

The Dual-Factor Model of Mental Health: A Short-Term Longitudinal Study of School-Related Outcomes

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Abstract The Dual-Factor Model of Mental Health, proposed by Greenspoon and Sasklofske (Soc Indic Res 54:81–108, 2001), suggested that student mental health should be assessed on a dimension of *psychopathology* as well as a dimension of subjective well-being (SWB). Greenspoon and Sasklofske (Soc Indic Res 54:81–108, 2001) argued that measuring both psychopathology and SWB allow mental health professionals to have a more complete understanding of the child's psychological health. The present exploratory study provided a further evaluation of the usefulness of the Dual-Factor model in understanding adolescents' SWB using both person-centered and variable-centered analyses. Using person-centered analyses, we explored whether group membership revealed differential changes in middle school students' GPAs as well as emotional, cognitive, and behavioral engagement across a 5-month time period. Furthermore, we used variable-centered analyses to examine whether middle school students' levels of SWB at Time 1 predicted changes in our criterion variables. Specifically, we assessed whether SWB at Time 1 predicted student school engagement and GPA at Time 2 above and beyond their levels of internalizing and externalizing behaviors at Time 1, levels of student engagement and grades at Time 1, and demographic variables. Results of the person-centered analyses found statistically significant differences across the four groups identified in the Dual-Factor Model for emotional, cognitive and behavioral engagement as well as GPA. The results from the variable-centered analyses suggest subjective well-being to be a significant predictor of emotional, cognitive and behavioral engagement beyond measures of psychopathology. These results provide additional support for use of the Dual-Factor Model.

Keywords Dual-Factor model · Mental health · Subjective well-being · Adolescence

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1 Introduction

Mental health professionals have become increasingly interested in expanded definitions of mental health. Proponents of positive psychology have argued that the term mental health has previously been a misnomer, reflecting a dated model in which mental health was construed merely as the absence of mental illness (Seligman and Csikszentmihalyi 2001). In more recent years, scholars have argued for integrated models of mental health, which involve both the absence of serious psychopathological symptoms *and* the presence of positive feelings, thoughts, and behavior (e.g., Keyes 2003).

The definition of mental illness or psychopathology (PTH) in youth has been widely agreed upon to include the presence of psychological symptoms, that is, externalizing and/or internalizing behaviors resulting in maladaptive outcomes. Although definitions of positive mental health are controversial, one widely agreed upon indicator is the presence of subjective well-being (SWB). SWB has been defined by Diener (1984) as a multidimensional construct incorporating relatively frequent positive emotions (e.g., joy, interest) and infrequent negative emotions (e.g., anger, anxiety), along with a positive, cognitive judgment of the quality of life overall.

Such a conceptualization is reflected in the Dual-Factor Model (DFM) of Mental Health, first presented in *Social Indicators Research* by Greenspoon and Saklofske (2001). In this model, mental health is viewed as comprised of two dimensions: the mental health continuum and the mental illness continuum. Each dimension varies from a low level to a high level. When the dimensions are combined, four quadrants emerge. The first quadrant contains individuals who are high on PTH and low on SWB. These individuals are referred to as “distressed” in Greenspoon and Saklofske’s DFM. The second quadrant contains individuals who report high PTH and SWB. These individuals are referred to as “externally maladjusted” in Greenspoon and Saklofske’s model. These two groups represent individuals who are typically identified as emotionally disturbed or behavior disordered in traditional mental health evaluations based on only the mental illness dimension. In the DFM, two additional groups emerge. A third quadrant is comprised of individuals who are low on PTH and high on SWB. This group is referred to as “well-adjusted” by Greenspoon and Saklofske and distinguished from those individuals from a fourth quadrant, which is comprised of individuals who are low on PTH, but also low on SWB. This fourth quadrant of students was referred to as “dissatisfied” and would not be typically identified in traditional mental health screenings, even though these students show noteworthy difficulties in several major life arenas (e.g., academic performance, physical health) (Antaramian et al. 2010; Suldo and Shaffer 2008). For the purposes of this paper, we use the nomenclature of Antaramian et al. hereafter, which is Troubled (Quadrant 1), Symptomatic but Content (Quadrant 2), Positive Mental Health (Quadrant 3), and Vulnerable (Quadrant 4).

Subsequent research with the DFM has been sparse, but intriguing. The extant research has focused on presumed antecedents and consequences of the membership in each of the four quadrants. With regard to consequences, Suldo and Shaffer (2008) also showed the existence of four distinct groups of middle school students: 57 % of the participants were identified as Positive Mental Health group (i.e., high SWB and low PTH), 13 % were identified as the Vulnerable group (low SWB and low PTH), 13 % who were identified as the Symptomatic but Content group (high SWB and high PTH), and 17 % who were identified as the Troubled group (low SWB and high PTH). Furthermore, the results of their study revealed significant mean differences on a variety of variables among of all four groups. Most importantly, the Vulnerable students had lower standardized test scores,

academic self-concepts, valuing of school, and social support from classmates and parents, as well as more school absences, self-perceived physical health problems, and social problems compared to the Positive Mental Health group. The identification of two distinct groups of students who report low PTH but differ in level of SWB and who were clearly distinctive in terms of academic, physical, and interpersonal functioning, provides strong support for the additional utility of the inclusion of positive psychology measures (e.g., SWB) in comprehensive child and youth assessments. In a 1-year longitudinal follow-up analysis, Suldo et al. (2011) reported that students' initial mental health group status predicted changes in their school grade point averages (GPA). More specifically, middle school students showing high levels of PTH and corresponding low levels of SWB showed the most decline in GPA over time. Students with high PTH but adequate SWB did not decline as significantly in GPA over time with slopes similar to students with low levels of PTH. Extending beyond the person-centered analyses Suldo et al. (2011) also used variable-centered analyses which demonstrated the incremental validity of SWB data by showing SWB predicted GPA above and beyond demographics, externalizing and internalizing behaviors.

Like Suldo and Shaffer (2008), Antaramian et al. (2010) identified four groups of adolescents based on the DFM. The findings extended beyond those of Suldo and Shaffer's cross-sectional findings by showing significant differences on behavioral, cognitive, and emotional student engagement as well as academic achievement measures (i.e., GPA). The results of their analyses showed that the Positive Mental Health group demonstrated significantly higher student engagement (behavioral, cognitive, and emotional) than all other groups. Additionally, Antaramian et al. reported that the Symptomatic, but Content youth had significantly higher engagement scores than the Troubled youth. In terms of academic achievement, they found the Positive Mental Health youth had significantly higher GPA scores compared to the other three groups of youth, including the Vulnerable youth.

Given the importance of group membership in terms of outcomes, studies of the presumed antecedents of group membership have also yielded some insight into the importance of this expanded mental health model. In Greenspoon and Saklofske's initial work with elementary school students in Canada, they demonstrated that the groups could be differentiated on the basis of several personality (e.g., Neuroticism trait), cognitive (e.g., locus of control), and environmental (e.g., social support) variables. Supportive findings were demonstrated in a subsequent study of US secondary level students by Lyons et al. (2012), who also demonstrated the importance of major stressful life events in differentiating the Positive Mental Health youth from the Troubled youth. Together, these studies suggest the existence of meaningful determinants of group differences.

Overall, the studies employing the DFM support the assumption that measures of positive SWB provide important, incremental information in comprehensive assessments of child and youth functioning. Greenspoon and Sasklofske (2001) observed that the DFM of Mental Health is "surely a crude representation of reality", but they further observed that it represents a "doubling of the current taxonomy" and "a step forward" (p. 100). In line with this notion, the results of these preliminary studies suggest the value of differentiating the two dimensions of mental health, both concurrently and longitudinally.

The present exploratory study thus provided a further evaluation of the usefulness of the DFM in understanding adolescents' SWB. The study involved a 5-month follow up to the Antaramian et al. (2010) study, providing a longitudinal perspective on the relationship between group membership in the DFM and middle school students' academic performance and student engagement. Specifically, using person-centered analyses, we explored whether group membership demonstrated differential changes in middle school students'

GPA and school engagement across a 5-month time period. Engagement was conceptualized and measured using the tripartite model of Fredricks et al. (2005), which differentiates emotional, cognitive, and behavioral forms of engagement. Furthermore, like Suldo et al. (2011), we used variable-centered analyses to examine whether middle school students' levels of SWB at Time 1 predict changes in our criterion variables. Specifically, we assessed whether SWB at Time 1 predicted student school engagement and GPA at Time 2 above and beyond their levels of internalizing and externalizing behaviors at Time 1, and levels of student engagement and grades at Time 1, and demographic variables. In this manner, we evaluated the incremental validity of SWB information, using both person-centered and variable-centered analytical approaches, to more comprehensively understand adolescents' mental health.

2 Method

2.1 Participants

An archival dataset containing survey information collected on two occasions regarding school climate, student well-being, and student engagement was obtained from a middle school in the Southeastern United States. This dataset has been used in previous studies (e.g., Antaramian et al. 2010), but these analyses are new. The first survey was administered during October 2008 and the second survey was administered March 2009. At Time 1, 390 seventh graders and 419 eighth graders participated in the survey with a mean age of 12.71 (SD: 0.68), 52 % (n = 429) identified as female and 23 % (n = 171) received free or reduced lunch. At Time 1, 60 % self-identified as Caucasian, 27 % as African American, 3 % as Asian American or Pacific Islander, 2 % as Hispanic/Latino 1 % as Native American/Indian and 6 % as "Other". At Time 2, 359 seventh graders and 368 eighth graders participated in the survey.

2.2 Measures

2.2.1 Predictor Variables

Students' Life Satisfaction Scale (SLSS; Huebner 1991). The SLSS is a seven-item, self-report scale designed to measure overall or global life satisfaction. Participants respond to statements about their perceived quality of life using a 6-item Likert scale. Higher scores are considered an indication of higher levels of life satisfaction. Studies have provided evidence for its validity and reliability for elementary, middle, and high school students (for a review, see Proctor et al. 2009). The alpha coefficient for the SLSS was 0.84 in this study.

Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al. 1999). The PANAS-C is designed to measure the frequency a positive and negative emotions experienced by the respondent. Individuals are provided with a list of 27 words that describe positive and negative feelings and are asked to endorse how frequently they experience these emotions using a 5-point Likert scale. For this study, the internal consistency for the Positive Affect and Negative Affect subscales was 0.90 for both subscales.

The *Self-Report Coping Scale* (SRCS; Causey and Dubow 1992) is a 34-item self-report measure that assesses the use of approach and avoidant social coping strategies. Students were asked to report how often they engaged in the relevant behaviors in response to an argument with a friend by rating the items. These responses were rated on a 5-point Likert

scale ranging from “never” to “always” (Causey and Dubow 1992). The Internalizing and Externalizing subscales were used in this study to measure psychopathology. The Internalizing subscale is comprised of seven items, such as “Worry too much about it” and “Become so upset that I can’t talk to anyone.” The Externalizing subscale includes four items, such as “Get mad and throw or hit something” and “Yell to let off steam.” In this study, the internal consistencies were 0.75 and 0.72 for the Internalizing and Externalizing scales respectively.

2.2.2 Criterion Variables

2.2.2.1 School Records Information regarding student socioeconomic status (SES) (i.e., free or reduced lunch status) and student report card grades (i.e., GPA) was obtained from school records by authorized school personnel. School-reported student GPAs at Time 1 reflected a student’s grades for the first nine weeks of the Fall 2008 semester, and GPA at Time 2 reflected student grades for the third nine weeks of the 2009 semester.

2.2.2.2 Behavioral Engagement Behavioral Engagement was measured using the Behavioral Engagement Subscale of the School Engagement Scale (Fredricks et al. 2005). This subscale includes five statements that describe different school behaviors, such as “I follow the rules at school” or “I pay attention in class.” Students indicate how often they engage in each behavior on a 5-point Likert scale ranging from “never” to “all of the time”. In pilot testing, one item (“When I am in class, I just act as if I am working”) was frequently misunderstood by students and lowered the internal consistency of the scale. Therefore, this item was removed from the subscale. Its internal consistency was 0.84 in this study.

2.2.2.3 Cognitive Engagement Cognitive Engagement was measured using the Future Goals and Aspirations Subscale of the Student Engagement Instrument (SEI; Appleton et al. 2006). This subscale includes five statements that describe the relationship between schooling and future goal attainment (e.g. “School is important for achieving my future goals”) and are scored on a 4-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree”. Its internal consistency was 0.81 in the current study.

2.2.2.4 Emotional Engagement Emotional engagement was measured using the School Satisfaction Subscale on the Multidimensional Student Life Satisfaction Scale (MSLSS; Huebner 1994). This subscale measures student satisfaction with school experiences and has shown to have good validity and reliability (see Proctor et al. 2009). The current study used a modified version of the School Satisfaction Subscale in which reverse scored items were removed because of research suggesting problems with reverse scored items (Marsh 1986). This change resulted in a 5-item self-report scale assessing a student’s relationships with teachers and peers in school. The alpha coefficient was 0.89 for this study.

2.3 Procedures

Teachers administered the self-report measures during homeroom periods in regular classroom settings. Measures within the survey were given in counterbalanced fashion, except the global measure of life satisfaction was always administered first in the sequence. This procedure was used because of possible order effects in life satisfaction measurement, (Schimmack and Oishi 2005). Demographic information (e.g., age, gender, ethnicity) was obtained from a series of self-report items that preceded the various survey measures.

The use of the relatively short time frame of 5 months was based on research showing that individuals show a tendency to adapt (i.e., return to baseline levels of SWB) following many life experiences (Diener et al. 2006). Compared to more trait-like variables (e.g., personality traits), global life satisfaction represents a variable that may show fluctuations across shorter periods of time. For example, the 5-month stability coefficient for global life satisfaction for this study was 0.38, suggesting that adolescents' judgments of their life satisfaction can differ from semester to semester during a school year. Thus, compared to a longer-term interval, the use of a 5-month time interval likely provides a more optimal interval for examining causal processes (Cohen et al. 2003).

2.4 Data Analysis: Hierarchical Analyses

Data were analyzed to assess the relative contribution of SWB above and beyond demographic variables and indicators of internalizing and externalizing disorders. The results of these analyses help assess the relative importance of SWB as a construct that contributes to the ability to predict a student's GPA, Emotional Engagement, Behavioral Engagement, and Cognitive Engagement beyond what would be predicted using indicators of psychopathology exclusively. To assess this question, two multiple regression equations were specified for each criterion variable. For each criterion variable, the first multiple regression equation was used to predict the criterion variable at Time 2 based on gender, free lunch status, age, internalizing and externalizing behavior and the criterion variable at Time 1. The second multiple regression equation was specified in the same way as the first but with Time 1 SWB included as a predictor in the model. The R-squared values for each of the models were compared and the changes in amount of variance explained were assessed for statistical significance. Statistically significant differences would indicate that SWB predicted additional variance in the criterion variable beyond indicators of psychopathology and demographic variables.

2.5 Data Analysis: Repeated Measures

A repeated measures hierarchical linear model was conducted to assess the change in GPA, Emotional Engagement, Behavioral Engagement, and Cognitive Engagement for each quadrant in associated with the DFM. Participants were grouped into one of the four quadrants based on their self-reported levels of SWB and psychopathology. Following from Suldo and Shaffer (2008), SWB was calculated as the sum of an individual's self-reported life satisfaction and positive affect minus negative affect [$LS + (PA - NA)$]. Individuals who reported levels of SWB one standard deviation below the mean were classified as "low SWB" and the remaining individuals were classified as "high SWB". Likewise, individuals who reported levels of internalizing and/or externalizing behaviors one standard deviation above the mean were classified as "high PTH" and the remaining individuals were classified as "low PTH".

Next, the data were screened to assess univariate and multivariate outliers, multivariate normality, and homogeneity of variance-covariance matrices. Variables with non-normal distributions were transformed. Second, correlations between the predictors and outcomes were assessed to examine the relationship between the predictor variables (SWB and PTH) and criterion variables (GPA, Emotional Engagement, Behavioral Engagement and Cognitive Engagement) across both time periods. Multiple regression analyses were conducted to determine if quadrant membership at Time 1 predicted the criterion variables at Time 2.

To determine longitudinal outcomes associated with quadrant membership in the DFM, four, mixed model, repeated measures ANOVAs were conducted using quadrant membership at Time 1 as a predictor of engagement, GPA, Emotional Engagement, and Cognitive Engagement at Time 2 as outcomes. As described above, individuals were classified into one of four quadrants based on their self-reported levels of SWB and PTH at Time 1. Group membership was used as the between subjects factor and time was the within subjects factor. Measures of student Behavioral Engagement, Emotional Engagement, Cognitive Engagement and GPA were used as repeated measures variables. Significant interactions between time and the group membership would indicate that the differences among the groups were not invariant across the two time periods.

3 Results

3.1 Data Screening

Tests of univariate normality on the criterion variables indicated that levels of skewness fell within acceptable limits (-1.0 to 1.0) with the exception of Cognitive Engagement. Histograms of this variable indicated negative skew at both Time 1 and Time 2 (-2.3 and -2.02 respectively). Attempts to transform these variables failed to improve the distribution of this variable. Tests of kurtosis also indicated that the variables all fell within acceptable limits (-1.0 to 1.0) with the exception of Cognitive Engagement (7.17 and 4.75 at Time 1 and Time 2 respectively). Visual inspection of the data also revealed no univariate or multivariate outliers for any variable.

Each criterion variable was also checked for homogeneity of variance–covariance structure across Time 1 and two using Bartlett’s Test of Homogeneity of variances. The results from these analyses indicated homogeneity of variance-structure for GPA and Emotional Engagement and heterogeneity of variance structure for Behavioral Engagement and Cognitive Engagement. Covariance at Time 1 for Behavioral Engagement was 0.45 and 0.22 at Time 2. Likewise, covariance at Time 1 for Cognitive Engagement was 0.19 at Time 1 and 0.22 at Time 2.

3.2 Multiple Regression Equations

Time one SWB and PTH variables were used to predict GPA, Emotional Engagement, Behavioral Engagement and Cognitive Engagement in Time 2. The results of these analyses revealed that SWB was a significant predictor of Emotional Engagement, Behavioral Engagement and Cognitive Engagement ($p < 0.01$), but not GPA ($p < 0.10$). Furthermore, the results indicated that internalizing and externalizing coping strategies did not significantly predict any of these outcomes. Each of these models also predicted between 30 and 40 % of the variance in the specific outcome except for the model predicting Time 2 GPA, which accounted for nearly 70 % of the variance. The results from these analyses are found in Tables 1, 2, 3 and 4.

3.3 Mixed-Model Repeated Measures ANOVA

Four mixed-model, repeated measures ANOVAs were conducted to assess differences in (1) Grade Point Average (GPA), (2) Emotional Engagement, (3) Behavioral Engagement,

Table 1 Multiple regression predicting GPA

	Estimate	SE	R ²	ΔR^2
Step 1			0.7*	
Intercept	0.42	0.36		
Gender	0.00	0.04		
SES	0.00	0.04		
Age	-0.01	0.03		
GPA Time 1	0.88*	0.02		
Internalizing	0.02	0.03		
Externalizing	-0.04	0.02		
Step 2			0.702*	0.002*
Intercept	0.40	0.36		
Gender	0.00	0.04		
SES	0.00	0.04		
Age	-0.01	0.03		
GPA Time 1	0.87*	0.02		
Internalizing	0.03	0.03		
Externalizing	-0.03	0.02		
SWB	0.01	0.01		

* $p < 0.05$ **Table 2** Multiple regression predicting emotional engagement

	Estimate	SE	R ²	ΔR^2
Step 1			0.343*	
Intercept	1.64	0.87		
Gender	0.06	0.09		
SES	0.01	0.10		
Age	0.04	0.07		
EE Time 1	0.59*	0.04		
Internalizing	-0.11	0.06		
Externalizing	-0.03	0.05		
Step 2			0.361*	0.018*
Intercept	1.74	0.86		
Gender	0.05	0.09		
SES	0.04	0.10		
Age	0.03	0.06		
EE Time 1	0.53*	0.04		
Internalizing	-0.04	0.07		
Externalizing	-0.01	0.05		
SWB	0.10*	0.02		

* $p < 0.05$

Table 3 Multiple regression predicting behavioral engagement

	Estimate	SE	R ²	ΔR^2
Step 1			0.267*	
Intercept	2.20*	0.35		
Gender	-0.05	0.03		
SES	-0.02	0.04		
Age	0.01	0.03		
BE Time 1	0.34*	0.03		
Internalizing	-0.04	0.02		
Externalizing	-0.02	0.02		
Step 2			0.281	0.014*
Intercept	2.30	0.35		
Gender	-0.05	0.03		
SES	-0.02	0.04		
Age	0.01	0.02		
BE Time 1	0.31*	0.03		
Internalizing	-0.01	0.02		
Externalizing	-0.01	0.02		
SWB	0.03*	0.01		

* $p < 0.05$ **Table 4** Multiple regression predicting cognitive engagement

	Estimate	SE	R ²	ΔR^2
Step 1			0.304*	
Intercept	1.83*	0.37		
Gender	0.03	0.03		
SES	-0.07	0.04		
Age	-0.01	0.02		
CE Time 1	0.57*	0.04		
Internalizing	-0.01	0.02		
Externalizing	-0.03	0.02		
Step 2			0.329*	0.025*
Intercept	2.01*	0.36		
Gender	0.03	0.03		
SES	-0.06	0.04		
Age	-0.02	0.02		
CE Time 1	0.50*	0.04		
Internalizing	0.03	0.02		
Externalizing	-0.02	0.02		
SWB	0.04*	0.01		

* $p < 0.05$

Table 5 Means and standard deviations for outcomes for each group

Outcome	Time 1	Time 2	Diff
GPA			
Positive mental health	3.17 (0.75)	3.15 (0.69)	0.02
Vulnerable	2.83 (0.83)	2.74 (0.86)	0.09
Troubled	2.78 (0.77)	2.81 (0.77)	-0.03
Symptomatic but content	2.99 (0.74)	2.78 (0.69)	0.21
Emotional engagement			
Positive mental health	4.55 (1.14)	4.71 (1.11)	-0.16
Vulnerable	3.48 (1.32)	3.42 (1.24)	0.06
Troubled	3.72 (1.43)	3.52 (1.39)	0.2
Symptomatic but content	4.34 (1.14)	4.72 (1.06)	-0.38
Behavioral engagement			
Positive mental health	4.22 (0.56)	3.67 (0.40)	0.55
Vulnerable	3.73 (0.73)	3.30 (0.44)	0.43
Troubled	3.64 (0.73)	3.17 (0.57)	0.47
Symptomatic but content	3.84 (0.74)	3.58 (0.46)	0.26
Cognitive engagement			
Positive mental health	3.82 (0.30)	3.85 (0.31)	-0.03
Vulnerable	3.43 (0.60)	3.40 (0.58)	0.03
Troubled	3.47 (0.63)	3.40 (0.72)	0.07
Symptomatic but content	3.78 (0.35)	3.73 (0.44)	0.05

and (4) Cognitive Engagement among quadrants in the DFM across two time periods (Table 5).

(1) Grade Point Average

Results of the mixed-model repeated measures ANOVA predicting GPA indicated statistically significant effects for covariates, quadrant, and time. Statistically significant differences in mean levels of GPA were found for sex, age, and SES ($p < 0.05$). Statistically significant differences were also observed between GPA at Time 1 and Time 2 $F(1,615) = -2.91, p < 0.05$. Additionally, a statistically significant difference was also observed in the slopes of GPA across the Positive Mental Health quadrant and the Vulnerable quadrant $F(1,615) = -2.25, p < 0.05$. The parameter estimate that represented this change equaled -0.14 . This parameter is interpreted as a -0.14 difference between the changes of GPA from Time 1 to Time 2 between the Positive Mental Health quadrant to the Vulnerable quadrant. No other comparisons were statistically significant. The complete results of these analyses are reported in Table 6. A plot of means across time is shown in Fig. 1.

(2) Emotional Engagement

Results of the mixed-model repeated measures ANOVA predicting Emotional Engagement indicate statistically significant mean differences between the level of Emotional Engagement at Time 1 and Time 2 $F(1,593) = 2.10, p < 0.05$. This suggests that an overall increase in Emotional Engagement was observed from Time 1 to Time 2. Additionally, mean differences were observed between the Positive Mental Health and

Table 6 Repeated measures for GPA

Predictors	B	SE	<i>t</i> value
Intercept	5.45*	0.50	10.92
Gender	0.29*	0.05	5.40
Age	-0.18*	0.04	-4.72
SES	-0.33*	0.06	-5.19
Symptomatic but content	-0.08	0.11	-0.77
Troubled	-0.18	0.11	-1.60
Vulnerable	0.04	0.09	0.44
Time	-0.07*	0.03	-2.91
Symptomatic but content*time	-0.07	0.07	-1.01
Troubled*time	0.00	0.07	-0.04
Vulnerable*time	-0.14*	0.06	-2.24

* $p < 0.05$

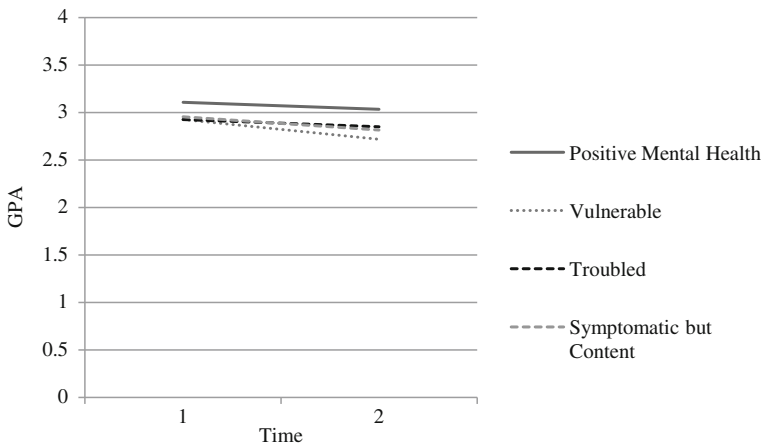


Fig. 1 Model implied means for GPA

Vulnerable quadrants $F(1,593) = -2.88, p < 0.05$. The parameter equaled -0.68 suggesting a -0.68 difference in the means of Emotional Engagement for the Vulnerable quadrant compared to the Positive Mental Health quadrant controlling for the other variables in the model. Additionally, a marginally statistically significant difference was also observed in the slopes of Emotional Engagement across the Positive Mental Health quadrant and the Troubled quadrant, $F(1,593) = -1.67, p < 0.10$. The parameter equaled -0.28 and is interpreted as a -0.28 decrease in the slope of Emotional Engagement in the Troubled quadrant compared to the Positive Mental Health quadrant. No other comparison was statistically significant. The complete results of these analyses are reported in Table 7. A plot of means across time is shown in Fig. 2.

(3) Behavioral Engagement

Results of the mixed-model repeated measures ANOVA predicting Behavioral Engagement indicate statistically significant differences in Behavioral Engagement from

Table 7 Repeated measures for emotional engagement

Predictors	B	SE	<i>t</i> value
Intercept	4.67*	0.76	6.18
Gender	0.22*	0.08	2.80
Age	-0.04	0.06	-0.60
SES	0.14	0.10	1.47
Symptomatic but content	-0.31	0.26	-1.18
Troubled	-0.47	0.27	-1.75
Vulnerable	-0.68*	0.24	-2.88
Time	0.13*	0.06	2.10
Symptomatic but content*time	0.18	0.16	1.11
Troubled*time	-0.28	0.17	-1.67
Vulnerable*time	-0.18	0.15	-1.22

* $p < 0.05$

Time 1 to Time 2 $F(1,598) = -17.20$, $p < 0.05$. The parameter of equaled -0.54 and represents a statistically significant decrease in Behavioral Engagement from Time 1 to Time 2. Additionally, statistically significant mean differences of Behavioral Engagement were observed between the Positive Mental Health quadrant and the Symptomatic but Content quadrant $F(1,598) = -4.63$, $p < 0.05$, Positive Mental Health quadrant and the Vulnerable quadrant $F(1,598) = -3.98$, $p < 0.05$, and Positive Mental Health quadrant and the Troubled quadrant $F(1,598) = -4.11$, $p < 0.05$. Finally, a significant difference between the slopes of the Positive Mental Health quadrant and the Symptomatic but Content quadrant was also observed $F(1,598) = 3.98$, $p < 0.05$. No other comparison was statistically significant. The complete results of these analyses are reported in Table 8. A plot of means across time is shown in Fig. 3.

(4) Cognitive Engagement

Results of the mixed-model repeated measures ANOVA predicting Cognitive Engagement indicate no statistically significant differences in Cognitive Engagement from Time 1 to Time 2, $F(1,588) = -0.78$, $p > 0.05$. Nevertheless, statistically significant differences were observed for age, $F(1,588) = -2.16$, $p < 0.05$, gender, $F(1,598) = 3.57$, $p < 0.05$, and SES, $F(1,598) = -2.16$, $p < 0.05$. Additionally, significant mean differences between the Positive Mental Health and Vulnerable groups were also found, $F(1,588) = -2.50$, $p < 0.05$. The change in Cognitive Engagement from Time 1 to Time 2 was also significantly different between the Positive Mental Health and Troubled groups $F(1,588) = -1.96$, $p = 0.051$. The parameter estimate for the mean differences equaled -0.18 and the parameter estimate for the difference in the slope equaled -0.13 . No other comparison was statistically significantly different. The complete results of these analyses are reported in Table 9. A plot of means across time is shown in Fig. 4.

4 Discussion

This exploratory study utilized both per variable-centered and person-centered approaches to understand how SWB and PTH influence middle school students' school engagement

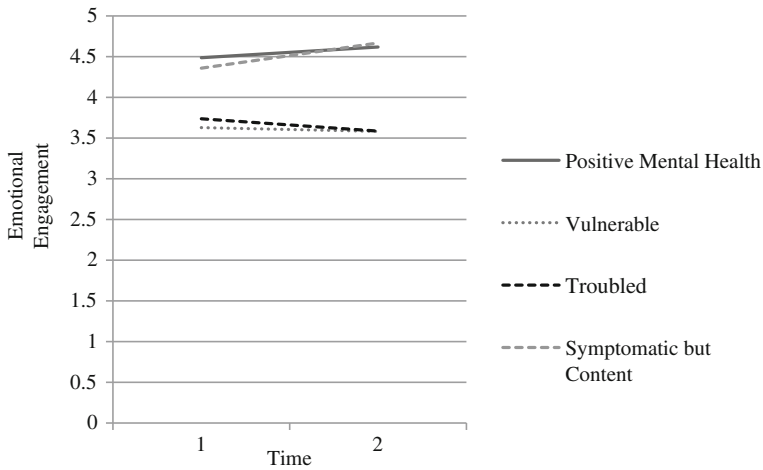


Fig. 2 Model implied means for emotional engagement

Table 8 Repeated measures for behavioral engagement

Predictors	B	SE	<i>t</i> value
Intercept	5.18*	0.31	16.81
Gender	0.05	0.03	1.60
Age	-0.04	0.02	-1.55
SES	-0.07	0.04	-1.72
Symptomatic but content	-0.65*	0.14	-4.63
Troubled	-0.58*	0.14	-4.11
Vulnerable	-0.51*	0.13	-3.98
Time	-0.54*	0.03	-17.20
Symptomatic but content*time	0.31*	0.08	3.98
Troubled*time	0.05	0.08	0.65
Vulnerable*time	0.10	0.07	1.34

* $p < 0.05$

and academic outcomes (i.e., GPA). With respect to the person-centered methodology, one purpose of this study was to provide a longitudinal examination of the relationship between group membership in the DFM and middle school students’ academic performance and student engagement. Specifically, we explored whether group membership in the DFM of mental health (Greenspoon and Sasklofske 2001) revealed changes in middle school students’ GPAs and behavioral, cognitive, and emotional engagement across a 5-month time period during the same school year.

The significant differences among the DFM four groups on both subjective and objective indicators of school performance support the value of using a DFM in the school context. The results of this study are largely consistent with previous findings and provide even stronger evidence to indicate that a lack of PTH alone is insufficient in understanding students overall functioning and risk.

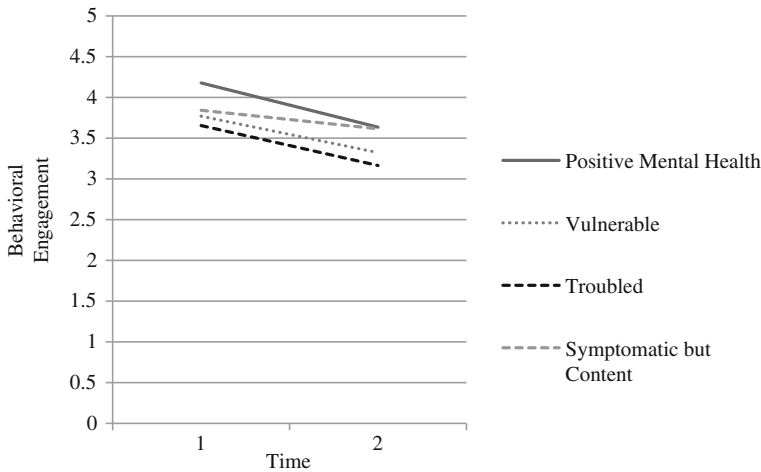


Fig. 3 Model implied means for behavioral engagement

Table 9 Repeated measures for cognitive engagement

Predictors	B	SE	<i>t</i> value
Intercept	4.31*	0.27	16.17
Gender	0.1*	0.03	3.57
Age	-0.04*	0.02	-2.16
SES	-0.08*	0.03	-2.24
Symptomatic but content	0.01	0.10	0.11
Troubled	-0.18	0.10	0.11
Vulnerable	-0.22*	0.09	-2.50
Time	0.02	0.02	0.78
Symptomatic but content*time	-0.04	0.06	-0.64
Troubled*time	-0.13*	0.06	-1.96
Vulnerable*time	-0.07	0.06	-0.17

* $p < 0.05$

Students in the Positive Mental Health group had the highest average GPAs and student engagement across all indicators 5 months later. Troubled students, who had low SWB and low PTH, were more likely than other groups to exhibit statistically significant differences compared to the Positive Mental Health group across objective and subjective academic indicators. More specifically, the Positive Mental Health group's emotional engagement was significantly higher than the Vulnerable group. Further, GPA for the Vulnerable group declined at a significantly faster rate than the Positive Mental Health group.

These results are consistent with previous research that suggests important differences across groups identified in the DFM (Antaramian et al. 2010; Greenspoon and Sasklowski 2001; Suldo et al. 2011). Antaramian et al. (2010), for example, found significant differences between DFM group membership and school grades in a cross-sectional analysis.

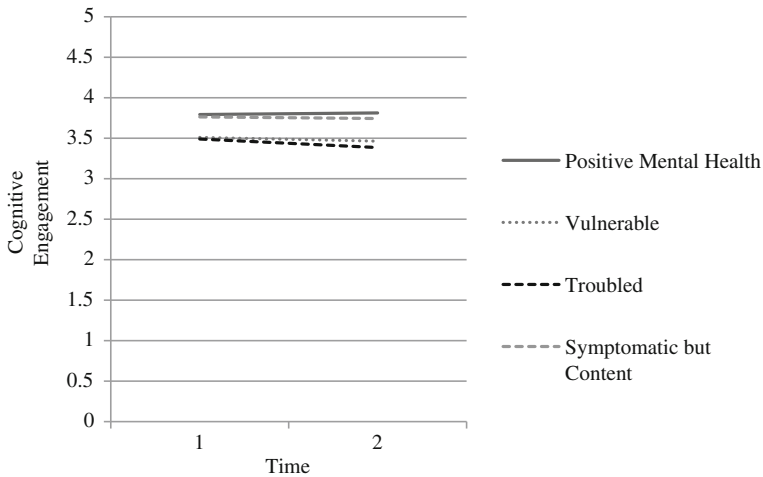


Fig. 4 Model implied means for cognitive engagement

Suldo et al. (2011) also found that students who reported the highest levels of life satisfaction were also more likely to receive higher grades over time. The findings also suggest that specific types of engagement may be more sensitive outcome measures when examining differences among mental health groups. Behavioral engagement yielded the most significant differences among groups, with significantly higher behavioral engagement among the Positive Mental Health group. An interesting finding from the comparison of the Positive Mental Health group to the Symptomatic but Content group on this criterion, was the Symptomatic but Content group reported a smaller decline in Behavioral Engagement from Time 1 to Time 2 compared to the Positive Mental Health group.

Results of variable-centered hierarchical analyses verify and further support the utility and relevance of SWB information above and beyond demographic variables and indicators of pathology. SWB scores predicted all forms of student engagement (but not GPA) at Time 2) above and beyond the PTH scores. With the exception of GPA, this finding supported the notion that when coupled with PTH measures, positive SWB measures can yield unique explanatory power, providing a more comprehensive picture of youth functioning.

4.1 Limitations and Implications

Although this study expanded on previous research in a number of ways, limitations should also be noted. First, the sample was a relatively homogeneous population consisting primarily of Caucasian students from a single school in the Southeast. Future studies should include more diverse samples to enhance the generalizability of results. Second, longitudinal research suggests that developmental differences may have an important impact on students' levels of engagement as well as academic performance (Wang and Eccles 2012). Although this study examined these changes over a two time periods, future studies should observe these changes over more periods of time in order to understand more fully the longer-term trajectories of student engagement and academic success in relation to SWB and PTH. These studies are necessary in order to fully understand the implications of integrated models of mental health, such as the DFM, for children's academic, social and emotional functioning across time.

Despite these limitations, this study has a number of important implications for professional working with children in schools. First, the results of this study suggest that professionals should consider a student's level of SWB in addition to levels of PTH when assessing a child's current level of school functioning in order to obtain the most comprehensive information. That is, this study demonstrated that measures of SWB explain significantly more variance in student engagement in comparison to the exclusive use of measures of PTH. Second, the results of this study suggest that school mental health professionals should consider SWB a construct relevant to academic outcomes and strive to monitor student SWB when necessary. Given that Positive Mental Health students achieved higher GPAs and engagement, it appears that the combined approach of increasing SWB and decreasing PTH may enhance students' behavior and performance in schools, leading to more precise mental health promotion strategies. Specific recommendations for promoting positive SWB in schools can be found in Antaramian et al. (2010).

This research also has important implications for the development of national and international well-being/social indicators monitoring systems for youth. Consistent with the positive psychology perspective, monitoring systems that incorporate integrated negative and positive psychosocial indicators, such as the DFM, should offer more complete and nuanced descriptions of youth functioning (e.g., identification of Vulnerable vs. Positive Mental Health students), which should in turn inform national policies and actions to address problems and promote optimal mental health.

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