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Abstract: Objectives: The dual-factor model was proposed as a comprehensive framework to assess and improve mental health outcomes. This model has been applied to the health of youth in the West; however, its validity has not been verified in other cultures. The present three-wave longitudinal study evaluates the utility of this model in understanding the trajectories of psychosocial functioning for high-school students in Japan. **Methods:** We assessed life satisfaction, behavioral problems, and psychosocial adjustment of a sample of 242 high-school students using self-report instruments every year, for three years. Students were classified into one of four distinct groups based on high/low psychopathology and high/low life satisfaction measured at the first year of high school. Using multigroup latent growth curve analyses, we explored whether the groups showed distinct trajectories in psychosocial outcomes across a three-year period. **Results:** The dual-factor model was supported through the identification of four distinctive mental health groups at the initial measurement. The group differences were further observed in different trajectories of psychosocial outcomes: The family relationships scores for symptomatic but content and troubled groups declined over time, and troubled youths reported a more negative trend than the other groups. In addition, self-esteem scores tended to increase over time for the vulnerable youths, and peer relationships for the troubled youths showed a negative trend. **Conclusions:** The results validated the importance of incorporating both positive and negative indicators of mental health to fully understand the different trajectories of psychosocial functioning and to provide effective intervention programs for Japanese youth.

Key words: dual-factor model, psychosocial outcomes, adolescence, longitudinal study

1. Introduction

The basic conception of mental health dictates that the absence of distress or difficulties does not guarantee individual wellness [1]. For example, people who do not present with specific psychological symptoms do not necessarily function optimally in daily life [2]. Similarly, youth with psychopathological concerns do not always experience lower levels of life satisfaction relative to healthy peers [3]. The burgeoning need to consider indicators of positive mental health, along with the emergence of positive psychology, which places emphasis on the positive characteristics and functioning necessary to actualize happiness [4], has led to the conceptualization of a mental health model that integrates risk and illness with optimal human functioning [2].

The dual-factor model (DFM) of mental health [5] conceptualizes mental health as comprising two continuous dimensions: psychopathology (PTH) and subjective well-being (SWB). These dimensions of DFM — high or low SWB and high or low PTH — can be discretely and uniquely combined to classify the general population into four groups [6]: Complete Mental Health, Symptomatic but Content, Vulnerable,

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and Troubled. The utility of the DFM has been validated in studies of adult well-being [2] and youth psychosocial and academic functioning, yet, the research conducted has been predominantly cross-sectional and aimed at Western populations. Therefore, the present study analyzed a three-wave annual survey of Japanese adolescents to further validate the relationship between DFM group membership and subsequent psychosocial functioning, and attempted to cross-culturally extend the findings.

2. Literature Review: Dual-Factor Model of Mental Health

Since Greenspoon and Saklofske [5] introduced the DFM of mental health and revealed group differences across temperament, self-concept, locus of control, and interpersonal relations, several studies have examined the utility and validity of this model among youth, including elementary [5] and middle school students [6-9], high school students [10, 11], and college students [12]. For example, Suldo and Shaffer [6] evaluated the utility of the model among US middle school students and revealed significant group differences on various measures of school functioning, such as academic performance, social support, and physical health. Antaramian et al. [7] found that individuals low in SWB and PTH were at risk for diminished school engagement, which closely resembled troubled adolescents. Lyons et al. [8] used logistic regression analyses and found that, aside from personality and stressful life events, different levels of parental support seemed to be the key factor in differentiating the vulnerable and troubled groups from the group exhibiting desirable mental health.

Suldo, Thalji, and Ferron [13] conducted the first longitudinal examination of the relationships between students' mental health status and their subsequent academic functioning one year later. Their results indicated that students' initial mental health status predicted changes in two areas of school functioning: grade point average and attendance. Kelly, Hills, Huebner, and McQuillin [14] found support for the DFM by revealing the stability and changes in the mental health status of US middle school students. Young people with good mental health were the most stable and the least troubled, while changes in one's mental health status were predicted by the availability of family and peer support with regard to education and learning. A study conducted among Chinese adolescents provided similar findings on the stability and dynamics of their mental health status over a year.⁹ The latent class analysis of longitudinal trends identified four groups comparable to the DFM mental health status and found that under 24% of adolescents remained in the same class over a three-year period [10]. However, most longitudinal studies were short-term and ranged from a few months to a year.

Overall, current studies examining the DFM support the assumption that measures of positive indicators of functioning provide significant supplementary information to formulate comprehensive а understanding of child and youth health. However, most empirical studies on the DFM related to adolescent health have been conducted in Western countries. The model must be assessed in more diverse samples from different cultures to expand its ecological validity [9]. Furthermore, long-term studies spanning several years are necessary to empirically test the longitudinal relationship between DFM membership and adolescent psychosocial functioning [10].

Socio-psychological problems such as depression, suicide attempts, school bullying, and absenteeism among youth in Japan represent immense concerns for parents and educators, researchers, and practitioners [15]. For example, Japan is the only country among economically advanced nations in which suicide is the leading cause of death. The suicide rate for individuals aged from 10-19 years is 3.1%, with an annual increase of 0.3, which is the highest rate reported thus far [16]. Epidemiological research shows that one in four junior high school students were in a depressed psychological

state [17], with a point prevalence rate of 4.9% and lifetime prevalence of 8.8% for the 12-18 years age group [18]. Late teens were found to be at high risk: their mean depression scores reached a clinical cut-off level and were the highest in childhood through adolescence [19]. Additionally, in 2015, according to the Programme for International Student Assessment, which measures cognitive abilities for 15-year-old students every three years, Japanese youth ranked 43rd in life satisfaction among the 47 participating countries [20]. Being physically and psychologically healthy during adolescence exerts a critical influence on adaptive functioning in academic, social, and career domains but also their future career development. Therefore, the current study aims to further examine the utility of the DFM for assessing adolescent health in Japan, so that effective interventions and prevention measures based on an in-depth understanding of adolescent mental health can be developed to facilitate the public goal of raising healthy children [21, 22]. We administered a longitudinal survey among Japanese high school students to investigate whether DFM group membership at the onset of the survey demonstrated different trajectories in self-rated psychosocial functioning over three years.

3. Methods

3.1 Participants and Procedure

The dataset analyzed in this study is part of a larger research project investigating the effects of home and school environments on the Quality of Life (QOL) of Japanese high school students [23]. Schools were randomly selected from the central region of Japan. Three out of 20 high schools were willing to participate in the present research, spanning three years. In the winter of 2008 (Time 1 of this study), freshmen/grade-10 students (N = 358, mean age = 15.9, SD = 0.85, girls 65.5%) completed the questionnaires at school. Of the students who participated in the survey at Time 1, 261 (mean age = 15.8, SD = 0.98, girls 65.5%) responded to either or

both of the two subsequent waves of measurement in the winters of 2009 (Time 2) and 2010 (Time 3). Analyses of the relevant study variables showed no significant differences between the students lost to attrition and those who remained: gender ($\chi^2(1) = 1.85$, p = .17), life satisfaction (t[352] = 0.60, p = .88), and difficulty scores (t[354] = 0.16, p = .88).

Consent forms were delivered to the participants' parents and collected by their teachers. Student IDs were assigned to each child by the survey company to anonymize the participants' personal information, which was not disclosed to the researchers. Teachers distributed the self-report questionnaire packets during the homeroom period in regular classroom settings. Students were informed orally by the teacher, who read the statement printed on the front page of the questionnaire, ensuring participants that their data was confidential, participation was voluntary, and they could withdraw their consent at any time. The study organized through careful considerations was according to the ethical guidelines dictated by the Declaration of Helsinki [24].

3.2 Measures

3.2.1 Subjective Well Being

We assessed life satisfaction as a positive indicator of functioning using the Students' Life Satisfaction Scale (SLSS) [25], which is a seven-item measure, including items such as "My life is better than most kids," and is rated on a six-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The SLSS has sound psychometric properties among Japanese adolescents [26], with reliability coefficients of .76, .78, and .80 for T1, T2, and T3, respectively. The responses were computed such that higher scores indicated more positive functioning.

3.2.2 Psychopathology

The Strength and Difficulties Questionnaire (SDQ) [27] is a screening instrument for emotional and behavioral problems. The self-rated version of the SDQ comprises 25 items divided into five subscales

with five items each: emotional symptoms (e.g., I worry a lot), conduct problems (e.g., I get very angry and often lose my temper), hyperactivity-inattention (e.g., I am restless; I cannot stay still for long), peer problems (e.g., I would rather be alone than with people of my age), and prosocial behavior (e.g., I try to be nice to other people; I care about their feelings). The reliability and validity of the scale was previously confirmed with a Japanese sample [28]. Each item is answered on a three-point ordinal Likert scale - 0 (not true), 1 (somewhat true), and 2 (certainly true) and subscale scores are generated by summing the scores of the relevant items (range: 0-10). Higher scores on all subscales (except prosocial behavior) indicated more difficulties. A total difficulties score was calculated by summing all scores excluding prosocial behavior (range: 0-40). The reliability coefficient of the difficulties scale scores were .72 (T1), .73 (T2), and .75 (T3).

3.2.3 Indicators of Daily Functioning

The German questionnaire for measuring quality of life in children and adolescents (KINDL) is one of the mostly used measures to evaluate adolescent OOL. The scale consists of 24 items that assess quality of life in six domains with four items each: physical health (e.g., I felt strong and full of energy), emotional health (e.g., I had fun and laughed a lot), self-esteem (e.g., I was proud of myself), family relationships (e.g., I got on well with my parents), peer relationships (e.g., I did things together with my friends), and school functioning (e.g., Doing the schoolwork was easy). The psychometric properties of the Japanese version of KINDL [29] have been validated [29]. The evaluation of daily functioning is rated on a 5-point Likert scale ranging from 1 (never) to 5 (always), and subscale item responses are added to create domain with higher scores indicating scores. better functioning in the specific domain. As criterion variables, we used all the domain scores excluding emotional health as it represented a potential confound. Internal consistency calculated for physical health,

self-esteem, family relationships, peer relationships, and school functioning were .58, .87, .65, .63, and .44 for T1; .61, .84, .70, .63, and .45 for T2; and .71, .89, .70, .68, and .47 for T3, respectively. Similar to prior studies, the alpha values for the school functioning domain were notably low [30-32].

3.3 Data Analysis

3.3.1 DFM Classification

Participants were classified in one of the four quadrants based on their self-reported levels of SWB and PTH. SWB was measured as the sum scores of life satisfaction, and the students who scored above the 30th percentile on SWB were classified as having "high SWB", and students below this cut-off were classified as having "low SWB" [6]. Based on the clinical recommendation for cut-off points for SDQ difficulties scores [33], raw scores above 15 were considered as "high PTH" while those below this cut-off were classified as "low PTH". Group differences in psychosocial functioning were assessed via multivariate analysis of covariance (MANCOVA) with gender as a covariate, using the cross-sectional data at Time 1.

3.3.2 Latent Growth Curve Modelling

To determine whether DFM membership at Time 1 students' predicted subsequent psychosocial functioning, latent growth curve model (LGCM) analysis was used to capture longitudinal trajectories of psychosocial functioning over three years. The LGCM estimates growth factors (i.e., intercept and slope) from repeated measures data to explain both intra- and inter-individual variability of change in the developmental process [34, 35]. While other methods such as the repeated analysis of variance (ANOVA) test variation generically using two-wave data [9, 13], the LGCM utilizes scores assessed several points across time to enable the (non)linear growth trend of the construct at both aggregate and individual levels.

The proposed LGCM is presented in Fig. 1. The paths from the latent intercept factor to the observed

variables were constrained to one. Thus, the intercept values remained constant for each individual across the three measurement time points [34]. In addition, the paths from the slope factor to the variables were set to zero, one, and two, indicating that the variable was measured at equal intervals. We analyzed multiple LGCMs with varying dependent variables: physical health, self-esteem, family/peer relationships, and school functioning, by using the full information likelihood method for handling missing data. SPSS version 22 and AMOS version 22 were used for the present data analyses.



Fig. 1 Latent growth curve model.

4. Results

4.1 DFM Group Classification Among Japanese Youth

Based on the levels of SWB and PTH, students were classified into one of four mental health groups defined by the DFM. SWB scores were based on SLSS reports of global life satisfaction, and psychopathology levels were assessed using the difficulties score composed by SDQ subscale scores. Using the nomenclature of the literature [6], the following groups were identified. Chi-square test indicated nonsignificant differences for gender distribution among the groups (χ^2 [3] = 0.79, n.s.):

- 1) Complete mental health (50.2%: n = 131) demonstrated high SWB and low PTH.
- 2) Vulnerable (16.5%: n = 43) demonstrated low SWB and low PTH.
- 3) Symptomatic but content (17.2%: n = 45) demonstrated high SWB and high PTH.

4) Troubled (16.1%: n = 42) demonstrated low SWB and high PTH.

MANCOVA analysis revealed that psychosocial daily functioning differed significantly among the DFM groups (Wilks's Lambda = 0.54, F (6, 251) = 9.55, p = .00). Subsequent univariate MANCOVAs indicated that the main effects of the group were significant in all the five domains of daily functioning (Table 1). The complete mental health group scored better than the other groups, and the troubled group showed the lowest scores across all functioning domains. The functioning scores for the vulnerable group were generally comparable to those for the symptomatic but content group. However, vulnerable youth scored higher than symptomatic but content relationships, students in peer whereas the symptomatic but content group scored higher in self-esteem and family relationships than the other groups.

4.2 Trajectories of QOL Scores: Multigroup LGCM Analyses

Separate LGCMs were tested on five measures of psychosocial functioning. As shown in Table 2, the analyses indicated that the models showed a good fit to the data. Table 3 represents the estimated latent growth parameters. Overall trends of the QOL scores across time were negative. In particular, the significant slope for family relations indicates that the family scores decreased on average by 0.19 points per year (p < .05), and the significant variance of the slope implies that there was substantial variation in family relations trajectories among the participants over time (p < .05).

 Table 1
 Mean levels of daily functioning scores at Time 1 by DFM group (N = 261)

	DFM group								
	Complete mental health ($n = 131$)		Vulnerable $(n = 43)$		Symptomatic but content ($n = 45$)		Troubled $(n = 42)$		
Daily functioning	М	SD	М	SD	М	SD	М	SD	F
Physical health	3.76 a (3.76)	0.62	3.37 b (3.37)	0.57	3.32 b (3.32)	0.79	2.78 c (2.78)	0.61	25.97
Self-esteem	2.53 a (2.53)	0.85	1.90 b (1.87)	0.65	2.35 a (2.35)	1.13	1.83 c (1.84)	0.89	10.79
Family relations	4.02 a (4.02)	0.64	3.62 b (3.62)	0.91	3.74 a (3.74)	0.72	3.45 b (3.46)	0.75	8.32
Peer relations	4.02 a (4.02)	0.62	3.80 a (3.80)	0.60	3.57 b (3.57)	0.67	3.11 c (3.11)	0.79	21.93
School functioning	3.13 a (3.13)	0.73	2.79 b (2.78)	0.74	2.69 b (2.69)	0.69	2.32 c (2.33)	0.90	14.05

Note. Means having the same letters are not significantly different. Adjusted means are shown in parentheses. All F values are significant at p < .001.

Table 2 Latent growth curve modeling fit indices.

Functional Domain	Chi-square	df	<i>p</i> -value	CFI	RMSEA
Physical health	30.918	10	.001	.908	.064
Self-esteem	14.011	10	.172	.991	.028
Family relationships	4.956	10	.894	1.000	.000
Peer relationships	16.173	10	.095	.980	.035
School functioning	15.346	10	.120	.977	.032

Note: CFI: Comparative Fit Index, RMSEA: Root Mean Square Error.

Table 3	Parameter	estimates f	from t	he L	GCM	analyses	across 3	years.
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Demonstra estimates	Measures of daily psychosocial functioning						
Parameter estimates	Physical	Self	Family	Peer	School		
Mean intercept	3.30 (.16)***	2.94 (.19)***	4.01 (.16)***	3.75 (.16)***	3.20 (.17)***		
Mean slope	-0.12	-0.10	-0.19 (.08)*	-0.10	-0.05		
Intercept variance	0.28 (.06)***	0.41 (.08)***	0.32 (.06)***	0.25 (.06)***	0.26 (.07)***		
Slope variance	0.04 (.03)	0.02 (.04)	0.07 (.03)*	0.01 (.03)	0.03 (.03)		
COV (intercept, slope)	-0.04 (.04)	0.01 (.05)	-0.03 (.03)	0.01 (.03)	-0.02 (.04)		

Note: ***p < .001, ** p < .01, * p < .05. Standard errors are shown in parentheses. Gender was controlled.

In the second stage of the modeling process, a series of multigroup analyses were conducted on each of the QOL domain scores. Table 4 shows the estimated latent growth parameters by the group and the estimated trajectories of domain scores were plotted in Fig. 2. The estimated slopes of family relations were significant for the symptomatic but content group (mean slope = -.35, p < .05) and the troubled group (mean slope = -.55, p < .05), indicating that the trajectory of family relations in the troubled group had a steeper slope than the other group. In addition, though not representing significant findings, the trend of the self-esteem trajectory was generally positive for youth in the vulnerable group, which later converged with that of the complete mental health group, whereas both the symptomatic but content and the troubled groups experienced a downward trend. Likewise, the differences among groups on peer relations tended to diverge, and the slope of the troubled group was rather steeper than that of the other groups (mean slope = -.32 vs -.02-.11, n.s.). Finally, the school functioning scores across groups showed a convergence over time, with positive slopes (mean slope = .12-.13, n.s.), except for the complete mental health group (mean slope = -.17, n.s.).

Table 4	Estimated a	nath coefficients	of functioning	using multigroup	n I CCM	across 3 voors
Table 4	Estimated	path coefficients	s of functioning	using mulugrou	DLGUM	across 5 years.

DFM group and parameter	Measures of daily psychosocial functioning							
estimates	Physical	Self	Family	Peer	School			
Complete mental health								
Intercept	3.58 (.18)***	3.35 (.24)***	3.86 (.20)***	4.03 (.18)***	3.54 (.21)***			
Slope	-0.17	-0.07	0.05	-0.02	-0.17			
blope	(.14)	(.14)	(.11)	(.11)	(.12)			
Intercent/Slope	-0.03	0.04	-0.07	0.02	0.04			
intercept/blope	(.04)	(.06)	(.03)*	(.04)	(.04)			
		Vulnerable						
Intercept	3.08 (.26)***	2.64 (.31)***	4.27 (.44)***	3.94 (.31)***	3.13 (.33)***			
01	0.03	0.37	-0.31	-0.05	0.12			
Slope	(.19)	(.27)	(.22)	(.18)	(.22)			
T ((0)	0.08	-0.09	-0.02	-0.03	0.05			
Intercept/Slope	(.06)	(.06)	(.09)	(.06)	(.08)			
	Syn	nptomatic but conte	ent					
Intercept	3.21 (.42)***	2.91 (.54)***	3.79 (.35)***	3.51 (.35)***	2.81 (.36)***			
C1	-0.25	-0.42	-0.35	-0.11	0.12			
Slope	(.25)	(.26)	(.17)*	(.23)	(.22)			
L	-0.22	0.08	0.08	-0.0	-0.13			
Intercept/ Slope	(.13)	(.18)	(.07)	7 (.09)	(.09)			
		Troubled						
Intercept	2.83 (.35)***	2.07 (.47)***	4.48 (.39)***	3.02 (.45)***	2.37 (.48)**			
<u>C1</u>	0.10	-0.42	-0.55	-0.32	0.13			
Stope	(.25)	(.27)	(.24)*	(.22)	(.29)			
I. (/Cl	-0.03	-0.03	-0.05	-0.01	-0.09			
Intercept/Stope	(.08)	(.10)	(.08)	(.12)	(.11)			

Note: ***p < .001, **p < .01, *p < .05. Standard errors are shown in parentheses. Gender was controlled.

5. Discussion

The present study examined the longitudinal relationships between DFM classification and measures of daily functioning or QOL among Japanese

adolescents. In addition to examining the utility of the DFM, this study makes a unique empirical contribution to the literature by analyzing the three-wave survey data of high school students. Specifically, we investigated whether DFM mental health classification





Fig. 2 Estimated trajectories of psychosocial functioning by group based on the dual-factor model.

determined by the combination of life satisfaction (i.e., SWB) and SDQ difficulties (i.e., PTH) scores at the beginning of high school could demonstrate unique characteristics among the DFM quadrants, and further tried to predict different trajectories in QOL domain scores spanning over a three-year period.

The classification found that half of the adolescents (50.2%) fell within the complete mental health group, characterized by having high SWB and low levels of PTH. Approximately 17% of the participants were considered vulnerable, as they exhibited low levels of both SWB and PTH. These students are typically left undetected because they are considered mentally healthy according to traditional illness models. However, in contrast with the complete mental health group, vulnerable youth had low SWB, thereby experiencing unsatisfactory conditions of living. Meanwhile, 17% of the adolescents who were classified as symptomatic but content demonstrated significant levels of PTH but reported relatively positive appraisals of life. Their high levels of SWB countered the traditional illness models which presume that mental illness entails low satisfaction with living. Finally, approximately 16% of the study sample comprised the troubled group. These students are likely to have an extremely low mental health status, characterized by clinically significant PTH and low levels of life satisfaction.

Cross-cultural similarities and differences in the distribution of participants across the DFM group were found. Consistent with previous studies, the sample size of the complete mental health group was

the largest of all the DFM groups. However, the proportion (50.2%) was smaller than that of other studies (57-69.9%) [6, 7, 9, 14], which makes the present study unique. The percentage of the troubled group (16%) was comparable to that of other studies targeted at American adolescents (13-17%) [6, 7, 14] and the Chinese sample (10%) [9]. A larger size of the vulnerable group (16.5% in the present study) can also be found in the DFM study for Chinese youth which qualified 20% of the students as vulnerable [9], compared to American youth (7.3-13%) [6, 7, 14]. In contrast, the proportion of the symptomatic but content group in the present study (17.2%) was more similar to that of the American studies (13-17%) [6, 7, 14], than the Chinese study (10.1%) [9]. Thus, the present study classified more students as having a less-than-optimal mental health status than previous studies.

These differences can be related to different psychometric instruments and classification criteria, but the sociocultural influences might be attributable to the distribution of the DFM group [9]. The response tendency may partially explain the larger proportion of the vulnerable group among study participants in Asian cultures such as Japan and China. People in collectivistic countries tend to prioritize group interests over their own and operate from an external locus of control [36]. Thus, they tend to report lower levels of SWB than individuals in individualistic cultures [37]. Meanwhile, adolescents try to stand out and fit in, in an attempt to satisfy their need for competence and connectedness [38]. A ubiquitous penetration of social media provides them with a convenient platform for self-expression and networking, but exposure to negative behaviors and anonymous strangers can have a negative impact on teens who are vulnerable to mental illness, making them feel insecure and distressed. Social media may partially explain the similar ratios of high PTH groups (i.e., symptomatic but content and troubled) both in the present study and previous studies in the US.

In addition to supporting the DFM approach for assessing adolescents' mental health, the current study validated the utility of the classification by identifying the group differences in the QOL domain scores at Time 1. On all the domain scores, students with complete mental health were more successful than their peers. Vulnerable students enjoyed relationships with their peers at the same level as the complete mental health group, yet they obtained lower scores on self-esteem and family relations than the symptomatic but content group. This result suggests that enhancing life satisfaction in adolescents can help them gain a positive sense of self and enjoy more positive relationships with their family. In addition, the significant differences between the symptomatic but content youth and troubled youth in all the OOL domain scores demonstrated that adolescents have distinct profiles of psychosocial functioning, implying that SWB is a resilience factor that can enable better functioning, even with the presence of PTH [9].

Moreover, the differences observed among the four classified DFM groups' daily functioning trajectories further support the utility of DFM in assessing adolescent functioning and risk. Students in the complete mental health group had the highest average score across almost all indicators over three years. The optimal trajectory for youth in the complete mental health was consistent with previous findings [9, 13]. In family relations domain, the scores for the symptomatic but content and troubled groups declined over time, and troubled youth reported more negative relations with family than those in the symptomatic but content group. Although non-significant, self-esteem scores tended to increase over time for the vulnerable youth, and peer relations domain scores for the troubled youth showed a negative trend. The most notable finding of the current study was that high PTH (i.e., symptomatic but content and troubled) was a risk factor for family relationships over time and, if coupled with low SWB, troubled youth had relatively worse relationships with their family. This result was

consistent with previous findings which indicated that middle school students with high SWB received significantly more parental support with respect to academics [7]. Additionally, groups of students with high PTH tended to perceive themselves in an increasingly negative light over time compared to vulnerable youth experiencing an upward trend in self-esteem evaluation. Thus, a lack of PTH can significantly improve self-esteem. Although further longitudinal research is needed, the findings suggest that adolescents with psychopathology tend to perceive themselves negatively and interact poorly with their family, which in turn triggers hostile responses from the family, thus exacerbating the dissatisfaction among family members and with themselves.

These results indicated the benefit of the DFM as an assessment tool. The absence of the signs of psychopathology alone were inadequate to predict adolescents' functioning longitudinally. Arguably, this verifies the significance of assessing SWB as a unique determinant, which contributes to formulating an in-depth conception of individual well-being [5, 6]. If assessments do not operationalize both SWB and PTH, problems related to self-esteem and family relations will likely remain undetected, placing individuals at a higher risk of encountering future problems. The fair proportions of the vulnerable and symptomatic but content groups in the present study clearly demonstrate the need to apply the comprehensive assessment framework proposed by the DFM among Japanese youth.

There were several limitations to this study. This research utilized an extant database; thus, variables selected for verifying the model were rather arbitrary. Future studies should test an even more comprehensive model of antecedents and outcomes derived through not only self-report but also parent or teacher evaluations. In addition, the small sample size limited our ability to draw reliable trajectories of daily psychosocial functioning. Furthermore, the reliability coefficients of some of the outcome variables, such as school functioning, were low; thus, other measures for similar constructs need to be used to verify the present findings.

6. Implications

Despite these limitations, this study makes unique contributions to the empirical literature on adolescent mental health by using Japanese high school students in the sample, thus expanding the model's external validity. The classification in the present study yielded a unique distribution of the four groups. More than half of the sample had a less-than-optimal mental health state. Specifically, this study identified almost one third of such high school students (33.5%), who were otherwise overlooked by traditional psychopathological models.

In this study, the vulnerable youth (low SWB and low PTH), who had good friendships but were less satisfied with themselves and their relationships with family, later experienced an upward trend in self-esteem, which differentiated them from their symptomatic but content peers (high SWB and high PTH). High levels of satisfaction in peer relationships might be a resilience factor, which helps foster their positive sense of self. Coupled with the finding that individuals in the complete mental health group (high SWB and low PTH) also retained higher levels of self-esteem across time, low PTH might be necessary for maintaining and improving the adolescents' self-esteem. The symptomatic but content group (high SWB and high PTH), on the other hand, experienced declining trajectories in almost all the QOL domains apart from school functioning. This can be attributed to their conflicting status of high SWB along with high PTH, which may hamper their capacity to function optimally. Alleviating PTH while maintaining SWB is needed for the symptomatic but content youth. Reassuring their sense of self-worth and providing opportunities for positive experience could lead to increased well-being. The DFM classification helps identify those at risk and enables us to keep track of

their daily psychosocial functioning, especially their self-esteem and family relationships for early intervention. Imminent and intensive interventions are most necessary for troubled youth (low SWB and high PTH), who had the lowest scores on all indicators compared to the other groups across time. Based on the current findings, there is a significant decline in the family relationships and self-esteem domains, which provides specific target areas of monitoring and intervention to help adolescents improve their QOL. Assessment methodologies that combine positive and negative indicators of mental health could assist in the development of an effective intervention program specifically targeting at-risk youth.

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