Associations Between Positive Mental Wellbeing and Depressive Symptoms in Australian Adolescents

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This study examined the association and directionality of effect between mental wellbeing and depressive symptoms in Australian adolescents. Data were collected on two occasions 21 months apart. At Time 1, 1,762 10- to 14-year-old adolescents from a range of socio-economic status areas participated. At Time 2 (T2), 1,575 participated again. On both occasions, the Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS) and the Children's Depression Inventory 2 (CDI 2) were administered via online survey. Cross-lagged, longitudinal path analyses demonstrated a negative association between earlier symptoms of depression and later positive mental wellbeing, and that the reverse was also true, though weaker. The model accounted for 20% of the variance in males' T2 CDI 2 depressive symptom scores (26% for females) and 21% of the variance in males' T2 SWEMWBS mental wellbeing scores (23% for females). Depressive symptomatology and mental wellbeing were highly correlated, but symptoms of depression were more strongly associated with later mental wellbeing than vice versa. This has implications for educational psychologists, teachers, health professionals, and policy makers seeking to reduce depressive symptoms or promote mental wellbeing. Focusing solely on the promotion of mental wellbeing, without intervening to reduce symptoms of depression, may limit the potential outcomes that might be achieved.

■ **Keywords:** positive mental wellbeing, depressive symptoms, adolescence

Adolescence is a period frequently marked by the onset (and first appearance) of symptoms of adverse mental health (Patel, Flisher, Hetrick, & McGorry, 2007), with depression being particularly prevalent (Merikangas, Nakamura, & Kessler, 2009; Patel, 2013). Various studies have shown that 5–9% of adolescents are clinically depressed (see Goldfield et al., 2016), with females twice as likely as males to experience depressive episodes in adolescence (Hankin, Mermelstein, & Roesch, 2007). A meta-analysis of epidemiological studies estimated the point prevalence rate of major depression among 13- to 18-year-olds to be 5.6% (Costello, Erkanli, & Angold, 2006).

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However, as reported by Bertha and Balazs (2013), 9–16% of 14- to 16-year-olds experience subclinical levels of depressive symptoms (i.e., the presence of clinically relevant depressive symptoms that do not meet the full criteria of a major depressive episode), and these increase the risk of depression and other psychopathology in adulthood considerably (Balazs et al., 2013; Bertha & Balazs, 2013).

Anxiety, aggression, substance use, and reductions in academic performance and engagement and physical health, along with impaired peer and family functioning are all associated with depressive symptoms in adolescence (Fletcher, 2008; Jaycox et al., 2009); and for many individuals these tend to continue into young adulthood. Moreover, for some, there are increased risks of sexual behaviour and alcohol problems (see McLeod, Horwood, & Fergusson, 2016).

In sum, depression has a dramatic negative impact throughout the lifespan and adolescence is a period of particular risk for the emergence of depressive disorders (see Gomez-Baya, Mendoza, Paino, & de Matos, 2017). Longitudinal research has shown that the peak age of onset of depression is during mid adolescence, between the ages of 13 and 15 (Costello, Copeland, & Angold, 2011), and the transition from subclinical depression to major depression occurs in late adolescence (Bertha & Balazs, 2013). With regard to treatment outcomes, 14-year-old adolescents with a psychiatric disorder who access mental health services substantially reduce depressive symptoms at 36-month follow-up (i.e., 17 years of age). For those who had a disorder but did not access mental health services, the odds of their developing depressive symptoms in the clinical range is seven times higher (Neufeld, Dunn, Jones, Croudace, & Goodyer, 2017). Adolescence is therefore a critical juncture for developing effective prevention and intervention strategies.

Schools are important community contexts for promoting the mental health of adolescents (World Health Organisation [WHO], 2001). As such, universal school-based prevention programs (e.g., Headstrong [The Black Dog Institute] and MindMatters [Beyond Blue]) have been identified as a means of targeting a broad portion of adolescents at or before peak emergence of mental health conditions such as depression (Nehmy, 2010). Although there is some evidence of their effectiveness, as shown by the reduction of depression and/or anxiety, mental health is considered to be not just the absence of mental illness, but rather a state of complete emotional, psychological, social, and mental wellbeing (Keyes, 2002; WHO, 2004).

A construct that has emerged from searches for protective factors against adverse mental health issues is positive mental wellbeing (Gargiulo & Stokes, 2009), and its promotion among young people has assumed increased importance across a range of countries (Clarke et al., 2011; Jacka et al., 2013; Perry, Presley-Cantrell, & Dhingra, 2010). Hedonic (i.e., happiness, subjective wellbeing) and eudemonic (i.e., positive functioning) aspects of wellbeing (Clarke et al., 2011; Ryan & Deci, 2001; Tennant et al., 2007) make up the broad concept of positive mental wellbeing, and it is these in combination that contribute to a young person being mentally healthy (Keyes, 2002).

Though distinct from negative psychological wellbeing, positive mental wellbeing still appears to be bound up in experiences of negative adjustment to a greater or lesser extent. For example, depression and positive mental wellbeing are negatively correlated among adults (Tennant, Joseph, & Stewart-Brown, 2007); among adolescents, positive mental wellbeing is also negatively correlated with symptoms of anxiety and/or depression (Clarke et al., 2011). There is also evidence that emotional problems during adolescence may influence subsequent positive mental wellbeing much

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later in life (at 60–64 years old; Nishida, Richards, & Stafford, 2016). It is therefore of interest to better understand the ways in which these two constructs influence each other, especially given the emphasis on intervention programs during adolescence.

Objective

The primary objective of this study was to examine the directionality of the relationship between positive mental wellbeing, measured using the Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS; Stewart-Brown et al., 2009), and symptoms of depression, measured using the Children's Depression Inventory 2 (CDI 2; Kovacs, 2004) with a sample of Australian adolescents over approximately two years.

Method

Participants and Settings

Data were collected on two separate occasions 21 months apart. Time 1 (T1), comprised a total of 1,762 adolescents (966 males, 796 females) from Grades 5 (285 males, 246 females 10 years of age), 7 (371 males, 299 females 12 years of age) and 9 (310 males, 251 females 14 years of age). At Time 2 (T2), a total of 1,575 adolescents (881 males, 694 females) who participated at T1 from Grades 7 (263 males, 227 females 12 years of age), 9 (335 males, 256 females 14 years of age) and 11 (283 males, 211 females 16 years of age) participated again.

This T1–T2 time period was used to coincide with the timing of school terms and to ensure that the T2 testing was completed before the end of the school year.

Adolescents were initially recruited from 25 randomly selected schools. Of these, 14 were state government primary schools (four in rural locations), six were state government high schools (four in rural locations), one was a state government district high school (a rural location catering for grades K–10) and four were non-government schools (K–12). All schools were located across a range of socio-economic status (SES) areas as indexed by their Socio-Economic Index for Areas (SEIFA; Australian Bureau of Statistics, 2011). Six primary schools were in low SES areas, three in mid SES areas, and five were in high SES areas. Of the six high schools there were three in low SES areas, two in mid SES areas and one in high SES areas. The District High School was in a low SES area and of the four non-government high schools, all were in high SES areas. As the study progressed, an additional 14 high schools were engaged because some students transitioned to new high schools (i.e., from primary school Grade 7 to high school Grade 8), along with general population movements (across all grade levels). Six of the newly engaged high schools were from mid SES areas and eight were from high SES areas.

Instrumentation

Two instruments were administered online: the SWEMWBS (Stewart-Brown et al., 2009) and the CDI 2 (Kovacs, 2004). The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS; Tennant et al., 2007) is a valid and reliable 14-item, self-report scale measuring adult mental wellbeing (e.g., Clarke et al., 2011; Bartram, Sinclair, & Baldwin, 2013; Gremigni & Stewart-Brown, 2011; Lloyd & Devine, 2012; López et al., 2013). The shorter seven-item adult format has also been validated (Gremigni & Stewart-Brown, 2011; Vaingankar et al., 2011).

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When administered to adolescents, both the 14-item and the shorter 7-item formats have proven reliable. However, while excellent fit statistics were reported for the 14-item WEMWBS (GFI = 1.000, RMSEA = 0.003) with data from 1,650 13- to 16-year-olds (Clarke et al., 2011), follow-up interviews identified issues of concern pertaining to definition and understanding of items and potential for misinterpretation of items. In another study of 829 Australian 13- to 16-year-olds, the shortened 7-item version (i.e., SWEMWBS) demonstrated a better fit than the 14-item version: $\chi^2(df = 13) = 30.75$, $p = .004$, CMIN/DF = 2.37; CFI = .99; RMSEA = .040 (90% CI [.022, .020]) and provided higher levels of internal reliability (Cronbach's alpha = .87; Hunter, Houghton, & Wood, 2015).

The use of the WEMWBS with younger children has been very limited, however, and questions have been raised pertaining to its suitability with this population. In a recent study (Miller, 2016) involving 625 primary school students aged from 8 to 10 years (331 males, 284 females; 10 unknown) from a range of SES areas (18% low SES, 55% middle SES, 27% high SES), the full 14-item one-factor measurement model demonstrated a good fitting model: $\chi^2(df = 77) = 341.341$, $p = .000$, CMIN = 4.33, CFI = .93, TLI = .91, RMSEA = .07 (90% CI [.066, .082]) and the estimate of reliability was sufficiently high to provide confidence in the use of the total score (Cronbach coefficient alpha = .92).

In this present study, participants completed the seven-item shortened version using a 5-point response option format (1 = *none of the time*, 2 = *rarely*, 3 = *some of the time*, 4 = *often*, 5 = *all of the time*). Participants report their feelings according to how they have felt during the previous two weeks (e.g., 'I've been feeling useful', 'I've been dealing with problems well'). Each of the seven items receive a factor score weight that is applied to the participants' scores. All scores are added together to produce a final score (see Hunter et al., 2015), with higher scores representing higher levels of positive mental wellbeing.

The CDI 2 (Kovacs, 2004) is a brief self-report assessment of cognitive, affective, and behavioural symptoms of depression in children and adolescents aged from 7 to 17 years. The CDI 2 comprises 12 different items, each providing three separate sentence response options that best describe participants' feelings and ideas over the past two weeks (e.g., 'I am sad once in a while', 'I am sad many times', 'I am sad all the time'). Total raw scores are converted to a standardised *t* score (mean of 50, *SD* = 10) to allow for appropriate age (7–12 years of age, 13–17 years of age) and sex (M/F) comparison. The CDI 2 has demonstrated good reliability, and discriminant and convergent validity. Cronbach's alpha has been reported as follows: for the overall total sample .82; the values among individual age and sex groupings have ranged from .77 to .85; and test–retest reliability from .76 to .92, indicating excellent temporal stability (see Kovacs, 2004). In the present study, Cronbach's alpha was .80 (T1) and .84 (T2).

Procedure

Permission to conduct this research was obtained from the Human Research Ethics Committees of the administering institution and the State Department of Education. Permission was also granted by the publishers to administer the two instruments online. Following this, schools were randomly selected from a mix of socioeconomic and metropolitan and rural areas and their principals contacted to ascertain their interest in participating. Information sheets and consent forms (for parental and

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TABLE 1
Means (Standard Deviations) for Depression Score (CDI *t* score) and Wellbeing Score (SWEMWBS) at Time One and Time Two

Variable	Boys[1]	Girls[2]	Total
CDI T1	51.76 (10.38)	54.22 (11.93)	52.88 (11.18)
CDI T2	51.89 (11.93)	53.76 (12.28)	52.73 (12.12)
SWEMWBS T1	3.03 (0.56)	2.86 (0.57)	2.95 (0.57)
SWEMWBS T2	3.11 (0.59)	2.93 (0.63)	3.03 (0.61)

Note: [1] $n = 929$–603, [2] $n = 851$–491.
CDI = Children's Depression Inventory (Short Form) *t* scores. SWEMWEBS = Warwick-Edinburgh Mental Well-being Scale (Short Form).

TABLE 2
Bivariate Correlations Between Age, Depression Scores (CDI 2 *t* score) and Wellbeing Scores (SWEMWBS) at Times One and Two

	2.	3.	4.	5.
1. Age	.08**	.05	−.08**	−.10***
2. CDI 2 T1	–	.46***	−.61***	−.42***
3. CDI 2 T2	–	–	−.33***	−.64***
4. SWEMWBS T1	–	–	–	.42***
5. SWEMWBS T2	–	–	–	–

Note: $^{**}p < .01$. $^{***}p < .001$.
CDI 2 = Children's Depression Inventory 2 (Short Form) *t* scores. SWEMWEBS = Warwick-Edinburgh Mental Well-being Scale (Short Form).

participant consent) were then sent to the schools who agreed to participate for forwarding to the parents of potential participants, explaining their son or daughter's involvement in the research.

The SWEMWBS and CDI 2 were administered to participants via an online survey during regular school hours. All participants were provided with a unique identification code that allowed them to log into the survey at each of the administration times. This unique code also ensured that all information provided was confidential and that data collected could be linked via these codes for the purposes of data analysis. School principals nominated one teacher to be responsible for liaising with the researchers and for administering the survey at each of the time points over the 21-month period. These teachers each received written instructions to ensure standardisation of administration procedures.

Results

We first screened the data ($N = 1{,}762$) for multivariate and univariate outliers. Multivariate outliers were defined as Mahalanobis distance values significant at $p < .001$, and univariate outliers were those with a *z* score greater than 3.29 on either of the two CDI 2 scores or two SWEMWBS scores (Tabachnick & Fidell, 2007). The final sample size for all analyses was therefore $n = 1{,}686$, with over 95% of the sample retained. Means and standard deviations for the T1 and T2 test administrations (i.e., four assessments) used in the current report are shown, by sex, in Table 1. Bivariate correlations between all four measures, and age, are shown in Table 2, indicating

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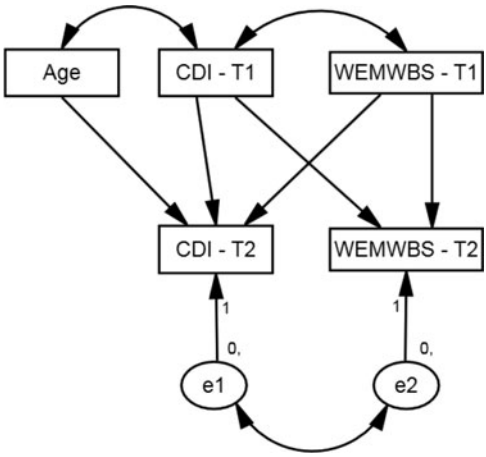

FIGURE 1

Full cross-lagged model.

Note: The final model constrained all paths to be equal across gender except: the covariance between 'CDI 2 — T1' and 'SWEMWBS — T1' and the path from 'Age at T1' to 'CDI 2 — T2'. CDI 2 = Children's Depression Inventory 2 (Short Form) *t* scores. SWEMWEBS = Warwick-Edinburgh Mental Well-being Scale (Short Form).

that the four variables are all significantly associated with one another in expected directions.

AMOS 22.0 was employed to assess a cross-lagged model. Full information maximum likelihood (FIML) was used in the analyses to address missing data. To assess model fit, several indices were used. While a non-significant chi-squared value is indicative of good fit, it is very sensitive to sample size, and therefore we used additional criteria to assess model fit, including the CMIN/DF, CFI, and RMSEA. A good fitting model is indicated by: CMIN/DF values under 3–4; CFI values above .95; and RMSEA scores of .06 or less (Bentler, 1992; Hu & Bentler, 1999).

In our model, age was included as a covariate of CDI 2 scores, but not of SWEMWBS scores. This is because research consistently reports sex and age effects upon CDI 2 scores (Twenge & Nolen-Hoeksema, 2002). However, in other studies, the age effects pertaining to the SWEMWBS have disappeared after adjusting for sex (Clarke et al., 2011), and the absence of age effects on the SWEMWBS has also been reported for young people in Australia (Hunter et al., 2015). The full model is shown in Figure 1.

We first tested a model where all paths shown in Figure 1 were free to vary across males and females, and requested pairwise parameter comparisons from AMOS 22.0. Pairwise parameter comparisons reflect standardised differences (*z* scores) between parameters so that values greater than 1.96 indicate that the relevant parameters differ at $p < .05$. The fit of this initial model was good: $\chi^2(df = 4) = 16.32$, $p = .003$; CMIN/DF = 4.08; CFI = 0.992; RMSEA = .043 (90% CI [.023, .065]). Inspection of the pairwise parameter comparisons indicated that there were two sex differences, neither of which reflected differences on key paths of interest. First, the association between CDI 2 (i.e., depressive symptoms) and SWEMWBS (i.e., positive mental wellbeing) at T1 was stronger for females ($z = -3.06$). Second, the path from Age at T1 to CDI 2 at T2 was also stronger for females ($z = -3.31$).

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TABLE 3
Unstandardised (b) and Standardised (β) Estimates in the Final Model

	Unstandardised estimate (SE)	Standardised estimate[1]
CDI 2 T1 to CDI 2 T2	0.46 (0.04)	.39*** / .45***
CDI 2 T1 to SWEMWBS T2	−0.01 (0.002)	−.24*** / −.27***
SWEMWBS T1 to SWEMWBS T2	0.28 (0.04)	.27*** / .26***
SWEMWBS T1 to CDI 2 T2	−1.61 (0.72)	−.08*
Age T1 to CDI 2 T2	0.49 (0.22) / −0.58 (0.24)	.07* / −.08*

Note: Where two estimates are given these are for boys followed by girls.
[1]Standardised estimates may still vary even when the unstandardised estimate is constrained across groups because of differences in group variances.
*$p < .05$; ***$p < .001$.
CDI 2 = Children's Depression Inventory 2 (Short Form) *t* scores. SWEMWEBS = Warwick-Edinburgh Mental Well-being Scale (Short Form).

TABLE 4
Unstandardised (Covariance) and Standardised (Correlation) Estimates in the Final Model

	Unstandardised estimate	Standardised estimate[1]
Age T1 — CDI 2 T1	0.44 (0.39)	.03 / .02
CDI 2 T1 — SWEMWBS T1	−3.38 (0.25) / −4.64 (0.34)	−.58***/ −.66***
CDI 2 error T2 — SWEMWBS error T2	−3.28 (0.19)	−.58***/ −.56***

Note: Where two estimates are given these are for boys followed by girls.
[1]Standardised estimates may still vary even when the unstandardized estimate is constrained across groups because of differences in group variances.
**$p < .01$. ***$p < .001$.
CDI 2 = Children's Depression Inventory 2 (Short Form) *t* scores. SWEMWEBS = Warwick-Edinburgh Mental Well-being Scale (Short Form).

We therefore assessed a final model that constrained the parameters that were invariant across males and females to be the same. The fit of the final model was good: $\chi^2(df = 10) = 19.85$, $p = .031$; CMIN/DF = 1.99; CFI = .994 RMSEA = .024 (90% CI [.007, .040]), and the chi-squared change test indicated that there was no significant decrement in fit when moving to the constrained model ($p = .740$), thereby providing support for the more parsimonious second model with the sex constraints applied.

As shown in Table 3, there is a negative association between earlier depressive symptomatology and later mental wellbeing scores, and also a small, negative association between earlier mental wellbeing scores and later depressive symptomatology. This latter effect of mental wellbeing on later depressive symptomatology was notably smaller than the reverse effect of depressive symptomatology upon later mental wellbeing score. Age was negatively associated with later CDI 2 (depressive symptom) *t* scores for females, but positively related to later scores for boys, though both effects were small. In addition, CDI 2 *t* scores and mental wellbeing were negatively correlated at both time points (see Table 4), more strongly so for females than for males at T1. Squared multiple correlations indicated that the model accounted for 20% of the variance in males' T2 CDI 2 *t* scores (26% for females) and 21% of the variance in males' T2 SWEMWBS scores (23% for females).

Discussion

The aim of this research was to examine the direction of the relationship between mental wellbeing (SWEMWBS) and depressive symptoms (CDI 2) in Australian

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adolescents across a period of 21 months. We observed strong bivariate correlations between scores on these two constructs. However, the results of our main analysis suggested that the association of symptoms of depression with later positive mental wellbeing was more substantial than the effects of positive mental wellbeing on later depressive symptomatology. These results suggest that positive mental wellbeing does *not* act as a strong protective factor with respect to the long-term development of symptoms of depression (Gargiulo & Stokes, 2009), but that elevated symptoms of depression may hinder the development of later positive mental wellbeing.

Further work is required that can clarify the reasons for the uneven bidirectionality of effects we have observed. One explanation may lie in the nature of depression. Depression is thought to develop, and to be maintained, by maladaptive cognitive biases that lead to passivity and an explanatory style for future events that encourages helplessness and hopelessness (Peterson & Seligman, 1984). Such an orientation may be at odds with the maintenance of subjective experiences of happiness and life satisfaction as emphasised in the hedonic perspective on positive mental wellbeing (Ryan & Deci, 2001). Thus, the strong cognitive biases associated with depressive symptomatology may impair the development of positive mental wellbeing. The reciprocal may not be true if cognitive biases or orientations toward more positive outlooks are less stable or more fragile. Future research should seek to clarify and examine in more detail the cognitions most closely associated with positive mental wellbeing in adolescence.

Where the focus of intervention is to reduce symptoms of depression, our results suggest that a focus on positive mental wellbeing will not have a large effect. However, where the focus of intervention is the promotion of positive mental wellbeing, the present results provide some evidence that reducing the number of depressive symptoms experienced by young people may be a helpful way of achieving this. This effect is independent of the association of earlier positive mental wellbeing with later positive mental wellbeing. It may be that tackling such cognitive biases increases the extent to which young people engage in positive activities that subsequently enhances positive mental wellbeing. Future research is required to investigate whether this is the case, and such recommendations are limited by the fact that our results are explicitly not based on intervention work.

A large sample of community-dwelling adolescents from a wide range of socio-economic areas was recruited in the current study. Nevertheless, it must be acknowledged that only self-report data were collected and that data from multiple informants is a recommended optimal strategy (cf. Antshel, Faraone, & Gordon, 2012). However, there is clear evidence that self-report is an effective means of obtaining an accurate insight into the subjective dispositions (such as positive mental wellbeing) that can be difficult to obtain from third parties such as teachers and parents (Frick, Barry, & Kamphaus, 2009). Additionally, the current study examined a range of levels of depressive symptomatology and the results may or may not generalise when comparing the presence or absence of clinical depression.

Conclusions

In summary, the data presented here are, to our knowledge, the first to examine the reciprocal relationships between symptoms of depression and positive mental wellbeing longitudinally among adolescents. The results indicate that depressive

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symptomatology and positive wellbeing are highly correlated, but that symptoms of depression are more strongly associated with later positive wellbeing than vice versa. Reviews of the research evidence show that mental health promotion interventions can be implemented effectively with children and adolescents in schools. However, more research is needed to strengthen the evidence base on the interrelationships between mental health and other health (see Barry, Clarke, Jenkins, & Patel, 2013). This current research has addressed one aspect of this by examining the association and directionality of effect between positive mental wellbeing and depressive symptoms. The findings have strong implications for educational psychologists, teachers, policy makers, and allied health professionals, especially in countries that have identified positive mental wellbeing as a national priority. Specifically, implementing school-based programs that focus solely on the promotion of positive mental wellbeing without intervening to reduce symptoms of depression may limit any potential outcomes that might be achieved.

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Conflict of Interest

None of the authors have any conflict of interest to declare.

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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