for adults in the workplaces served as a conceptual model in the development of the scale. The results of reliability tests afforded a satisfactory level of reliability for all the six sub-scales with alpha coefficients of reliability ranging from .83 to .89, and item analyses revealing 94 of 96 items correlated higher with their intended sub-scales than those not. The results of confirmatory factor analyses based on a

partial disaggregation model (Bagozzi and Heatherton, 1994) indicated that among several alternative models the originally hypothesized six-factor model would explain the greatest proportion of covariance in the matrix of 24 sub-tests derived from the 6 factor subscales. Based on these results it is concluded that for a sample of 158 students who participated in the present study a Japanese version of the DOSC scale, Form H is a multidimensional scale measuring the six hypothesized constructs of academic self-concept (ASP, ANX, AIAS, LAI, IA, STR).

Researchers have long discussed cultural influence on the development of self-concept. However, past studies on self-concept have mainly dealt with American, Europeans, and Australians, products of western philosophical traditions that tend to value self as a primary source of control over one's environment (Hattie, 1998). However, there is little study relating to the differences between western views of self-concept and views in other cultures. Furthermore, there is little empirical study relating to the effects of such differences on individuals. A few studies (Shweder & Bourne, 1982; Stevenson, Azuma, & Hakuta, 1986) in the past suggested that in the western culture individuals try to alter

and shape their environment, while in the Japanese culture individuals try to fit themselves into their environment. Explained as such, it is natural to expect a significant difference how individuals in the two cultures view themselves and how they act and react in a given situation. The findings of the present study provide an important step to future cross-cultural comparisons of academic self-concept of student in the two cultures.

Today colleges and universities in both Japan and the U. S. A. are accepting students from each other with increasing numbers. As students begin to assimilate to a new culture, educators need to be aware of how such assimilation can lead to dramatic changes in ways those students appraise themselves and possible negative consequences. The situation and the environment have a great impact on a person's self-concept. A potential consequence is a failure of a student fails regardless of his or her promising potential because of negative self-concept, and unintentional contribution by schools and educators to the development of such negative self-concept. The DOSC scale, Form H could serve as a useful diagnostic tool to screen such cases.

Recommendations

The present study employed a sample size of 158 subjects. The most widely quoted rule-of-thumb for CFA states that a sample size should be at least 200 (Boomsma, 1982). On the other hand some studies (Anderson and Gerbing, 1984) found that for models with at least three indicators per factor sample sizes as small as 150 generally would be adequate. The present study conformed to the less stringent guidelines of the latter; however, the study needs to be replicated with a larger sample to ascertain the degree to which the findings of the present study would be generalized to a broad spectrum of college student population in Japan. Future studies should also look into cross-cultural comparisons of scores on the DOSC scale in the U.S.A. and Japan.

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