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Subjective well-being mediates the effects of resilience and mastery on depression and anxiety in a large community sample of young and middle-aged adults

Richard A. Burns, Kaarin J. Anstey, Timothy D. Windsor

Objective: The tripartite model of depression and anxiety hypothesizes that positive and negative affect is related to depression and anxiety. However, the specific role of cognitive or psychological well-being constructs like resilience and mastery within a tripartite context and throughout adulthood is unclear.

Method: Data was drawn from two longitudinal population-based cohorts, aged 20–24 and 40–44 based in Canberra, Australia (N = 3989). We sought to determine the interrelatedness of two affective measures of subjective well-being, positive and negative affect, with two cognitive measures of psychological well-being, resilience and mastery. We then tested their independent effects on depression and anxiety, and hypothesized, following the tripartite model, that subjective well-being would mediate the effects of the psychological well-being variables on mental health and that the psychological well-being variables would be more strongly related to positive subjective well-being.

Results: Principal axis factoring delineated four affective and cognitive dimensions of well-being comprising positive and negative affect, resilience and mastery. Structural equation models identified the psychological well-being variables as significantly related to subjective well-being, which fully mediated the effects of resilience and partially mediated the effect of mastery on depression and anxiety. These findings were consistent throughout both young and middle adulthood.

Conclusions: Psychological well-being components are significant predictors of subjective well-being affect states that increase vulnerability to depression and anxiety.

Key words: anxiety, depression, mental health, psychological resilience.

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One consequence of the so-called ‘revolution’ in positive psychology has been a considerable shift in focus from models of ill-health to notions of positive well-being that are distinct from negative well-being states. However, the view that wellness is simply the absence of mental and physical

ill-health has long been challenged [1]. More recently, researchers have sought to identify personal characteristics, such as resourcefulness and hardiness, that predispose individuals to better mental ill-health outcomes, with results subsequently informing government population-level health policy [2].

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Subjective well-being and mental health

Subjective well-being (SWB) approaches typically focus on individuals’ self-appraisals of affect and

judgements of satisfaction [3]. Optimal affective well-being is typically defined in terms of both the presence of positive emotions and absence of negative emotions [4]. Whilst negative affect relates to individuals' experiences of negative feelings such as sadness, guilt and fear, positive affect is defined in terms of the experience of positive emotions including happiness and energy [5]. The tripartite model of depression and anxiety (TMDA) hypothesizes that low positive affect characterizes depression whilst high negative affect relates to both depression and anxiety [6].

Considerable evidence has supported the TMDA hypothesis relating to the role of positive and negative affect as aetiologies for depression and anxiety [7–9]. Whilst there is consistent evidence for the role of negative affect in both depression and anxiety [10,11], the evidence that low positive affect is a unique etiological component for depression has received mixed support [12,13]. Within a clinical context, the TMDA hypothesis has been supported in a sample of 41 private practice patients who were undergoing cognitive behaviour therapy for depression and anxiety [14]. Over the course of treatment, results were consistent with the tripartite model; reduced negative affect was associated with a reduction in both anxiety and depression, whilst increased positive affect only occurred for those patients who reported a reduction in depression. The importance of this further supports the independent effects of positive and negative affect on depression and anxiety, in particular the notion that positive affect has specific relevance to depression.

Psychological well-being

In contrast to SWB, the psychological well-being (PWB) approach is one that describes wellness in terms of those individual characteristics which are believed to contribute to optimal SWB outcomes (i.e. increased positive affect and decreased negative affect) [3]. PWB constructs typically reflect adaptive cognitive components of self-referent belief systems (e.g. self-concept, control, purpose in life). For example, resilience relates to a network of favourable attitudes and behaviours of self that are associated with adaptive coping strategies to stressful life events and negative life conditions, and resilient people are frequently characterized by an internal locus of control, pro-social behaviour, positive self-image and greater optimism [15–17]. These resilience characteristics are associated with better physical and mental health outcomes [18], and more positive adaptive behaviours to negative life events [19,20]. Mastery is another cognitive component of PWB which reflects a

strong self-referent belief in one's capacity to influence the environment and bring about desired outcomes. Considerable evidence links increased mastery to better psychological [21] and physical health outcomes [22,23], and lower mortality risk [24].

Aims

There exists considerable support for the related nature of PWB and SWB components where factorial analytical analyses delineate between affective and cognitive dimensions of well-being whilst demonstrating their interrelatedness [25–27]. The importance of the PWB constructs appears related to their function in promoting better SWB outcomes and positive emotions in particular [26]. However, there is a lack of research concurrently evaluating the relationship between delineated components of PWB and SWB with mental health outcomes such as depression and anxiety.

The aims of the present study were to (i) assess the independence of related PWB (operationalized as resilience and mastery) and SWB (operationalized as positive and negative affect) constructs, (ii) identify the role of PWB in predicting depression and anxiety symptom scores within a TMDA framework, and (iii) demonstrate that current PWB is mostly independent of prior SWB and mental health outcomes. Following prior research into the structure and relationship of PWB and SWB [25,27], we expected factor analysis to identify a measurement model of well-being that discriminated between related PWB and SWB components of well-being. Subsequently, we expected PWB to be a significant predictor of SWB which would in turn predict mental health outcomes. We also expected the association of PWB and mental health to be mediated by positive and negative affect. Our conceptual model is displayed in Figure 1. Furthermore, we expected that current PWB would be largely independent of prior SWB and mental health.

Materials and methods

Study design and participants

Our sample was drawn from the PATH Through Life Project, a large community survey concerned with the health and well-being of randomly selected individuals from the electoral rolls of Canberra or the neighbouring town of Queanbeyan, Australia [28]. Voting is compulsory in Australia. Results presented here concern the wave 3 data for the youngest and mid-aged cohorts, who were aged 20- to 24- and 40- to 44-years-old at baseline. Although mastery, affect and mental health data were collected at all three waves, a measure of resilience was only

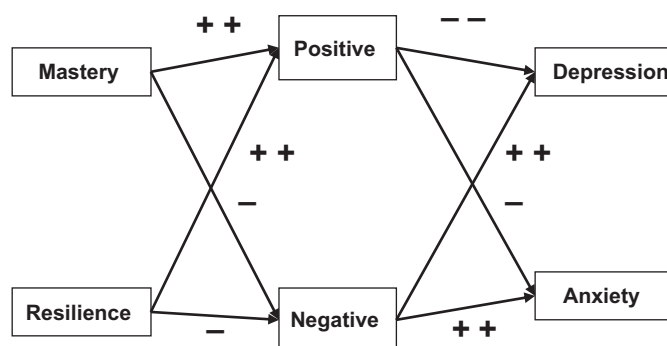


Figure 1. A conceptual model of the role of PWB in a tripartite model of current depression and anxiety (+ weak positive associations; - weak negative associations; ++ strong positive associations; -- strong negative associations).

introduced at wave 3 and so our analysis focused on this wave. Of the 4934 participants commencing the study in wave 1, 4160 were contactable for assessment eight years later at wave 3 in 2007/2008. Participants ($n = 171$) were excluded if they were missing 50% or more on items that comprised each scale used in this analysis. Participants ($n = 120$) missing data on all wave 3 variables, were then imputed using the EM Algorithm in SPSS PASW version 17. Prior (wave 2) affect and mental health were to be used in the analyses as control variables and participants were also excluded if they did not participate or provide affect and mental health data in wave 2. This resulted in a final sample size of $N = 3989$ participants, 47% of whom were male. In addition, 88% reported their self-rated health as either 'Good', 'Very good' or 'Excellent', 73% were married or 'defacto', and 39% reported a university education at bachelor degree level or above. Participants were mostly assessed in their own homes and asked to complete a questionnaire under the supervision of a professional interviewer. Participants received a full description of the study and provided informed consent. The study was approved by the Human Research Ethics Committee at the Australian National University.

Questionnaires

Psychological well-being

Resilience: Connor-Davidson Resilience Scale

The Connor-Davidson Resilience Scale (CD-RISC) [29] ($\alpha = 0.918$) was used to measure one aspect of PWB. The scale comprises 25 items that measure individuals' sense of resilience and capacity to change and cope with adversity (e.g. Have a strong sense of purpose, Tend to bounce back after illness or hardship). Respondents indicated agreement with each item on a 5-point Likert scale with higher scores indicating greater resilience.

Mastery: Personal Mastery Scale

The Personal Mastery Scale (PMS) [30] ($\alpha = 0.782$) was also used to measure PWB. The scale consists of 7 items measuring locus of control (e.g. What happens to me in the future mostly depends on me, I can do just about anything I really set my mind to do). Respondents

indicated agreement with each item on a 4-point Likert scale. Internal reliability and construct validity have been reported [31].

Subjective well-being

Positive and negative affect: Positive and Negative Affect Schedule

The Positive and Negative Affect Schedule (PANAS) [32] was used to measure SWB. The scale comprises a 20-item self-report measure of positive (e.g. active, interested; $\alpha = 0.917$) and negative (e.g. distressed, nervous; $\alpha = 0.89$) affect with 10 items per construct. Individuals indicated their response on a 5-point Likert scale with higher scores on each scale indicating greater well-being on each dimension. The instrument has proved reliable as a measure of both trait and state measures of affect, depending on the time reference included in the item operative, although correlations between time reference stems are strong [33]. The 'past month' reference was used in this study.

Mental health

Depression and anxiety: Goldberg Depression and Anxiety Inventory

The Goldberg Depression and Anxiety Inventory [34] comprises 18 items that list symptoms of depression and anxiety. Participants respond 'yes' or 'no' to whether they have experienced any of the symptoms. The scale reports high sensitivity and predictive qualities of DSM diagnosis of depression and anxiety [34].

Statistical analysis

To investigate the hypothesis of independence of the SWB and PWB constructs, items from the resilience, mastery, positive and negative affect scales were evaluated using an exploratory factor analysis in PASW version 17. Principal axis factoring with a direct oblimin oblique rotation was used, and factor scores saved using the regression procedure in PASW. To test the second hypothesis, a structural equation model (SEM) was created in SPSS AMOS version 17 to test whether the SWB variables mediated the direct effects of PWB on the mental

health outcomes. A second SEM model controlled for prior (wave 2) SWB and mental health outcomes. Standard errors for the SEM were computed from a bootstrap of 200 samples using AMOS version 17. To control for the Goldberg scale distributions that are typically non-Gaussian, the SEM was estimated using both asymptotically distribution-free and maximum likelihood estimation, but results did not differ. A range of goodness of fit indices (GFI) were used to assess model fit and included a test of chi-square distribution, an adjusted goodness of fit index (AGFI), optimal values > 0.9 [35]; a confirmatory fit index (CFI), optimal values > 0.9 [36]; and the root mean square error of approximation (RMSEA), optimal values < 0.06 [37].

Results

Measurement of cognitive and affective components of well-being

Principal axis factoring (PAF) of the resilience, mastery, and PANAS items revealed a four-factor structure whereby items loaded onto factors that corresponded with the original measures (resilience, mastery, positive affect, negative affect), explaining 51% of item variance (Table 1). Previous factor analysis of the resilience and PANAS items [38] revealed that resilience items 2, 3 and 9 failed to load above 0.32, the level at which a factor explains 10% of the variance in an item, onto a uni-dimensional resilience factor, with this result replicated in the current analysis. All other items loaded onto their respective parent scales, reporting loadings above 0.32. Although discrimination between the four constructs at the item level exists, moderate factor correlations indicate moderate to strong associations with measures of prior and current symptoms of depression and anxiety and prior affect (Table 2). Both Kaiser, Meyer and Olkin's measure of sampling adequacy (KMO = 0.963) and Bartlett's test of sphericity ($\chi^2 = 57235.57$, $p = 0.000$) indicated data appropriate for PAF. For subsequent analyses, factor scores were saved following the factor analysis using the regression method in PASW version 17.

Correlations among well-being constructs and depression and anxiety

Correlations between the SWB, PWB and mental health variables are reported in Table 2, by age cohort, with the 40s above the diagonal and the 20s cohort below. The strength of associations appear comparable between age groups. Cross-sectional relationships indicated the co-morbidity of mental health states at both waves, whilst the association across time was moderate for both depression and anxiety. Similar associations were reported for the SWB variables. The association between SWB and mental health variables both within and across waves consistently reported negative associations between positive affect and mental ill-health states, with positive associations between negative affect and mental ill-health. The cross-sectional associations were stronger than the longitudinal associations. Longitudinal associations of prior SWB and prior mental health with the PWB variables were weaker than the corresponding cross-sectional relationships. Prior and current mental ill-health and negative affect were negatively related to PWB, while higher positive affect was related to higher PWB.

Delineating the role of PWB within the tripartite model of depression and anxiety

Following our conceptual model (Figure 1), an SEM was used to test the hypothesis that PWB constructs were significant predictors of SWB and the TMDA hypothesis that SWB components were significant

Table 1. Results of a principal axis factoring with an oblique direct oblimin rotation of the resilience, PANAS and mastery item

	Factor			
	1	2	3	4
CD-RISC item 17	0.713	-0.029	0.031	0.037
CD-RISC item 24	0.673	0.1	0.059	0.084
CD-RISC item 16	0.651	0.013	0.018	0.014
CD-RISC item 18	0.633	-0.032	-0.08	-0.046
CD-RISC item 5	0.623	-0.047	0.08	0.062
CD-RISC item 15	0.618	-0.022	0.032	-0.058
CD-RISC item 4	0.616	-0.06	-0.014	0.123
CD-RISC item 12	0.61	0.083	0.015	0.072
CD-RISC item 19	0.601	-0.073	-0.035	-0.05
CD-RISC item 23	0.6	0.004	0.093	0.06
CD-RISC item 14	0.596	-0.102	-0.013	-0.034
CD-RISC item 11	0.576	0.05	0.072	0.147
CD-RISC item 8	0.563	-0.043	0.043	0.041
CD-RISC item 7	0.55	0.02	-0.012	0.035
CD-RISC item 6	0.474	-0.053	0.035	-0.052
CD-RISC item 20	0.473	0.044	-0.017	-0.031
CD-RISC item 21	0.452	0.075	0.16	0.119
CD-RISC item 1	0.449	-0.12	0.023	0.049
CD-RISC item 25	0.435	-0.012	0.191	0.078
CD-RISC item 10	0.431	0.071	0.042	0.043
CD-RISC item 22	0.399	-0.081	0.119	0.238
PANAS item 19	-0.027	0.796	-0.022	-0.004
PANAS item 7	-0.025	0.754	-0.018	-0.007
PANAS item 13	-0.056	0.719	0.078	0.002
PANAS item 21	0.037	0.685	-0.154	-0.06
PANAS item 17	-0.009	0.637	0.052	-0.019
PANAS item 12	-0.038	0.604	0.004	-0.021
PANAS item 18	-0.038	0.592	-0.029	-0.068
PANAS item 9	0.041	0.579	-0.179	-0.036
PANAS item 20	0.003	0.008	0.849	0.021
PANAS item 23	0.04	-0.028	0.818	-0.005
PANAS item 22	0.148	0.089	0.727	0.001
PANAS item 6	0.031	0.005	0.726	0.021
PANAS item 14	-0.042	0.059	0.698	0.046
PANAS item 3	0.038	-0.121	0.656	0.001
PANAS item 8	0.044	-0.037	0.631	0.006
PANAS item 2	-0.01	-0.096	0.613	0.012
PANAS item 11	-0.007	-0.057	0.608	-0.027
PANAS item 16	0.015	-0.012	0.591	0.057
Mastery item 3	-0.063	-0.035	0.011	0.73
Mastery item 1	-0.03	-0.082	-0.014	0.652
Mastery item 7	-0.006	-0.02	0.007	0.65
Mastery item 2	-0.021	-0.098	-0.007	0.573
Mastery item 5	0.069	-0.172	0.076	0.509
Mastery item 6	-0.094	-0.061	-0.024	-0.451
Mastery item 4	-0.178	-0.025	-0.096	-0.381

Table 2. Bivariate correlations between the PWB and SWB variables derived from factor analysis with depression and anxiety

	1	2	3	4	5	6	7	8	9	10
1. Prior anxiety	—	0.735*	0.57*	0.508*	0.649*	-0.351*	0.399*	-0.251*	-0.202*	-0.331*
2. Prior depression	0.734*	—	0.503*	0.577*	0.62*	-0.494*	0.388*	-0.348*	-0.266*	-0.418*
3. Current anxiety	0.542*	0.446*	—	0.713*	0.399*	-0.227*	0.602*	-0.438*	-0.303*	-0.434*
4. Current depression	0.458*	0.479*	0.705*	—	0.388*	-0.262*	0.579*	-0.57*	-0.381*	-0.511*
5. Prior negative affect	0.639*	0.65*	0.45*	0.446*	—	-0.339*	0.523*	-0.229*	-0.26*	-0.39*
6. Prior positive affect	-0.409*	-0.508*	-0.234*	-0.298*	-0.362*	—	-0.162*	0.554*	0.426*	0.384*
7. Current negative affect	0.379*	0.374*	0.606*	0.59*	0.466*	-0.135*	—	-0.322*	-0.315*	-0.453*
8. Current positive affect	-0.282*	-0.327*	-0.391*	-0.52*	-0.261*	0.483*	-0.339*	—	0.592*	0.592*
9. Current resilience	-0.258*	-0.282*	-0.273*	-0.338*	-0.27*	0.403*	-0.291*	0.562*	—	0.532*
10. Current mastery	-0.314*	-0.352*	-0.441*	-0.51*	-0.33*	0.34*	-0.474*	0.553*	0.592*	—

Coefficients above the diagonal are for the 40s cohort and those below are for the 20s cohort. *p < 0.001.

predictors of depression and anxiety. All regression paths were included in the model. A substantial proportion of variance in both the PANAS (positive affect = 42%; negative affect = 20%) and mental health (depression = 49%; anxiety = 43%) variables was explained. Direct and indirect effects of the two cognitive PWB components on depression and anxiety, where positive and negative affect functioned as mediators, were identified (Table 3). Resilience and mastery were both very strong positive predictors of positive affect in particular, but only mastery reported substantial direct associations with depression and anxiety. Whilst results do indicate significant positive effects for resilience on depression ($\beta = 0.047$; $p < 0.01$) and anxiety ($\beta = 0.049$; $p < 0.001$), a review of the standard errors from a bootstrap of 200 samples indicated that these effects are not substantially different from zero and suggests that the significant main effect has limited meaningful contribution to the model (Table 3). Positive and negative affect were clearly the strongest predictors of depression and anxiety.

Following the TMHA hypothesis, lower positive affect was a stronger predictor of higher depressive than anxiety symptoms, whilst negative affect reported comparative associations with both mental health outcomes, although a slightly stronger positive association with anxiety than depression was reported. Several significant mediation effects

were identified (Table 3). Positive and negative affect fully mediated the effect of resilience and partially mediated the effects of mastery on both depression and anxiety. Overall GFI revealed strong support for this model ($\chi^2 = 15.557$, $df = 4$, $p = 0.004$; AGFI = 0.99; CFI = 0.999; RMSEA = 0.027 (90%CI: 0.014–0.042)). A multi-groups analysis revealed no significant differences in the path regression weights between the two age cohorts (Figure 2). Constraining the regression weights to be equal between age groups also reported excellent GFI ($\chi^2 = 36.686$, $df = 14$, $p = 0.001$; AGFI = 0.991; CFI = 0.998; RMSEA = 0.020 (90% CI: 0.012–0.028)) whilst a comparison between these models ($\chi^2_{diff} = 21.129$; $df = 10$; $p = 0.020$), did not indicate superior fit for the unconstrained baseline model. Therefore our findings appear consistent for both young and middle adults.

Given the longitudinal nature of the PATH study, it was possible to determine the extent to which wave 3 resilience and mastery were associated with prior levels of affect and mental health at wave 2. The degree of variance explained in wave 3 resilience (17%) and mastery (16%) indicate that wave 2 mental health and SWB are mostly unrelated to PWB at wave 3. Instead, prior mental health and affect were most clearly related to their current respective states, and considerably less so with the PWB components (Table 4). The inclusion of prior SWB and mental

Table 3. Comparison of standardized direct and indirect effects on current SWB and mental health

	Positive affect ($R^2 = 0.422$)	Negative affect ($R^2 = 0.201$)	Depression ($R^2 = 0.491$)		Anxiety ($R^2 = 0.433$)	
	Direct effect β (95%SE [†])	Direct effect β (95%SE [†])	Direct effect β (95%SE [†])	Indirect effect β (95%SE [†])	Direct effect β (95%SE [†])	Indirect effect β (95%SE [†])
Resilience	0.373*** (0.014*)	-0.077*** (0.017**)	0.047** (0.039*)	-0.157*** (0.01**)	0.049*** (0.044*)	-0.111*** (0.01**)
Mastery	0.364*** (0.013*)	-0.401*** (0.016*)	-0.118*** (0.016**)	-0.293*** (0.01**)	-0.089*** (0.016**)	-0.272*** (0.011**)
Positive affect	—	—	-0.333*** (0.014**)	—	-0.206*** (0.014**)	—
Negative affect	—	—	0.43*** (0.012**)	—	0.547*** (0.013*)	—

*p < 0.05; **p < 0.01; ***p < 0.001; — no effect to report; †Standard errors were computed from a bootstrap of 200 samples.

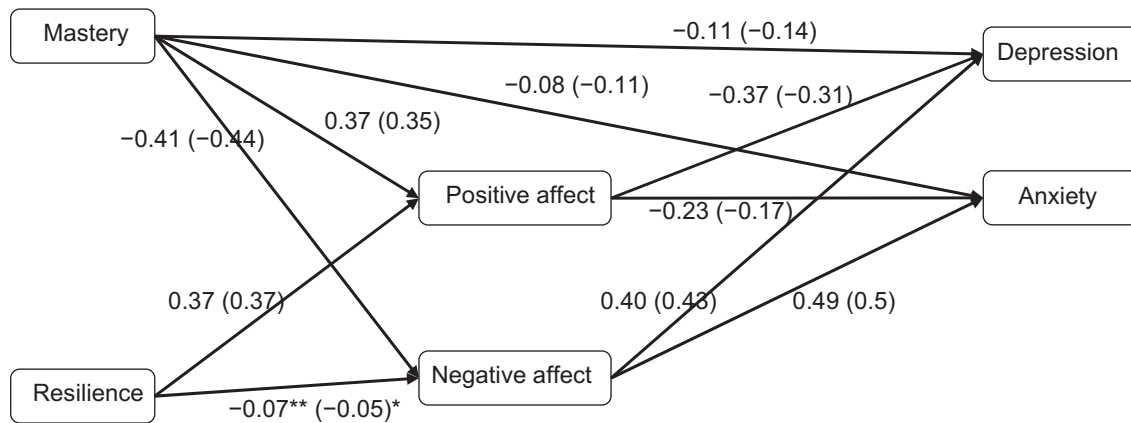


Figure 2. A comparison of regression paths between age cohorts (40s age cohort in parentheses; all coefficients significant at $p < 0.001$ except for * $p < 0.05$; ** $p < 0.01$).

health variables in our cross-sectional SEM contributed little additional explained variance for either positive affect (2%) or depression (6%), although anxiety (10%) and negative affect (12%) reported slightly larger increases in explained variance. GFI also revealed strong support for this model ($\chi^2 = 34.747$, $df = 20$, $p = 0.021$; AGFI = 0.987; CFI = 0.998; RMSEA = 0.02 (90%CI: 0.008–0.032)); chi-square analysis did not reveal a significant improvement in model fit in comparison with the previous cross-sectional analysis. For all analyses, a variance inflation factor (VIF) high score of 2.766, and a condition index (CI) high of 6.048, showed that multi-collinearity was not present.

Discussion

In the present study we sought to assess the independence of related PWB and SWB constructs, to identify the role of PWB in mental health outcomes within a TMDA framework and demonstrate that current PWB is mostly

independent of prior SWB and mental health outcomes. Construct independence of resilience, mastery and positive and negative affect items indicate that these measures reflect different cognitive and affective components of well-being, whilst moderate correlations between these constructs at a first-order factor level, indicate PWB and SWB as related. Importantly, whilst resilience and mastery were not the most significant predictors of depression and anxiety, they were identified as significant predictors of SWB, in particular explaining half of the variance in positive affect. In addition, the results of an SEM in this study generally support prior findings relating to the TMDA [14,39]. Positive affect was more strongly associated with depression than anxiety, whilst negative affect showed comparable associations with both mental health outcomes. Our findings provide strong support for extending research to investigate positive and negative

Table 4. Results of a regression analysis in which prior SWB and mental health predict level of current PWB, SWB and mental health

	Mastery ($R^2 = 0.163$) β (95%SE [†])	Resilience ($R^2 = 0.168$) β (95%SE [†])	Positive affect ($R^2 = 0.248$) β (95%SE [†])	Negative affect ($R^2 = 0.247$) β (95%SE [†])	Depression ($R^2 = 0.259$) β (95%SE [†])	Anxiety ($R^2 = 0.303$) β (95%SE [†])
Depression	-0.1** (0.038*)	0.017 (0.042)	-0.054 (0.036)	0.106* (0.037**)	0.281*** (0.034**)	0.09** (0.035*)
Anxiety	-0.041 (0.035)	-0.034 (0.034)	-0.041 (0.032)	0.085* (0.032*)	0.194*** (0.032**)	0.441*** (0.029**)
Positive affect	0.217*** (.025**)	0.342*** (0.025**)	0.427*** (0.025**)	0.097*** (0.022**)	-0.015 (0.023)	0.023 (0.022)
Negative affect	-0.147*** (0.033**)	-0.125*** (0.032**)	-0.046 (0.029)	0.389*** (0.032**)	0.08* (0.031*)	0.07* (0.028*)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; [†]Standard errors were computed from a bootstrap of 200 sample.

components of SWB concurrently since they are differentially related to mental health outcomes. Importantly, these findings were consistent across both our young and middle-aged cohorts in our large community sample.

This study identified strong support for the mediating role of positive and negative affect in the relationships between depression and anxiety with resilience and mastery. Support for such a model has been proposed in the literature. The 'Broaden and Build' theory of positive emotions [40] describes the reciprocal relationship between positive emotions in developing individual characteristics such as resilience and mastery that further drive current affect states, which following the TMDA hypothesis are significant predictors of mental health outcomes. Our SEM identified resilience and mastery as the strongest predictors of positive affect, whilst prior positive affect was the only variable to report any significant effect on current PWB. Although mastery was a significant predictor of negative affect and reported direct effects on depression and anxiety, its stronger relationship with positive affect support the reciprocal nature of the 'broaden and build' hypothesis. Clearly, the strongest associations with the PWB variables were the cross-sectional correlations with current positive affect, but it appears that factors other than prior affect and mental health contribute to explained variance in current resilience and mastery. The importance of PWB should be emphasized since the effects of resilience and mastery on current mental health variables were comparable to the prior mental health and affect variables. In addition, PWB explained considerable variance in current SWB which was itself an important driver of current mental health.

The reported moderate longitudinal associations between the SWB and mental health variables do indicate variability in reported affect and mental health. This possibly supports a set-point theory of affect which proposes that affect states fluctuate around mean levels of affect [41–43]. Interestingly, the longitudinal associations between prior SWB and current PWB and mental health actually support a reversed mediation model to that described by the TMDA, since prior SWB was more strongly related to current PWB than current mental health. However, this is likely the consequence of an epidemiological study design, in which participants were assessed once every four years. Consequently we propose that the TMDA may more accurately describe associations between PWB, SWB and mental health outcomes over shorter temporal contexts and that there are limitations to extending the affect-mental health associations proposed in the TMDA model, which were supported in our cross-sectional analyses, to greater longitudinal contexts. In addition, future research should seek to identify the importance of discerning between stable and reactive

natures of SWB which may be related to the likelihood of predicting better mental health outcomes.

There are other limitations to the findings in this study. First, the role of personality was not considered. Although strong associations between extraversion with positive affect and neuroticism with negative affect have been reported, the evidence supporting the relationship between personality and clinically significant mental health outcomes has been less substantial [6]. Whilst several studies have found that neuroticism or emotional instability predicts subsequent onset of depression and anxiety, the relationship with extraversion is less clear [11,44,45]. In particular, it is important to further test the demonstrated relationships between cognitive and affective components of well-being and mental health outcomes after controlling for the personality effects. Whilst, recent analyses [26] controlled for a five-factor personality model and identified PWB as contributing to greater explained variance in positive affect, clearly there will be some conceptual overlap with personality and the well-being constructs not considered in this analysis. Further limitations include a lack of clinical diagnoses of depression and anxiety and the assumption for the causal direction of the influence of current PWB on SWB and mental health variables, due to the lack of prior data on some of the well-being measures at the prior wave. In addition, participants were drawn from two narrow age cohorts and these findings need to be extended to older age groups.

This study has supported recent findings that identify multi-dimensional models of well-being [25,27]. Furthermore, this study has shown that two cognitive PWB components explain a significant proportion of variance in SWB affect states, which are themselves significant drivers of mental health outcomes. In particular, the strong relationship between resilience and mastery with positive affect demonstrates that interventions to reduce depression and anxiety symptomology need to incorporate techniques that broaden and build cognitive PWB components that are more likely to increase levels of, and reduce reactivity in, positive affect. Consequently, we believe that the importance of PWB constructs lies in their capacity to decrease our vulnerability to negative mental health outcomes. Our findings suggest that rather than affecting depression and anxiety directly, PWB exerts an indirect effect on mental health symptoms through its role in reducing negative, and enhancing positive affective experiences.

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References

1. WHO. *Preamble to the Constitution of the World Health Organization*. Geneva: WHO, 1948:100.
2. Huppert FA. State of science review SR-X2: psychological well-being: evidence regarding its causes and consequences. *Foresight Mental Capital and Wellbeing Project*. London: Office of Science and Innovation, 2008.
3. Ryan RM, Deci EL. On happiness and human potentials: a review of research on hedonic and eudaimonic well-being. *Annu Rev Psychol* 2001; 52:141–166.
4. Vittersø J. Personality traits and subjective well-being: emotional stability, not extraversion, is probably the important predictor. *Pers Individ Dif* 2001; 31:903–914.
5. Watson D, Clark LA. Negative affectivity: the disposition to experience aversive emotional states. *Psychol Bull* 1984; 96: 465–490.
6. Clark LA, Watson D, Mineka S. Temperament, personality, and the mood and anxiety disorders. *J Abnorm Psychol* 1994; 103: 103–116.
7. Brown TA, Chorpita BF, Barlow DH. Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *J Abnorm Psychol* 1998; 107:179–192.
8. Joiner TA, Cantanzaro S, Laurent J. Tripartite structure of positive and negative affect, depression, and anxiety in child and adolescent psychiatric inpatients. *J Abnorm Psychol* 1996; 105:401–409.
9. Watson D, Clark LA, Weber K, Assenheimer JS, Strauss ME, McCormick RA. Testing a tripartite model: II. Exploring the symptom structure of anxiety and depression in student, adult, and patient samples. *J Abnorm Psychol* 1995; 104:15–25.
10. Lauer CJ, Bronisch T, Kainz M, Schreiber W, Holsboer F, Krieg JC. Pre-morbid psychometric profile of subjects at high familial risk for affective disorder. *Psychol Med* 1997; 27:355–362.
11. Roberts SB, Kendler KS. Neuroticism and self-esteem as indices of the vulnerability to major depression in women. *Psychol Med* 1999; 29:1101–1109.
12. Hirschfeld RMA, Klerman GL, Lavori P, Keller MB, Griffith P, Coryell W. Premorbid personality assessments of first onset of major depression. *Arch Gen Psychiatry* 1989; 46:345–350.
13. Kendler KS, Nealer MC, Kessler RC, Heath AC, Eaves LJ. A longitudinal twin study of personality and major depression in women. *Arch Gen Psychiatry* 1993; 50:853–862.
14. Kring AM, Persons JB, Thomas C. Changes in affect during treatment for depression and anxiety. *Behav Res Ther* 2007; 45: 1753–1764.
15. Cederblad M. Fifty years of epidemiologic studies in child and adolescent psychiatry in Sweden. *Nord J Psychiatry* 1996; 50: 55–66.
16. Lamand AJ, Depp CA, Allison M, Langer R, Reichstadt J, Moore DJ, Golshan S, Ganiats TG, Jeste DV. Measurement and predictors of resilience among community-dwelling older women. *J Psychiatr Res* 2008; 43:148–154.
17. Rutter M. Resilience in the face of adversity: protective factors and resistance to psychiatric disorders. *Br J Psychiatry* 1985; 25:173–180.
18. Connor KM, Sutherland SM, Tupler LA, Malik ML, Davidson JRT. Fluoxetine in post-traumatic stress disorder: randomised, double-blind study. *Br J Psychiatry* 1999; 175:17–22.
19. Aspinwall LG, MacNamara A. Taking positive changes seriously. *Cancer* 2005; 104:2549–2556.
20. Charney DS. Psychobiological and vulnerability: implications for successful adaptation to extreme stress. *Am J Psychiatry* 2004; 161:195–216.
21. Rodin J. Aging and health: effects of the sense of control. *Science* 1986; 233:1271–1276.
22. Karasek RA, Theorell TG, Schwartz J, Pieper C, Alfredsson L. Job, psychological factors and coronary heart disease: Swedish prospective findings and US prevalence findings using a new occupational inference method. *Adv Cardiol* 1982; 29:62–67.
23. Marmot M, Shipley M, Brunner E, Hemingway H. Relative contribution of early life and adult socioeconomic factors to adult morbidity in the Whitehall II study. *J Epidemiol Community Health* 2001; 55:301–307.
24. Seeman M, Lewis S. Powerlessness, health and mortality: a longitudinal study of older men and mature women. *Soc Sci Med* 1995; 41:517–525.
25. Burns RA, Machin MA. Investigating the structural validity of Ryff's psychological well-being scales across two samples. *Soc Indic Res* 2009; 93:359–375.
26. Burns RA, Machin MA. Identifying gender differences in the independent effects of personality and psychological well-being on two broad affect components of subjective well-being. *Pers Individ Dif* 2010; 48:22–27.
27. Gallagher MW, Lopez SJ, Preacher KJ. The hierarchical structure of well-being. *J Pers* 2009; 77:1025–1050.
28. Jorm AF, Windsor TD, Dear KB, Anstey KJ, Christensen H, Rodgers B. Age group differences in psychological distress: the role of psychosocial risk factors that vary with age. *Psychol Med* 2005; 35:1253–1263.
29. Connor KM, Davidson JRT. Development of a new resilience scale: The Connor-Davidson Resilience scale (CD-RISC). *Depress Anxiety* 2003; 18:76–82.
30. Pearlman LI, Schooler C. The structure of coping. *J Health Soc Behav* 1978; 19:2–21.
31. Pearlman LI, Menaghan EG, Lieberman MA, Mullen JT. The stress process. *J Health Soc Behav* 1981; 22:337–356.
32. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: The PANAS scales. *J Pers Soc Psychol* 1988; 54:1063–1070.
33. Kuehner C, Huffziger S, Liebsch K. Rumination, distraction and mindful self-focus: effects on mood, dysfunctional attitudes and cortisol stress response. *Psychol Med* 2009; 39:219–228.
34. Goldberg D, Bridges K, Duncan-Jones P, Grayson D. Detecting anxiety and depression in general medical settings. *Br Med J* 1988; 297:897–899.
35. Jöreskog KG, Sörbom D. LISREL-VI user's guide. Mooresville, IN: Scientific Software, 1984.
36. Bentler PM. Comparative fit indexes in structural models. *Psychol Bull* 1990; 107:238–246.
37. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, eds. *Testing structural equation models*. Newbury Park, CA: Sage, 1993.
38. Burns RA, Anstey KJ. The Connor-Davidson Resilience Scale (CD-RISC): testing the invariance of a uni-dimensional resilience measure that is independent of positive and negative affect. *Pers Individ Dif* 2010; 48:527–531.

39. Clark LA, Watson D. Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *J Abnorm Psychol* 1991; 100:316–336.
40. Fredrickson BL. The value of positive emotions: the emerging science of positive psychology in coming to understand why it's good to feel good. *Am Sci* 2003; 91:330–335.
41. Headey BW, Wearing AJ. Personality, life events and subjective well-being: toward a dynamic equilibrium model. *J Pers Soc Psychol* 1989; 57:731–739.
42. Lykken DT, Tellegen A. Happiness is a stochastic phenomenon. *Psychol Sci* 1996; 7:186–189.
43. Nes RB, Roysamb E, Tambs K, Harris JR, Reichborn-Kjennerud T. Subjective well-being: genetic and environmental contributions to stability and change. *Psychol Med* 2006; 36:1033–1042.
44. De Beurs E, Beekman ATF, Deeg DJH, Van Dyck R, Van Tilburg W. Predictors of change in anxiety symptoms of older persons: results from the Longitudinal Aging Study Amsterdam. *Psychol Med* 2000; 30:515–527.
45. Jorm AF, Christensen H, Henderson AS, Jacomb PA, Korten AE, Rodgers B. Predicting anxiety and depression from personality: Is there a synergistic effect of neuroticism and extraversion? *J Abnorm Psychol* 2000; 109:145–149.