Research Article

PSYCHOLOGICAL WELL-BEING, DEPRESSION, AND ANXIETY IN JAPANESE UNIVERSITY STUDENTS

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Background: *In order to further investigate the relationship of psychological well-being with depression and anxiety.* **Method:** *Students from five universities were solicited to participate in this study and 545 students with a mean age of 20.1 (SD = 2.2) years were finally accessed to analysis.* **Result:** *All six dimensions—autonomy (AU), environment mastery (EM), personal growth (PG), positive relationships with others (PR), purpose in life (PL), and self-acceptance (SA)—of the Scales of Psychological Well-being Inventory (SPWB) were moderately negatively correlated with depression and anxiety as measured by the Hospital Anxiety and Depression Scale (HADS). Furthermore, due to a good fit with the present data, the model of SPWB on depression and anxiety was consistent with the theory of psychological well-being and indicated that HADS depression was predicted by EM, PR, and SA, while HADS anxiety was predicted by AU, EM, PG, PR, and SA.* **Conclusion:** *SPWB is a reliable measure of well-being for Japanese young adults, and the negative affectivity such as depression and anxiety is to some extent determined by the lack of psychological well-being. Depression and Anxiety 26:E99–E105, 2009.*

Key words: *psychological well-being; depression; anxiety; structural equation modeling (SEM)*

INTRODUCTION

Although the typical greeting, "How are you?" seems simple enough for the answer, "I am fine", theorists have found that the concept of psychological well-being (PWB) is much more complex and controversial. The concept of well-being refers to optimal psychological functioning and experience. However, historically, mental health research has been dramatically weighted on the side of psychological dysfunction, and health has been equated with absence of illness rather than the presence of wellness.[1] Because health was defined as "a state of complete physical, mental, and social well-being" (p. 28) by the World Health Organization,[2] especially in recent decades, research on positive functioning has flourished from two general perspectives:[3] the hedonic approach, defining well-being as subjective well-being (SWB), such as happiness, pleasure attainment, and life satisfaction;[4] the eudaimonic approach, defining well-being as PWB, namely a person's full functioning.[5]

From the eudaimonic view, Ryff[6] proposed a multidimensional model of well-being, which includes the following constructs: autonomy (AU), environmental mastery (EM), personal growth (PG), positive relationships with others (PR), purpose in life (PL), and self-acceptance (SA). Each construct of PWB articulates different challenges that individuals encounter as they strive to function positively, and in combination, these dimensions encompass a breadth of wellness. Ryff[5] also developed a self-rating questionnaire (Scales of

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Psychological Well-being, SPWB) to measure these constructs. Although early studies supported the six-factor structure[5–7] and showed how the six dimensions varied by age, sex, and culture,[8] and were associated with personality traits,[9] life changes,[10–11] stressful life events, and resilience,[12] in recent years, there is increasing controversy about the six-factorial structure of SPWB.[13–16] In these studies, due to high correlations among four of six dimensions (EM, PG, PL, and SA), it is suggested that these four dimensions should be integrated into only one.[16] Furthermore, a model that a single second-factor is loaded on these four dimensions has been proposed.[13] On the other hand, despite low internal consistency, the six-factor structure was none the less supported in western and eastern samples.[17–21] For the Japanese sample, the six-factor structure was also validated using an exploratory factor analysis.[22] Because confirmatory factor analysis (CFA) can be a more powerful tool when a model has already been established,[23] in this study, CFA will be carried out using the same sample as Kitamura et al.[22] used.

As different aspects of well-being, researches have proved the association between SWB and PWB.[21,24] However, as the definition of mental health has gradually shifted from the absence of negative affectivity, including depression and anxiety, to the presence of positive affectivity, research interest on how these two are associated has emerged. PWB has been negatively correlated with negative affectivity.[6,7,12,13,22,25] Because these studies were correlational, which one is determinant for the other remains to be studied. Mood state may determine PWB. For instance, some studies have indicated that people who are upset, depressed, or anxious describe themselves as unwell.[26,27] King and Pennebaker[28] have suggested that suppressing or withholding emotions has clear costs for psychological health, and Keyes[29]; has reported that completely mentally healthy adults—individuals free of a 12-month mental disorder and flourishing—had the healthiest psychosocial functioning (i.e., low helplessness, clear goals in life, high resilience, and high intimacy). Contrarily, Ryff[6] argued that PWB should be fully functioning and that the six components of the PWI should be recognized as the principal factors that determine the mood state. Owing to low prevalence of only 20% of flourishing in adult population, the need for a program on mental health promotion to complement ongoing efforts to prevent and treat mental illness was educed.[29] Therefore, because emotional state is not included in the definition of well-being, affectivity can be studied as an outcome of PWB or vice versa.

The purposes of this study are two-fold. The first is to confirm whether the prior six-factor structure of SPWB fits the Japanese sample by the method of CFA. The second is to explore the relationship of PWB with negative affectivity such as depression and anxiety using structure equation modeling, which can weigh the causal links between the multiple variables.

METHODS

SAMPLE AND PROCEDURE

Students from five universities were solicited in class by a lecturer to participate in this study. Before the questionnaires were distributed to students, an explanation was made that the participation was voluntary with anonymity and that nonparticipation would not bring any disadvantage. This was also explicitly described in the cover letter of the questionnaire. The completed questionnaires were returned either by hand or through the mail. A total of 574 questionnaires of students who received course credits for taking part in the study were obtained, including 60 students in the major of foreign languages, 197 in health studies, 64 in management studies, 67 in medical school, 72 in social sciences, and 114 in nursing. The procedure of the study has also been described in detail elsewhere.[22] Owing to missing data, 29 students were excluded. Therefore, 132 men (24%) and 413 women (76%) with a mean age of 20.1 ($SD = 2.2$) years were finally accessed to analysis. Owing to the lack of information as to the total number of students approached by lecturers, the attention rate of the participation in this study is not known.

QUESTIONNAIRES

Psychological well-being. The SPWB[5] is a 120-item self-rating measurement, which covers the six areas of well-being: AU, EM, PG, PR, PL, SA. Each area of the first version of SPWB includes 20 items. Subsequently, the versions of 3-item, 4-item, 9-item, and 14-item for each dimension were adopted in the earlier research mentioned in the Introduction. The original version of SPWB adopted a 6-point Likert-type rating, anchored disagree and agree specifically with strongly, moderately, and slightly. The 84-item Japanese version, translated by Kitamura et al.[22] was used in this study, and subjects responded to the SPWB scales only on a 2-point scale: agree = 1 and disagree = 0. Thus, the score of each subscale ranged from 0 to14. The scores of negative items were reversed so that higher score represents more PWB. An exploratory factor analysis of the Japanese version of the SPWB has demonstrated a six-factor structure.[22]

Depression and anxiety. The negative mood of the participants was tested by the Hospital Anxiety and Depression Scale HADS[30]; a self-report screening instrument. It consists of 14 items: seven items for the anxiety (HADS-A) and seven items for depression (HADS-D). The score range of each subscale ranged from seven to 28 using a 4-point scale anchored by 1 and 4. The HADS was translated into Japanese by Kitamura.[31] Although initially the HADS was designed to identify depression and anxiety among a clinical population, Matsudaira et al.[32] have confirmed that this measurement also fits nonclinical populations.

STATISTICAL ANALYSIS

Mplus 4.1,[33] SPSS 14.0,[34] and AMOS 6.0[35] were used in the statistical analysis. Because the items of the SPWB were rated by the method of a 2-point scale and AMOS could not be fitted to the dichotomous variables,[35] CFA of SPWB was initially analyzed by Mplus 4.1,[33] a software available to continuous and ordinal variables, especially binary variables. Then SPSS 14.0 was used to perform descriptive statistic and MANOVA for gender difference and finally, AMOS 6.0 was used for structural equation modeling (SEM) of the subscales of the SPWB and HADS. For Mplus, the default estimator for models containing categorical variables is the mean and variance-adjusted weighted least-squares method, whereas the maximum likelihood method for parameter estimation is used by AMOS. For inferential statistical evaluation, only the χ^2-test is available. Although the χ^2-test is sensitive to sample size (such large samples often return statistically significant χ^2 values), it has been suggested that too much

emphasis should not be placed on the significance of χ^2 statistic. Jöreskog and Sörbom[36] have proposed that the magnitude of χ^2 should be compared to the expected value of the sample distribution, i.e., the number of degrees of freedom, as $E(\chi^2) = df$. The ratio χ^2/df should be as small as possible for a good model fit. Thus, a ratio between 2 and 3 is indicative of an acceptable model fit and the lower the ratio, the better the fit. Other descriptive indices included the root mean squared error of approximation RMSEA,[37] the Comparative Fit Index CFI,[38] the Tucker–Lewis Index TLI,[39] the Goodness of Fit Index GFI,[40] the Adjusted Goodness of Fit Index AGFI,[41] and the Akaike Information Criterion AIC.[42] According to Schermelleh-Engel, Moosbrugger, and Müller,[43] an RMSEA less than 0.08, a CFI and TLI more than 0.97, a GFI more than 0.90, and an AGFI more than 0.85 indicate an acceptable fit; an RMSEA less than 0.05, a CFI and TLI more than 0.97, a GFI more than 0.95, and an AGFI more than 0.90 indicate a good fit; a lower AIC shows a better fit among competing models. These indices were used differently for confirmatory factor analyses of the SPWB and SEMs of subscales of the SPWB and HADS.

RESULTS

CONFIRMATORY FACTORS ANALYSIS OF SPWB

In order to confirm the six-factor structure originally proposed by Ryff,[6] CFA of the SPWB was performed by Mplus 4.1. The six-factor structure of SPWB was supported by $\chi^2 = 712.50$ ($P<.001$), $\chi^2/df = 2.3$, RMSEA = 0.049, CFI = 0.863, TLI = 0.893, indicating an acceptable fit. The fact loading and response frequency of each item were listed in Table 1.

TABLE 1. The factor loadings and response frequencies (agree%) of all the 84 items

	Factors of SPWB					
Items	AU	EM	PG	PR	PL	SA
a	0.50 (12)	**0.02** (9)	0.38 (90)	0.56 (52)	0.59 (54)	0.69 (52)
b	0.64 (65)	0.43 (25)	0.60 (23)	0.63 (67)	0.44 (93)	0.72 (65)
c	0.53 (73)	0.66 (90)	0.56 (30)	0.78 (85)	0.46 (75)	0.49 (48)
d	0.62 (19)	0.37 (80)	0.50 (77)	0.57 (7)	0.59 (24)	0.46 (12)
e	**0.30** (32)	**0.17** (62)	**0.17** (14)	**0.28** (1)	0.66 (64)	0.76 (48)
f	0.38 (38)	0.58 (24)	0.83 (54)	0.73 (80)	0.58 (53)	0.54 (64)
g	**0.32** (50)	0.41 (26)	**0.26** (19)	0.53 (6)	0.62 (96)	0.73 (90)
h	0.48 (62)	0.54 (45)	0.68 (46)	0.82 (49)	0.62 (24)	0.86 (40)
i	0.84 (37)	0.49 (81)	0.84 (38)	0.47 (54)	0.54 (43)	0.57 (64)
j	0.61 (62)	0.62 (63)	0.51 (56)	0.84 (91)	0.51 (37)	0.72 (58)
k	0.59 (57)	0.55 (90)	0.66 (19)	0.52 (68)	**0.31** (94)	0.58 (83)
l	0.48 (27)	0.65 (51)	0.62 (19)	0.71 (23)	0.78 (44)	0.43 (21)
m	0.73 (52)	0.64 (30)	0.66 (90)	0.54 (32)	0.60 (64)	0.79 (58)
n	0.48 (33)	0.53 (33)	**0.18** (75)	0.65 (18)	0.83 (56)	0.57 (45)

Negative items had been reversed. Items a–n represent, respectively, the 14 items of each subscale of SPWB: 1, 7, 13, ,19, 25, 31, 37, 43, 49, 55, 61, 67, 73, 79 for AU; 2, 8, 14, 20, 26, 32, 38, 44, 50, 56, 62, 68, 74, 80 for EM; 3, 9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81 for PG; 4, 10, 16, 22, 28, 34, 40, 46, 52, 58, 64, 70, 76, 82 for PR; 5, 11, 17, 23, 29, 35, 41, 47, 53, 59, 65, 71, 77, 83 for PL; 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84 for SA. Boldfaced numbers are the low factor loadings.

The tetrachoric correlations of factors from the CFA modeling were shown in the upper diagonal of Table 2. Except for a low correlation (0.14) between AU and PR and a high correlation (0.82) between EM and PL, all the correlations are moderate ranging from 0.36 to 0.76. If the variables are dichotomous (0, 1), the Cronbach's α is equivalent to the Kuder–Richardson 20 (KR-20) reliability measure.[44] Therefore, in this study, the Cronbach's α coefficients were provided: 0.75 for AU, 0.66 for EM, 0.74 for PG, 0.77 for PR, 0.77 for PL, and 0.81 for SA.

CORRELATIONS AMONG SUBSCALES OF SPWB AND HADS

Owing to different conceptions of factor and subscale, the item scores of each factor were summed to create the score of each SPWB subscale. The method of MANOVA was used to examine the gender difference within each subscale of the SPWB and HADS, and the result demonstrated that there was no significant gender difference for subscales of SPWB ($F(1,549) = 0.628$, $P = .428$) and HADS ($F(1,567) = 1.028$, $P = .311$). Therefore, the data from men and women were combined for the following SEM analyses. A similar result such as factor correlation was observed so that the six subscales of the SPWB were moderately and significantly correlated and ranged from 0.26 to 0.58 (lower diagonal of Table 2), in addition to the correlation between AU and PR ($r = 0.08$, $P = .08$). All the subscales of the SPWB were significantly negative correlated with HADS depression and anxiety and ranged from −0.119 to −0.466 (lower diagonal of Table 2).

ANALYSIS OF STRUCTURE MODELING

In order to examine the relationship of the different dimensions of the SPWB and the negative affectivity of depression and anxiety, two hypothetical structure equation models were built based on the results of the above correlation analysis: for one model, the causal paths were defined from all the six subscales of SPWB towards depression and anxiety; for the other contrary model, the causal paths were defined from depression and anxiety towards six subscales of SPWB (see Figs. 1 and 2).

The results of the two models were shown in Figures 1 and 2. In the model of SPWB on HADS, the causal paths from AU, PG, and PL to depression and from PL to anxiety were not significant ($P>.05$), residual causal paths were significant ($P<.01$) except for the path from AU to anxiety ($P = .014$). In the model of HADS on SPWB, all the causal paths were significant ($P<.01$) except for the paths from depression to PG and PL and from anxiety to AU ($P>.05$).

The good fit of RMSEA, GFI, and AGFI of the two refined models indicated that both models fitted the

TABLE 2. Pearson correlations, means, *SD*s, and Cronbach's α of subscales of SPWB and HADS

	1	2	3	4	5	6	7	M	*SD*	Cronbach's α
1 AU	—	0.501**	0.472**	0.142*	0.358**	0.564**	—	6.8 (0–14)	3.1	0.75
2 EM	0.343**	—	0.740**	0.679**	0.828**	0.758**	—	7.8 (1–14)	2.6	0.66
3 PG	0.329**	0.492**	—	0.489**	0.741**	0.665**	—	10.3 (1–14)	2.8	0.74
4 PR	0.076	0.436**	0.363**	—	0.561**	0.508**	—	10.1 (1–14)	2.8	0.77
5 PL	0.262**	0.583**	0.556**	0.398**	—	0.744**	—	9.4 (0–14)	3.1	0.77
6 SA	0.433**	0.571**	0.502**	0.388**	0.617**	—	—	7.5 (0–14)	3.4	0.81
7 DEPR	−0.215**	−0.429**	−0.265**	−0.357**	−0.292**	−0.409**	—	6.3 (0–20)	3.9	0.71
8 ANXI	−0.119**	−0.466**	−0.394**	−0.443**	−0.431**	−0.431**	0.569**	4.5 (0–19)	3.4	0.76

$N = 545$ for all variables. The correlations signed; **are at $P<.01$; *are at $P<.05$.
The correlations among factors are above and those among subscales are under the diagonal.
AU, autonomy; EM, environmental mastery; PG, personal growth; PR, positive relationships; PL, purpose in life; SA, self-acceptance; DEPR, depression; ANXI, anxiety.

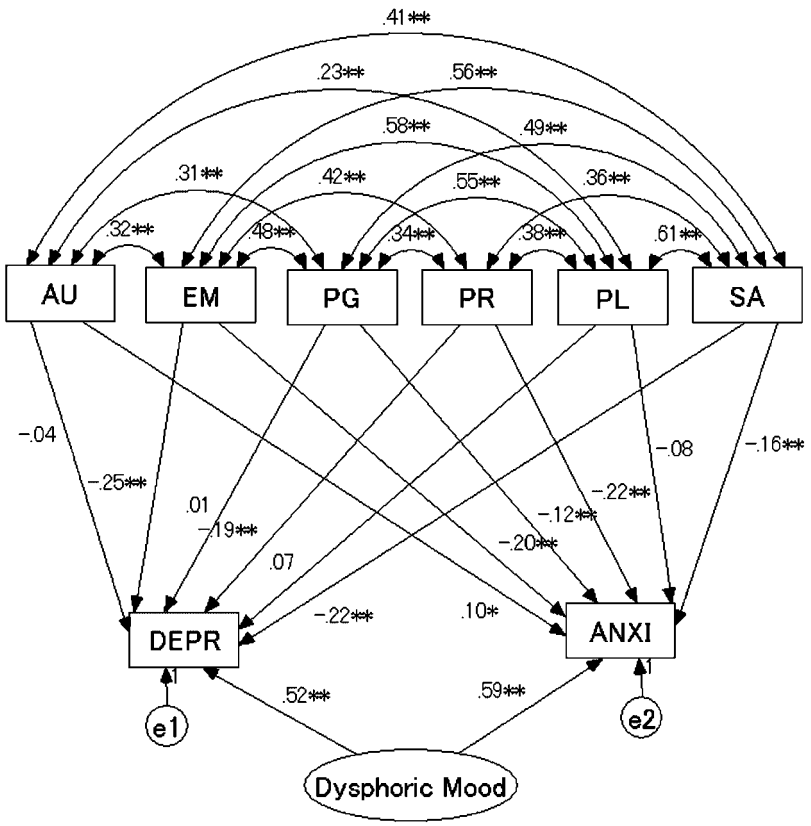

Figure 1. Model for subscales of SPWB on depression and anxiety 200 × 287 mm (96 × 96 DPI). *$P<.05$, **$P<.01$.

present data very well (see Table 3). The one purpose of this study was to explore the relationship of PWB with negative affectivity, such as depression and anxiety using structure equation modeling, which can weigh the causal links between the multiple variables. However, the result of the analysis failed to support the hypothesis that affectivity could be an outcome of PWB or vice versa, and further confirmed the association relationship between PWB and negative affectivity—depression and anxiety.

DISCUSSION

Using CFA, the same result as reported by Kitamura et al.[22] using exploratory factor analysis was obtained so that the earlier six-factor structure of SPWB fits the Japanese sample of university students. The goodness of fit and internal consistencies in this study were similar to the ones of short SPWB modified by Van Dierendinck[21] and the 4-item scales of Cheng and Chan.[17] The goodness of fit was $\chi^2_{(693)} = 1{,}110.76$, AIC = 1,302.20, CFI = 0.88,

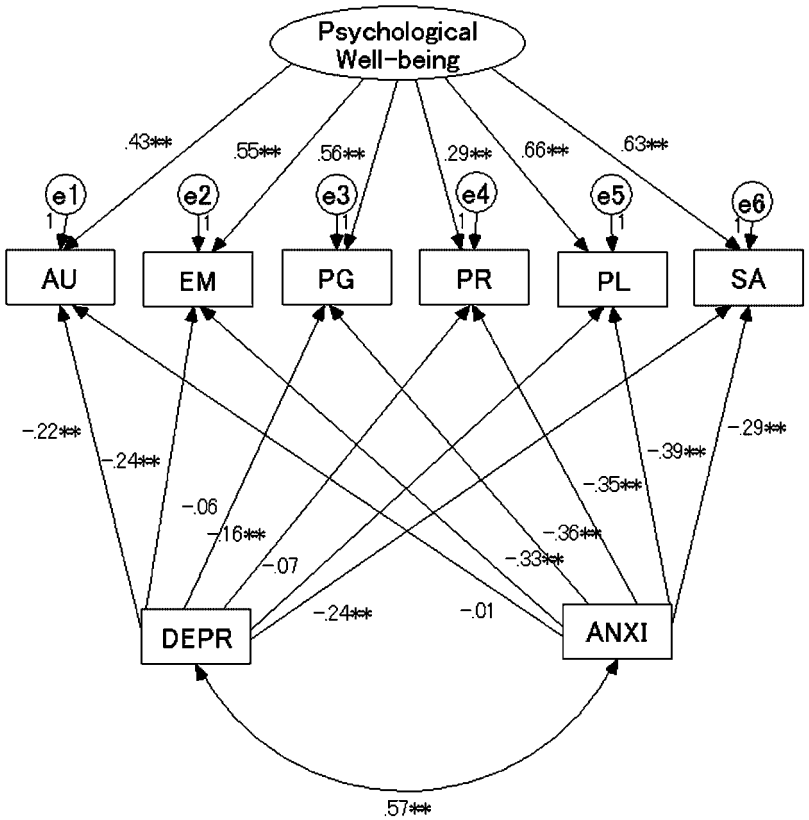

Figure 2. Model for depression and anxiety on subscales of SPWB 200 × 287 mm (96 × 96 DPI). $^{*}P<.05$, $^{**}P<.01$.

TABLE 3. Indices of good fit for the two models of subscales of SPWB, depression and anxiety

Final model	RMSEA	GFI	AGFI	AIC
SPWB on depression and anxiety	0.062	0.999	0.949	73.12
Depression and anxiety on SPWB	0.096	0.978	0.910	107.70

TLI = 0.87, and SRMR = 0.006 for Van Dierendonck's study and $\chi^2_{(237)} = 1{,}430$, AIC = 1,945, CFI = 0.93, and SRMR = 0.058 for Cheng and Chan's. The internal consistencies were 0.81 for AU, 0.78 for EM, 0.72 for PG, 0.80 for PR, 0.81 for PL, and 0.81 for SA in Van Dierendonck's study and 0.55, 0.63, 0.52, 0.65, 0.68, and 0.56, respectively in Cheng and Chan's. Moreover, compared with the Chinese sample, there was even higher internal consistency in Japanese. Given that the subscales of SPWB were developed to measure different aspects of positive functioning, the positive correlations between each other should be expected. Although moderate correlation between EM and PL seemed to measure the same underlying construct, different correlations with depression indicated the distinctness of these two subscales. However, it is noteworthy that AU and PR are not correlated significantly. The mean score of AU is the lowest among the six SPWB subscales, which may be due to differences in the self-construal that the self-oriented aspects of well-being, for example, AU, may be emphasized in Western culture, whereas other-oriented dimensions, for example, PR, may be of greater significance in Eastern cultures. A similar discussion was also made in the Chinese sample, and it reflected a culture difference in the east and west.[17]

The moderate negative correlations between the subscales of the SPWB and HADS are consistent with previous reports.[6,13,45] This result provides evidence that PWB and negative affectivity share a fair proportion of variance but are far from identical. PWB is substantially independent of current metal health. The absence of depression and anxiety does not present that an individual is self-accepting, autonomous, has a good relationship with others, or can handle difficulties in the environment.

SEM is a more powerful alternative to multiple regression and path analysis.[46] A SEM including six latent variables of SPWB from 84 items had been tried to use Mplus to conduct the analysis, but due to too many variables, the computer failed to calculate it. Therefore, the scores of six items of each factor were summed to create a continuous subscale and use AMOS to analyze the SEM. According to the results of AMOS, the two models—SPWB on HADS and

HADS on SPWB—obtained a good fit with the present data showing that it would be more appropriate to consider the co-variation but not the prediction between PWB and negative affectivity. Although the result of this study failed to support the hypothesis that affectivity could be an outcome of PWB or vice versa, the model of SPWB on depression and anxiety was consistent with Ryff's theory on PWB. As a fully positive optimal functioning, PWB draws heavily on formulations of human development and existential challenges of life. Negative affects such as depression and anxiety may be reflective of life adversities based on different degrees of PWB. Thus, under some conditions (e.g., the death of a loved person), individuals would be considered to be more fully functioning, and ultimately, have greater well-being if they experienced the negative feeling of sadness rather than avoiding it. The capacity to maintain high levels of purpose, mastery, or growth in the face of cumulative adversity has also led to a focus on resilience.[47] At the same time, this also agrees with the aims of psychotherapy whose approach seeks to enhance individual maturation and personality development as a defense against negative affectivity. Around the theory-guided PWB, a treatment of repression—well-being therapy—has been developed, and clinical research works have documented the relevance.[48,49] The findings of this study could provide some useful implications for clinical work in psychotherapy and some guides for a program on well-being promotion to prevent and treat mental illness.

This study is limited by the method of the sample recruitment. As introduced in the part of Sample and Procedure, the data were collected in class by convenience and the original 574 students were from the majors of arts and nursing, and this bias was reflected on the sex ratio of participants. This study was the first test of Ryff's SPWB in a Japanese young population; although there are some drawbacks about the samples, it may be felt that this limitation should not impact on the characteristics of Ryff's PWB in young Japanese and the result of this study should reflect the model of PWB among all the young Japanese to a considerable extent. In addition, because this study also included other scales besides the ones used in this article, in the interest of decreasing the burden of the participants, the response format was changed from 6-point to 2-point, for the original 6-point Likert-type rating was based on disagree and agree. Although this change brought about a loss of information of participants, from the result of the CFA, it could be concluded that the 2-piont rating format also fits the Ryff's scale of PWB in the Japanese population.

It is also acknowledged that this study is cross-sectional. The cross-sectional design should be the main reason for failing to explore the causal relationship between PWB and negative affectivity according to Ryff's theory. Therefore, a longitudinal study should be expected to clarify the relationship between PWB and negative affectivity.

Another focus of future research is the interaction of PWB with negative life events on the mood state. People who are high in PWB may be more resilient and thus, more likely to recover from life adversities through a period of negative affectivity, whereas people who are low in PWB are more likely to have an enduring negative affect when facing life adversities.

Despite these limitations, this study suggests that the SPWB is a reliable measure of well-being for Japanese young adults, and that the negative affectivity is to some extent determined by the lack of PWB.

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