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**STRESSFUL LIFE EVENTS, SOCIAL SUPPORT, AND  
DEPRESSIVE SYMPTOMS IN ADOLESCENTS: THE  
MEDIATING ROLE OF SCHOOL CONNECTEDNESS**

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## NON-TECHNICAL SUMMARY

Adolescence is a developmental period marked by sharp biological and social changes. Along with these shifts, young people also have increased risk of poorer mental health as they approach and experience adolescence. However, adolescents may draw up on social resources in their circles to help cope with changes in their mood as well as deal with life stressors overall. These social resources may include parents, friends, as well as their schools.

We use data from the Longitudinal Study of Australian Children (LSAC) to look at how different sources of social support can help adolescents aged 13 to 17 to cope with changes in their mental wellbeing. Additionally, we look at how social support can also act as a ‘buffer’ against additional life stressors happening among their families that may also lead to poorer mental health in adolescents.

Our findings suggest that social support from parents and connectedness with ones’ school is related to better mental health, overall. Surprisingly, support from friends worsens adolescents’ mental health during early to mid-adolescence. A possible explanation for this is that unlike parent support or school connectedness, which provide emotional support and esteem, adolescents’ friendships function to widen their social networks instead and therefore may not provide the same mental health benefits as other forms of support.

When we look at how social support may help adolescents cope with additional family life stressors, we find that adolescents who receive more support from their parents are ‘buffered’ from the negative impact of these increased life stressors. Finally, we also find that more family life stressors can also compromise how connected adolescent feel with their school, but these feelings of connectedness can still lead to better mental health. Together, our research suggests that parents and schools providing high levels of high-quality social support is important for helping adolescents maintain good mental wellbeing, both overall and in the face of stressful life events.



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## ABOUT THE AUTHORS

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## ABSTRACT

Adolescence is a period marked by changes in social relationships as well as increased risk of poor mental health. Using three waves of the K-cohort of the Longitudinal Study of Australian Children ( $N = 4,048$ ), we examined the role of familial stressful life events, parent support, friend support, and school connectedness on adolescent depressive symptoms. Using a cross-lagged panel structural equation model, we found that parent and school connectedness reduced adolescent depression over time. In contrast, friend support predicted higher depression over time. Additionally, in support of a stress-buffering effect, adolescents with more parent support were buffered from negative impacts from increased family stressful life events during mid-to-late adolescence. Finally, school connectedness emerged as a mediator between familial stressful life events and adolescent depression. These findings suggest that for adolescence, parent support and school connectedness are important factors in helping adolescents cope with stressful life events.

**Keywords:** stressful life events, social support, parent support, friend support, school connectedness, depression

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## 1. Introduction

Exploring mental health in adolescence is important given that adolescent mental health disorders are predictive of mental health disorders in adulthood (for a review see Johnson et al., 2018). In Australia—the country where this study is conducted—approximately 15.9% of adolescent boys and 12.8% of adolescent girls reported experiencing some form of psychological disorder at ages 12–17 (Lawrence et al., 2016). Moreover, there is evidence that psychological distress has increased markedly due to the COVID-19 pandemic, and particularly amongst adolescent girls (Li et al., 2021; Racine et al., 2021).

Adolescents who experience poor mental health may have worse performance in school (Needham et al., 2004), poorer educational achievement during later adolescence, and are more likely to experience unemployment, and poorer mental health outcomes in adulthood (Fergusson & Woodward, 2002). Thus, it is important to explore how decrements in mental health may be mitigated, such as through social support.

Adolescents who make good use of social resources in the face of adversity develop greater resilience, an important protective factor for recovering from stress (Olsson et al., 2003). We use the Longitudinal Study of Australian Children (LSAC) to explore the role of stressful life events in affecting levels of psychological distress amongst adolescents and the role of various forms of social support in buffering against decrements in mental health. We know from previous research that experiencing stressful life events can decrease mental health in adults (Kraaij et al., 2002; Liu, et al., 2019) but also children (Bøe et al., 2018) and adolescents (Hammen, 2005). Stressful events experienced in childhood and adolescence can lead to poorer mental health in adulthood, including a higher likelihood of being diagnosed with a major depressive disorder (LeMoult et al., 2020). We focus on adolescents as prevalence of depression rises rapidly at the onset of adolescence (Thapar et al., 2012), highlighting the necessity of understanding mitigating factors for this critical developmental period. We focus on one aspect of mental health in this paper, primarily depression, and use terms such as ‘depressive symptoms’ and ‘psychological distress’ and ‘[poor] mental wellbeing’ interchangeably.

### *Stress, Social Support, and Adolescent Mental Health*

Everyday stressors can lead to decrements in mental health, especially in adolescents as they are in developmental period in which they are still learning how to cope with stress. In general, stressful life events, whether they are episodic (i.e., acute stressful events) or chronic (i.e., stressors persisting over time) can lead to negative health outcomes, such as increased depressive symptoms (Hammen, 2005).



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Furthermore, research suggests that *changes* in the total number of stressors leads to changes in depression (Clements et al., 2008). The relationship between stress and depression has also been found, over time, to be stronger for girls relative to boys (Bouma et al., 2008; Waaktaar et al., 2004). Girls may also be more affected by different types of stress, such as family or interpersonal stress (Shih et al., 2006).

Despite the negative consequences of stress on adolescent mental health, they may also draw upon relevant social resources to mitigate these impacts. Social support, as in the provision of help through social networks whether through practical help or the perceived availability of support, can improve mental health in general, regardless of experiences of hardship (e.g., Gecková et al., 2003; Jose et al., 2013). Conversely, adolescents who perceive or experience poor social support may report higher levels of psychological distress (Van Droogenbroeck et al., 2018).

How social support affects adolescent mental health may also be impacted by socioeconomic factors. Youth reporting high levels of perceived support may differ in their psychological wellbeing depending on area-level disadvantage (Wight et al., 2006). For adolescents who perceive high levels of support, those living in areas of low advantage may not see the same benefits of support on their mental health as their counterparts who live in more socioeconomically advantaged areas. How social support affects depression may also differ by gender, for example, parental or family support may have stronger mental health benefits for adolescent girls than boys (Chu et al., 2010; Gariépy et al., 2016). However, a meta-analysis found more similarities between girls and boys in how support provides mental health benefits to adolescents, though the authors warn against dismissing gender-related effects (Rueger et al., 2016).

### *Stress-Buffering Hypothesis*

Social support may improve mental health through mitigating the negative impact of stressful life events on mental wellbeing. The stress-buffering model (Cohen & Wills, 1985; Wheaton, 1985) posits that social support, that is responsive to the stressors an individual is experiencing, buffers the negative impact of life stress on mental health and well-being. This is most commonly conceptualised as an interaction, whereby social support attenuates increases in depressive symptoms resulting from negative life events (Cohen & Wills, 1985). Although this effect has been documented in many studies (e.g., Dalgard et al., 1995; Ge et al., 2009), whether social support indeed moderates how stress impacts mental health remains uncertain (e.g., Burton et al., 2004; also see Rueger et al., 2016). It may be the case that social support effects are washed out when different sources of support are unaccounted for. Thus, it is important to differentiate between *types* of support sources. Adolescents may draw upon different



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sources of social support unique to their developmental period (e.g., parents, schools) to mitigate against decrements in mental health (for a review, see Garipey et al., 2016). Additionally, according to a meta-analysis of social support and adolescent mental health, the effect of social support differs by the source of support adolescents receive (Rueger et al., 2016).

### *Parental Support*

Families and parents are likely the primary source of support adolescents draw from and have been consistently identified as protective against depression in adolescents (Garipey et al., 2016). There is also evidence that families and parents provide the strongest support to psychological wellbeing compared to other sources of support (Rueger et al., 2016). This is shown by studies using longitudinal data, suggesting having more familial support is related to lower depression in adolescents (DuBois et al., 1994; Sheeber et al., 1997; Stice et al., 2004). These effects may be further broken down by parent, with support from mothers being more protective from decrements in mental health over time, a relationship not found for fathers (Colarossi & Eccles, 2003). Together, extant research suggests that parents play an important role for adolescent mental wellbeing.

Parental support has also been found to have a stress-buffering effect. Longitudinal research from the United States suggests that closeness with mothers can attenuate the negative impact of personal and family life events on later depression in adolescents (Ge et al., 2009). Furthermore, a close relationship with parents in general can buffer against increases in depression related to stress arising from conflict from peers (although this effect is not significant for non-peer-related stress; Hazel et al., 2014). Finally, in a longitudinal study from Australia, when several sources of support are examined simultaneously, family support emerges as the only significant buffer against decrements in mental health amongst adolescents (Pössel et al., 2018).

### *School Connectedness*

Another source of support identified as beneficial to adolescents' mental health are teachers and the school environment. Indeed, following parents and families, support from teachers and positive school environments (Garipey et al., 2016) as well as general peer support (i.e., classroom networks) are consistent protective factors. Schools function as healthy and stable environments providing opportunities to have peer relationships (Baker et al., 2003) and opportunities to feel connected to a community, boosting self-esteem and subsequently mood (Millings et al., 2012). Although some studies have found support from teachers is beneficial to youth mental wellbeing (e.g., Wang & Eccles, 2012),



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results are mixed across studies (Kidger et al., 2011). When considering the role of the school as a whole, according to a systematic review, adolescents' internal perceptions of school connectedness is reliably linked with better mental health (Kidger et al., 2011). This effect is supported by longitudinal data which suggests that school connectedness is related to improved mental health over time (Bond et al., 2007; Shochet et al., 2006; Zhu, 2018). Specifically, adolescents who felt greater connectedness with their school had better mental health relative to those who felt more disconnected from their school environment.

In terms of the evidence for the stress-buffering model, research from Norway has suggested that teacher support may have a buffering effect of stressful life events on depressive symptoms (Murberg & Bru, 2009). Similarly, longitudinal research from Australia suggests that teacher support buffers against the effect of average or high levels of stress on adolescent mental health (Pössel et al., 2013). The stress-buffering effect of adolescents' connectedness with their school environment is less clear. One study found that adolescents who experienced early adversity had higher depressive symptoms but this was not buffered by feelings of school connectedness (Markowitz, 2017). However, the role of school connectedness has not been explored in terms of its stress-buffering effects in terms of more recent cumulative stressful life events. Given that school connectedness combines the support of both teachers and wider peer networks, two sources with strong mental health benefits for adolescents (Rueger et al., 2016), its more immediate stress mitigating effects warrants further investigation.

### *Friend Support*

For adolescents, unlike other sources, support from close friends and peers appears to not to provide consistent benefits and is the most tenuous in its relationship with adolescent mental health (Chu et al., 2010; Garipey et al., 2016; Rueger et al., 2016). Longitudinal research suggests that when accounting for parent support, peer support is not related to changes in depressive symptoms over time (Stice et al., 2004). In fact, depressive symptoms were also found to predict poorer peer support over time. Similarly, another study found that changes in commitment with close friends or intimate partners were not significantly associated with changes in emotional problems over time (Meeus et al., 2007). However, other research has found associations between peer relationships and depressive symptoms (e.g., Windle, 1992). In an Australian study, peer connectedness was found to predict decreases in depression over time, even when accounting for school and family connectedness (which interestingly were not significant correlates; McGraw et al., 2008). In terms of the stress-buffering effect, the effect is also inconsistent. Although Windle (1992) did not find a stress-buffering effect amongst US adolescents, early research from Norway found that lower peer support (as well as family support but not school support) was related to



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increases in depressive symptoms relative to those with more support (Ystgaard, 1997, Ystgaard et al., 1999).

### *The Current Study*

The present study aims to examine the role of parental support, peer support, and school connectedness in mitigating the negative impacts of stressful life events experienced by a family on adolescent mental health. We use three waves of the Longitudinal Study of Australian Children (Mihal et al., 2021) to test the stress-buffering effect (Cohen & Wills, 1985; Wheaton, 1985) of parental support, peer support, and school connectedness on adolescent depression. To this end, we examine the principle-effects model predicting that increased support from parents (Hypothesis 1a), friends (Hypothesis 1b), and the school environment (Hypothesis 1c) will reduce depressive symptoms in adolescents (Kidger et al., 2011; McGraw et al., 2008; Stice et al., 2004). We hypothesise that stressful life events experienced in the family will lead to increased depression in adolescents (Hypothesis 2; e.g., Clements et al., 2008; Hammen, 2005). We also evaluate how social support may buffer the negative impact of stressful life events on mental wellbeing. To do so, we predict (Hypothesis 3) that social support moderates the effect of stressful life events on adolescent psychological distress by reducing decreases in mental health (Cohen & Wills, 1985).

Finally, we explore an alternative model of stress, social support, and depression in adolescence. We also predict that social support mediates the link between stressful life events in the family and depression in adolescents. Currently, there has been little focus on how stressful events lead to changes in social support or perceptions of available support, particularly for adolescents. In a meta-analysis of life events and changes to social networks, adults who have experienced relational changes such as parenthood, divorce, loss of a spouse, or relocation also experience changes in their social networks (Wrzus et al., 2013). Research on the impact of natural disasters has also found a bidirectional relationship between post-traumatic stress and social support (Platt et al., 2016). Specifically, although the stress from a shared event like a natural disaster can lead to increased social support as communities rally together, stress is also associated with decreases in perceived support. However, research on how stressful life events impact perceptions of social support, especially for adolescents, has been rarely researched. However, understanding the contributors to feelings of isolation and loneliness is important, particularly given the well-established link between diminished support and depression (e.g., Chu et al., 2010; Garipey et al., 2016; Rueger et al., 2016). Thus, we hypothesise that more stressful life events will lead to more depression, through decreased social support (Hypothesis 4).



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## 2. Method

### *Participants*

Participants are sampled from the kindergarten (K) cohort of the Growing Up in Australia: Longitudinal Study of Australian Children (LSAC), a developmental study of life course trajectories in Australian children across two cohorts. The K cohort comprises adolescents born between March 1999–2000 and first sampled at ages 4–5 (Mohal et al., 2021). Interviews with families are conducted biennially. Our study utilises data from waves five to seven, with wave five (W5) collected in 2012/13, wave six (W6) in 2014/15, and wave seven (W7) in 2016/17. Wave five received responses from 79.7% of the initial wave 1 sample (or 83.5% of the available sample), wave six received responses from 71.0% of the original wave (or 80.5% of the available sample), and wave seven received 62.0% of responses of the original sample (or 74.0% of the available sample). The most common reason for non-response was declining to participate.

Our sample comprises 48.94% girls and 51.06% boys ( $N = 4,048$ ). Participants are on average 12.41 years old ( $SD = 0.49$ ) at wave five, 14.41 years old ( $SD = 0.49$ ) at wave six, and 16.46 years old ( $SD = 0.51$ ) at wave seven. A small proportion of participants identify as Indigenous (2.86% at wave 5). Approximately 8.27% of participants spoke a language other than English in the home at wave five. Average household weekly income is AUD\$2,353.74 ( $SD = \$1,675.01$ ) at wave five.

### *Measures*

#### *Focal Variables*

**Stressful Life Events.** Twenty-six items are used to measure various types of stressful life events. The questions asked parents in the last twelve months if they experienced various events including illness and death of close family or friends, relationship initiation or dissolution, financial and/or occupational disruption or change, being a victim of a crime, changes in living situation, experience of natural disasters. A sum of all events is derived from these responses to create a measure of total number of stressful life events ( $\alpha_{W5} = 0.678$ ,  $\alpha_{W6} = 0.633$ ,  $\alpha_{W7} = 0.671$ ; missing<sub>W5</sub> = 5.11%, missing<sub>W6</sub> = 16.90%, missing<sub>W7</sub> = 26.09%).<sup>1</sup>

**Friend Communication and Trust.** A measure of communication and trust in friends is adapted from the peer facet of the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987) using eight

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<sup>1</sup> Missing data accounted for in main analyses using full information maximum likelihood estimation



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items. Adolescents were asked “how they get on with friends” and to rate each statement on a Likert scale from 1 (Almost always true) to 5 (Almost never true). Example items include “Friends sense when I’m upset”, “I trust my friends”, and “Friends ask me about problems”. Items are averaged to create a scale mean of total friend communication and trust (range 1 to 5). Higher values indicate lower communication and trust ( $\alpha_{W5} = 0.897$ ,  $\alpha_{W6} = 0.897$ ,  $\alpha_{W7} = 0.933$ ; missing<sub>W5</sub> = 5.14%, missing<sub>W6</sub> = 17.32%, missing<sub>W7</sub> = 27.62%).

**Parent Communication and Trust.** A measure of communication and trust in parents is adapted from the parent facet of the Inventory of Parent and Peer Attachment (Armsden and Greenberg, 1987) using eight items. Adolescents were asked “For each of these statements, choose the best answer for you...” and asked to rate items on a Likert scale from 1 (Almost never or never true) to 4 (Almost always or always true). Example items include “I talk with my parents when I have a problem” and “Parents accept me”. Items were averaged to create a scale mean of total parent communication and trust (range 1 to 4). Higher values indicate lower communication and trust ( $\alpha_{W5} = 0.922$ ,  $\alpha_{W6} = 0.936$ ,  $\alpha_{W7} = 0.946$ ; missing<sub>W5</sub> = 5.29%, missing<sub>W6</sub> = 17.39%, missing<sub>W7</sub> = 27.84%).

**School Connectedness.** Feelings of school connectedness is measured using twelve items from the Psychological Sense of School Membership scale (Goodenow, 1993). Adolescents were asked to rate items based on their own experience on a Likert scale from 1 (Not at all true) to 5 (Complete true). Example items include “Teachers are interested in me”, “Other students accept my opinions” and “I feel I don’t belong” (reverse-scored). Items are summed to create a total score of school connectedness. Higher scores indicate feeling greater connectedness in their school ( $\alpha_{W5} = 0.848$ ,  $\alpha_{W6} = 0.870$ ,  $\alpha_{W7} = 0.864$ ; missing<sub>W5</sub> = 9.19%, missing<sub>W6</sub> = 18.43%, missing<sub>W7</sub> = 37.50%).

**Depression.** Adolescent depressive symptoms are measured using the Short Mood and Feelings Questionnaire (Messer et al., 1995), a short form questionnaire designed to assess the epidemiology of children. Adolescents were asked “For each question please select how much you have felt or acted this way in the past two weeks. If a sentence was true about you most of the time, select ‘True’. If a sentence was only sometimes true, select ‘Sometimes’. If a sentence was not true about you, select ‘Not true’.” Thirteen items were included in this scale, example items include “I felt miserable or unhappy”, “I found it hard to think properly or concentrate”, and “I thought I could never be as good as other kids”. Items are summed to create a total score for adolescent mental distress, higher scores indicating greater distress



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(range 0 to 26;  $\alpha_{W5} = 0.921$ ,  $\alpha_{W6} = 0.943$ ,  $\alpha_{W7} = 0.951$ ; missing<sub>W5</sub> = 5.31%, missing<sub>W6</sub> = 17.49%, missing<sub>W7</sub> = 27.72%).

### Control Variables

Gender (Male, Female) and the Socio-Economic Index for Areas - Index Relative Advantage and Disadvantage 2016 (SEIFA IRSAD), a proxy for socio-economic status (Australian Bureau of Statistics, 2018) were included as control variables in our model to account for gender differences (e.g., Bouma et al., 2008) and socioeconomic factors (e.g., Wight et al., 2006). The IRSAD is an index of area-level relative disadvantage or advantage, defined as “people’s access to material and social resources, and their ability to participate in society” (p. 6). Geographic areas are ranked based on a continuum of disadvantage to advantage, with high scores indicating higher proportions of advantage and relatively low proportions of disadvantage. Examples of socioeconomic factors incorporated into this index include income, education, employment, occupation types, housing, and other social factors (e.g., disability, relationship status, single parenthood). The SEIFA IRSAD 2016 index is recoded to a binary variable to identify the most disadvantaged (and least advantaged) quintile of the sample.

### Analytic Strategy

Descriptive statistics were conducted in *STATA* 16. To assess changes in depressive symptoms from family experiences of stressful life events, and support from parents, friends, and schools, we ran a cross-lagged panel model with autoregressive paths with the three waves of LSAC selected for this study (waves five to seven, collected from 2013/14 to 2016/17). All other models were run in *Mplus* 8.6 (Muthen & Muthen, 1998–2020). Missing data were accounted for using full information maximum likelihood estimation across all models. This allows for the inclusion of all available responses, including those from whom we have missing data either across measures and/or across waves, thereby maximising the data available. Cross-lagged panel models accounting for autoregressive paths enables researchers to assess changes across constructs over time while controlling for within-construct temporal stability (Selig & Little, 2012). In terms of assessing model fit, we report our chi-square statistics but do not rely on it to assess model fit as it is sensitive to large sample sizes (Gerbing & Anderson, 1985). We instead use descriptive fit indices to determine model fit, such as the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR) using the cut-offs recommended by Hu and Bentler (1999), CFI > .95, RMSEA < .06, SRMR < .08. In order to assess longitudinal mediation effects, all models are bootstrapped with 5,000 resamples.



### 3. Results

#### *Preliminary analyses*

Bivariate correlations across all continuous measures are presented in Table 1. Depression ( $r_s = .225-.315$ ), stressful life events ( $r_s = .284-.387$ ) and friend support ( $r_s = .229-.375$ ) display small-to-moderate test-retest stability between W5 and W6 and W6 and W7. School connectedness ( $r_s = .439-.571$ ) and parent support ( $r_s = .342-.459$ ) has moderate test-retest stability. Additionally, as shown in Table 1, measures of depression and stressful life events are negatively correlated to all support measures at the bivariate level. Additionally, depression is positively correlated with stressful life events across all waves.

Descriptive statistics and rates of missing data of all measures are presented in Table 2. Average levels of depression across all waves are low overall but wave-to-wave comparisons suggest they are significantly higher with each progressive year ( $F_{(1, 10106)} = 466.75, p < .001$ ). In terms of familial stressful life events, counts of events are low overall and are not significantly different in frequency across waves ( $F_{(1, 10201)} = 2.44, p = 0.119$ ). Parent support is significantly higher at W5, relative to later waves ( $F_{(1, 10097)} = 155.58, p < .001$ ) with a similar pattern emerging for friend support ( $F_{(1, 10115)} = 124.49, p < .001$ ). Feelings of school connectedness are not significantly different between waves ( $F_{(1, 9530)} = 0.59, p = .443$ ). Girls have higher depression ( $M_{W5} = 4.29, SD_{W5} = 5.50; M_{W6} = 6.57, SD_{W6} = 6.98; M_{W7} = 8.64, SD_{W7} = 7.54$ ) relative to boys ( $M_{W5} = 3.84, SD_{W5} = 5.13; M_{W6} = 4.32, SD_{W6} = 5.99; M_{W7} = 6.43, SD_{W7} = 7.58$ ) across all three waves ( $t_{W5(3835)} = -3.33, p = .009; t_{W6(3342)} = -10.00, p < .001; t_{W7(2925)} = -7.88, p < .001$ ). Adolescents who lived in the most disadvantaged areas also have significantly higher depression in W5 ( $t_{W5(3835)} = -2.75, p = .006$ ) but not W6 and W7 ( $t_{W6(3342)} = -1.93, p = .053; t_{W7(2925)} = -1.75, p = .080$ ).

#### *Cross-lagged panel models*

##### Principle-Effects Models

First, we assess the principle-effects model (Hypothesis 1a–1c) with all sources of social support modelled simultaneously along with stressful life events and depressive symptoms (Model 1). We chose the approach of modelling all sources of support together as past research has suggested that accounting for all sources provides a more accurate account of social resources available to adolescents (see Pössel et al., 2018). In this initial model, we examine the cross-lagged effect of stressful life events as well as parent, friend, and school connectedness on depression using three waves of data. Each source of support at W6 and W7 are predicted by W-1 stressful life events and the W-1 measure of the same support construct.



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To account for intraindividual stability of constructs over time (see Selig & Little, 2012), autoregressive paths for each construct are also modelled. Finally, within-wave errors are correlated across measures for W6 and W7. This first model displays acceptable fit ( $\chi^2_{(51)} = 681.359, p < .001$ ; RMSEA = 0.062 [90% CI = 0.058, 0.066]; CFI = 0.926; SRMR = 0.071).

All three sources of support at W5 have significant cross-lagged effects on depression in W6. Specifically, parent support ( $B = -0.701, SE = 0.051, p = .001$ ) and school connectedness ( $B = -0.098, SE = 0.019, p < .001$ ) predicts decreases in depression. Interestingly, friend support at W5 is related to increased depression at W6 ( $B = 0.655, SE = 0.152, p < .001$ ). Between the sixth and seventh waves, prior wave parent ( $B = -0.614, SE = 0.218, p = .005$ ) and school connectedness ( $B = -0.130, SE = 0.027, p < .001$ ) also predicts reduced later wave depression while friend support does not have a significant effect ( $B = 0.404, SE = 0.225, p = .073$ ).



Table 1. *Bivariate correlations of stressful life events, school connectedness, parent support, friend support, and depression across waves 5 to 7 (N = 4,048).*

	1.	2.	3.	4.	5.	6.	7.	8.
1. Depression W5	–							
2. Depression W6	0.315***	–						
3. Depression W7	0.225***	0.296***	–					
4. Stressful life events W5	0.064***	0.073***	0.030	–				
5. Stressful life events W6	0.071***	0.082***	0.065**	0.375***	–			
6. Stressful life events W7	0.055**	0.081***	0.082***	0.284***	0.387***	–		
7. School connectedness W5	–0.435***	–0.249***	–0.174***	–0.099***	–0.097***	–0.094***	–	
8. School connectedness W6	–0.340***	–0.468***	–0.256***	–0.114***	–0.108***	–0.124***	0.522***	–
9. School connectedness W7	–0.245***	–0.302***	–0.351***	–0.086***	–0.100***	–0.088***	0.439***	0.571***
10. Parent support W5	–0.337***	–0.223***	–0.150***	–0.084***	–0.070***	–0.038*	0.436***	0.335***
11. Parent support W6	–0.223***	–0.379***	–0.202***	–0.044*	–0.068***	–0.094***	0.286***	0.470***
12. Parent support W7	–0.166***	–0.227***	–0.268***	–0.061**	–0.072***	–0.036	0.266***	0.305***
13. Friend support W5	–0.190***	–0.046**	–0.026	–0.055**	–0.035***	–0.031	0.443***	0.222***
14. Friend support W6	–0.194***	–0.233***	–0.118***	–0.071***	–0.051***	–0.056**	0.338***	0.482***
15. Friend support W7	–0.114***	–0.137***	–0.147***	–0.061**	–0.061***	–0.028	0.217***	0.278***

Note. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

Table 1 (continued). *Bivariate correlations of stressful life events, school connectedness, parent support, friend support, and depression across waves 5 to 7 (N = 4,048).*

	9.	10.	11.	12.	13.	14.	15.
9. School connectedness W7	–						
10. Parent support W5	0.252***	–					
11. Parent support W6	0.307***	0.430***	–				
12. Parent support W7	0.433***	0.342***	0.459***	–			
13. Friend support W5	0.171***	0.256***	0.119***	0.113***	–		
14. Friend support W6	0.329***	0.240***	0.273***	0.177***	0.375***	–	
15. Friend support W7	0.404***	0.126***	0.134***	0.203***	0.229***	0.362***	–

Note. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$



Table 2. Descriptive statistics and rates of missing data across all measures.

	<i>M</i>	<i>SD</i>	Range	% Missing
Depression W5	4.059	5.317	0–26	5.31
Depression W6	5.427	6.594	0–26	17.49
Depression W7	7.523	7.637	0–26	27.72
Stressful life events W5	2.556	2.497	0–25	5.11
Stressful life events W6	2.349	2.271	0–15	16.90
Stressful life events W7	2.670	2.516	0–28	26.09
School connectedness W5	48.600	7.625	17–60	9.19
School connectedness W6	49.454	7.478	18–60	18.43
School connectedness W7	48.319	7.373	19–60	37.50
Parent support W5	3.505	0.630	1–4	5.29
Parent support W6	3.321	0.740	1–4	17.39
Parent support W7	3.294	0.780	1–4	27.84
Friend support W5	4.133	0.782	1–5	5.14
Friend support W6	4.063	0.752	1–5	17.32
Friend support W7	3.908	0.899	1–5	27.62
Most disadvantaged quintile W5	0.206	0.404	Yes/No	2.40
Most disadvantaged quintile W6	0.195	0.396	Yes/No	12.65
Gender	0.489	0.500	Male/Female	2.27

To account for the potential bidirectionality of depression influencing perceptions of social support or connectedness (e.g., Pössel et al., 2013; Saeri et al., 2018; Stice et al., 2004) as well as stressful life events (see stress generation model whereby those with poorer mental health may also report more stress over time; Hammen, 1991; Jenness et al., 2019; Liu & Alloy, 2010), we test another model which includes W-1 paths for depression predicting all three support measures and stressful life events (Model 2). The fit indices for this model also indicate acceptable model fit ( $X^2_{(43)} = 522.159, p < .001$ ; RMSEA = 0.059 [90% CI = 0.054, 0.063]; CFI = 0.944; SRMR = 0.051).

The pattern of results in terms of the effect of prior wave support on subsequent wave depression are similar to the prior model. Between W5 and W6, again, both parent support ( $B = -0.658, SE = 0.226, p = .004$ ) and school connectedness ( $B = -0.085, SE = 0.019, p < .001$ ) predicts lower depression. Similarly, the friend support was also related to higher depression ( $B = 0.657, SE = 0.152, p < .001$ ). The relationships between W6 and W7 are similar to Model 1, with parent support ( $B = -0.589, SE = 0.219, p = .007$ ) and school connectedness ( $B = -0.125, SE = 0.027, p < .001$ ) predicting lower depression and a non-significant relationship between depression and friend support ( $B = 0.404, SE = 0.225, p = .073$ ).



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A chi-square difference test for nested models was used to compare these two initial models. The results indicated that the more restricted model (Model 1) has significantly poorer model fit compared to the less restricted model (Model 2;  $\Delta\chi^2_{(8)} = 159.20, p < .001$ ). Thus we retain the model in which bidirectional paths for depression and social support and stressful life events were modelled.

According to Hypotheses 1a to 1c, more social support from parents, friends, and schools should lead to lower depression symptoms. Our results partially support these hypotheses. We find that over time, more support from parents and stronger school connectedness is linked to lower depression symptoms in adolescents. However, in contrast to our predictions, friend support was related to increases in depression between ages 12/13 to 14/15 and not significantly associated with depression symptoms between ages 14/15 and 16/17, when accounting for other sources of support.

#### Stress-Buffering Effect Model

In the next model (Model 3), we assess Hypothesis 2 and 3 by evaluating how stressful life events and social support impact adolescent mental health together. To test if stressful life events are related to increases in depression, we assess the cross-lagged effect of stressful life events on depression symptoms. We test the stress-buffering effect as a moderation. To do this, an interaction term for stressful life events and each source of support is constructed using concurrent measures of both constructs. The interaction terms are then included in our cross-lagged panel model for all three waves, building on Model 2. Later wave depression (W6 and W7) are regressed on prior wave interaction terms (W5 and W6). Additionally, prior wave stressful life events, the corresponding social support construct, and depression are modelled to predict the later wave interaction term. The autoregressive paths for the interactions are also included in the model. A separate model is run for each interaction.

First, to assess Hypothesis 2, we use Model 3 to examine the relationship between prior wave reports of stressful life events and subsequent wave levels of depression. Our results partially support our predictions. Stressful life events significantly predict higher depression between W5 and W6 ( $B = 0.134, SE = 0.051, p = .008$ ) but not for W6 and W7 ( $B = 0.088, SE = 0.062, p = .160$ ). However, we observe a significant cross-lagged effect of the stress-buffering effect of parent support on adolescent depression between W6 and W7 (but not W5-W6), possibly explaining the non-significant relationship of stressful life events and depression at these waves.



Breaking down the significant cross-lagged effect between W6 and W7, the W6 interaction of stressful life events and parent support significantly predicted W7 depression symptoms ( $B = -0.186$ ,  $SE = 0.085$ ,  $p = .028$ ). The interaction terms for friend support and school connectedness does not have a significant cross-lagged relationship with depression, for either of the paths between W5 and W6 and W6 and W7. This model also displays acceptable model fit ( $\chi^2_{(72)} = 662.452$ ,  $p < .001$ ; RMSEA = 0.050 [90% CI = 0.047, 0.054]; CFI = 0.932; SRMR = 0.046). Like Model 2, this model shows parent support ( $B_{W5-W6} = -0.689$ ,  $SE = 0.225$ ,  $p = .002$ ;  $B_{W6-W7} = -0.576$ ,  $SE = 0.219$ ,  $p = .008$ ) and school connectedness ( $B_{W5-W6} = -0.086$ ,  $SE = 0.019$ ,  $p < .001$ ;  $B_{W6-W7} = -0.127$ ,  $SE = 0.027$ ,  $p < .001$ ) in prior waves predicts decreased depression in subsequent waves. Again, friend support at W5 predicts increased depression at W6 ( $B = 0.667$ ,  $SE = 0.152$ ,  $p < .001$ ) but not between W6 and W7 ( $B = 0.404$ ,  $SE = 0.226$ ,  $p = .074$ ).

In the next step, we include our two key control variables identified in the literature—gender and area-level disadvantage (SEIFA IRSAD 2016)—to our previous model (Model 3) to form our final model (Model 4). We build on Model 3 by including gender as a time-invariant predictor of all variables at W6 and W7. Area-level disadvantage is included as a predictor of all variables at W6 and W7. As area-level disadvantage is time-varying, we account for the autoregressive path between the W5 and W6 measures of this construct. The model displays good model fit across all descriptive fit indices ( $\chi^2_{(79)} = 624.865$ ,  $p < .001$ ; RMSEA = 0.041 [90% CI = 0.038, 0.044]; CFI = 0.965; SRMR = 0.037).

A full account of all paths from Model 4 is presented in Figure 1 and Table 3. Girls showed higher levels of depression at W6 and W7. Living in an area that is in the most disadvantaged quintile of the SEIFA IRSAD index at W5 predicts increased W6 depression ( $B = 0.586$ ,  $SE = 0.280$ ,  $p = .037$ ) but there is no significant effect between W6 and W7 ( $B = 0.042$ ,  $SE = 0.357$ ,  $p = .907$ ). The moderating effect of parent support on family stressful life events remains significant between W6 and W7 ( $B = -0.172$ ,  $SE = 0.078$ ,  $p = .027$ ). Additionally, there remains a main effect of prior wave parent support predicting decreased depression at both W6 ( $B = -0.449$ ,  $SE = 0.221$ ,  $p = .042$ ) and W7 ( $B = -0.492$ ,  $SE = 0.208$ ,  $p = .018$ ). Similarly, prior wave school connectedness is related to decreased depression at both W6 ( $B = -0.083$ ,  $SE = 0.019$ ,  $p < .001$ ) and W7 ( $B = -0.112$ ,  $SE = 0.026$ ,  $p < .001$ ). Finally, friend support continues to predict increased depression between W5 and W6 ( $B = 0.381$ ,  $SE = 0.149$ ,  $p = 0.011$ ) but not between W6 and W7 ( $B = 0.102$ ,  $SE = 0.224$ ,  $p = .648$ ).

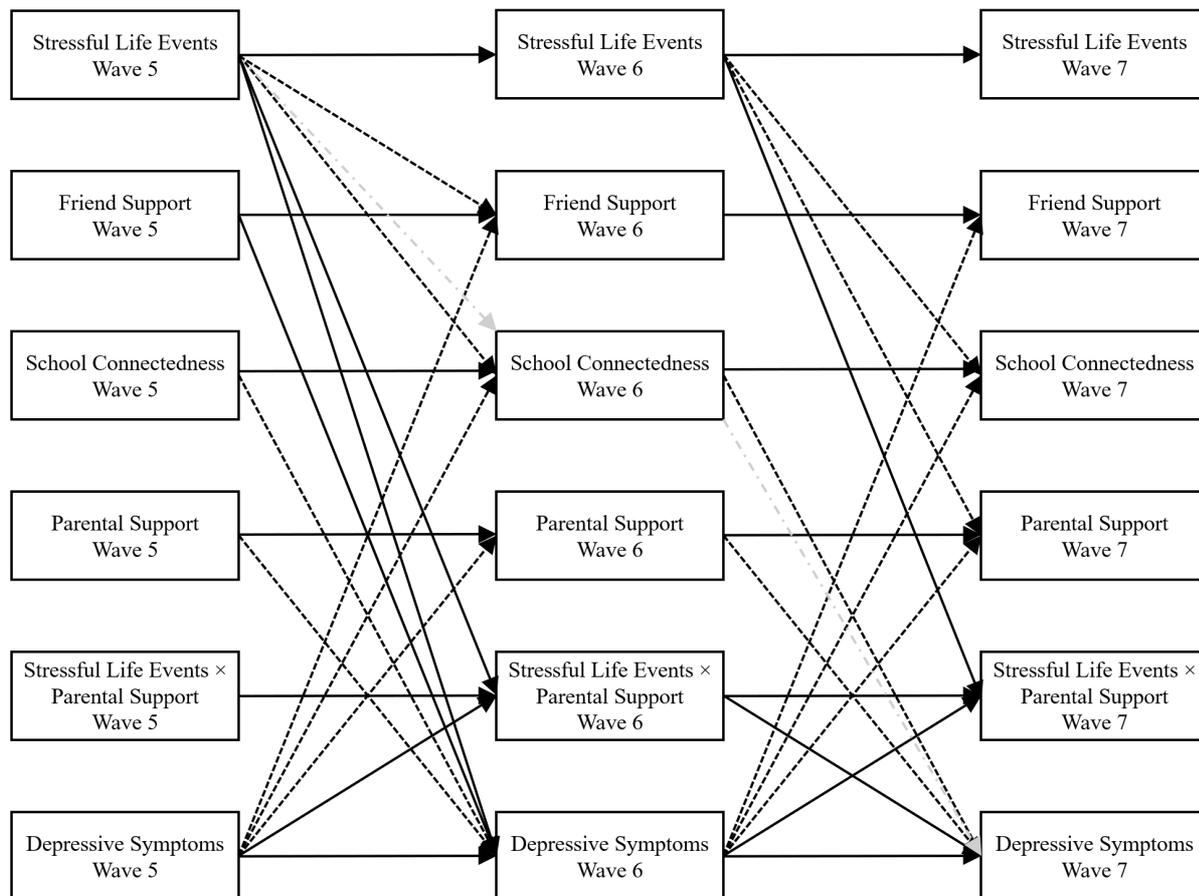


Figure 1. Cross-lagged panel model of familial stressful life events, friend, parent, and school support, predicting depressive symptoms with autoregressive paths. For ease of interpretation, only significant paths are pictured and coefficients are omitted, please see Table 3 for all estimates. Solid black lines indicate significant regression paths with a positive sign and dashed black lines indicate significant regression paths with a negative sign. Grey dashed lines indicate a significant indirect effect. To preserve space, control variables, covariances between exogenous variables, and covariances of the error terms for within-time endogenous variables are not depicted ( $N = 4,048$ ;  $\chi^2_{(79)} = 624.865$ ,  $p < .001$ ; RMSEA = 0.041 [90% CI = 0.038, 0.044]; CFI = 0.965; SRMR = 0.037).



*Stress-buffering effect of parent support on depression*

There is a significant interaction between stressful life events and parent support at W6, predicting depression in adolescents at W7. To examine the moderating effect further, we plot the simple slopes of stressful life events at W6 and depression at W7 at  $\pm 1$  SD of parent support at W6 (see Figure 2). High parent support is not significantly associated with changes in depression when experiencing more stressful life events ( $B = -0.003$ ,  $SE = 0.082$ , bias-corrected [BC] 95% CI =  $[-0.160, 0.160]$ ,  $p = 0.973$ ). However, low parent support at W6 is associated with significantly elevated depression at W7 ( $B = 0.228$ ,  $SE = 0.038$ , BC 95% CI =  $[0.080, 0.378]$ ,  $p < .001$ ).



Table 3. All regression paths in Model 4, the cross-lagged panel model of the stress-buffering effect of parent support, controlling for other sources of support and demographics variables ( $N = 4,048$ ;  $X^2_{(79)} = 624.865$ ,  $p < .001$ ; RMSEA = 0.041 [90% CI = 0.038, 0.044]; CFI = 0.965; SRMR = 0.037).

	<i>B</i>	<i>SE</i>	$\beta$	95% CI Lower	95% CI Upper	<i>p</i>
<b>Depression W7</b>						
Stressful life events W6 → Depression W7	0.113	0.060	0.034	-0.006	0.228	.060
Parent social support W6 → Depression W7	-0.492	0.208	-0.047	-0.892	-0.075	.018
School connectedness W6 → Depression W7	-0.112	0.026	-0.108	-0.163	-0.062	< .001
Friend social support W6 → Depression W7	0.102	0.224	0.010	-0.343	0.542	.648
Stressful life events W5 × Parent support W6 → Depression W7	-0.172	0.078	-0.039	-0.324	-0.018	.027
Depression W6 → Depression W7	0.246	0.030	0.213	0.188	0.305	< .001
Gender → Depression W7	1.509	0.284	0.099	0.943	2.057	< .001
Most disadvantaged quintile W6 → Depression W7	0.042	0.357	0.002	-0.668	0.749	.907
<b>Depression W6</b>						
Stressful life events W5 → Depression W6	0.138	0.049	0.052	0.043	0.234	.005
Parent social support W5 → Depression W6	-0.449	0.221	-0.043	-0.867	-0.007	.042
School connectedness W5 → Depression W6	-0.083	0.019	-0.096	-0.119	-0.045	< .001
Friend social support W5 → Depression W6	0.381	0.149	0.045	0.077	0.670	.011
Stressful life events W5 × Parent support W5 → Depression W6	0.026	0.061	0.008	-0.090	0.151	.665
Depression W5 → Depression W6	0.330	0.030	0.266	0.275	0.392	< .001
Gender → Depression W6	2.052	0.217	0.156	1.620	2.481	< .001
Most disadvantaged quintile W5 → Depression W6	0.586	0.280	0.036	0.054	1.134	.037
<b>Parent support W7</b>						
Stressful life events W6 → Parent support W7	-0.013	0.006	-0.039	-0.026	0.000	.043
Parent support W6 → Parent support W7	0.444	0.024	0.419	0.396	0.493	< .001
Depression W6 → Parent support W7	-0.008	0.002	-0.069	-0.013	-0.003	.001
Gender → Parent support W7	-0.017	0.026	-0.011	-0.070	0.031	.498
Most disadvantaged quintile W6 → Parent support W7	-0.008	0.036	-0.004	-0.080	0.060	.833
<b>Parent support W6</b>						
Stressful life events W5 → Parent support W6	-0.004	0.005	-0.015	-0.015	0.006	.425
Parent support W5 → Parent support W6	0.417	0.024	0.359	0.370	0.462	< .001
Depression W5 → Parent support W6	-0.014	0.003	-0.099	-0.019	-0.008	< .001
Gender → Parent support W6	-0.133	0.024	-0.091	-0.179	-0.088	< .001
Most disadvantaged quintile W5 → Parent support W6	-0.018	0.030	-0.010	-0.078	0.040	.544



School connectedness W7						
Stressful life events W6 → School connectedness W7	-0.139	0.059	-0.044	-0.258	-0.023	.018
School connectedness W6 → School connectedness W7	0.498	0.021	0.502	0.457	0.540	< .001
Depression W6 → School connectedness W7	-0.093	0.024	-0.085	-0.141	-0.049	< .001
Gender → School connectedness W7	-0.017	0.243	-0.001	-0.481	0.456	.944
Most disadvantaged quintile W6 → School connectedness W7	-0.832	0.320	-0.046	-1.482	-0.206	.009
School connectedness W6						
Stressful life events W5 → School connectedness W6	-0.217	0.053	-0.074	-0.326	-0.116	< .001
School connectedness W5 → School connectedness W6	0.375	0.017	0.390	0.341	0.408	< .001
Depression W5 → School connectedness W6	-0.233	0.031	-0.169	-0.296	-0.177	< .001
Gender → School connectedness W6	-1.122	0.222	-0.076	-1.562	-0.697	< .001
Most disadvantaged quintile W5 → School connectedness W6	-1.141	0.293	-0.063	-1.714	-0.566	< .001
Friend support W7						
Stressful life events W6 → Friend support W7	-0.011	0.007	-0.028	-0.025	0.003	.135
Friend support W6 → Friend support W7	0.367	0.025	0.309	0.318	0.416	< .001
Depression W6 → Friend support W7	-0.009	0.003	-0.067	-0.015	-0.004	.001
Gender → Friend support W7	0.145	0.033	0.081	0.081	0.211	< .001
Most disadvantaged quintile W6 → Friend support W7	-0.109	0.043	-0.049	-0.192	-0.023	.011
Friend support W6						
Stressful life events W5 → Friend support W6	-0.014	0.005	-0.047	-0.025	-0.004	.008
Friend support W5 → Friend support W6	0.302	0.020	0.315	0.262	0.339	< .001
Depression W5 → Friend support W6	-0.018	0.003	-0.129	-0.024	-0.012	< .001
Gender → Friend support W6	0.143	0.026	0.095	0.096	0.196	< .001
Most disadvantaged quintile W5 → Friend support W6	-0.035	0.031	-0.019	-0.095	0.025	.265
Stressful life events × Parent support W7						
Stressful life events W6 → Stressful life events W7 × Parent support W7	0.009	0.026	0.011	-0.048	0.055	.723
Parent support W6 → Stressful life events W7 × Parent support W7	0.067	0.065	0.026	-0.056	0.193	.300
Stressful life events × Parent support W6 → Stressful life events × Parent support W7	0.175	0.037	0.161	0.106	0.251	< .001
Depression W6 → Stressful life events W7 × Parent support W7	0.007	0.006	0.024	-0.006	0.019	.283
Gender → Stressful life events W7 × Parent support W7	0.022	0.073	0.006	-0.126	0.160	.758
Most disadvantaged quintile W6 → Stressful life events W7 × Parent support W7	0.080	0.101	0.017	-0.121	0.275	.430
Stressful life events × Parent support W6						
Stressful life events W5 → Stressful life events W6 × Parent support W6	0.001	0.019	0.001	-0.037	0.039	.960
Parent support W5 → Stressful life events W6 × Parent support W6	-0.084	0.062	-0.031	-0.208	0.037	.172
Stressful life events × Parent support W5 → Stressful life events W6 × Parent support W6	0.137	0.034	0.155	0.083	0.213	< .001
Depression W5 → Stressful life events W6 × Parent support W6	-0.003	0.007	-0.011	-0.018	0.010	.621




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Gender → Stressful life events W6 × Parent support W6	-0.094	0.060	-0.027	-0.213	0.022	.120
Most disadvantaged quintile W5 → Stressful life events W6 × Parent support W6	0.096	0.077	0.022	-0.056	0.243	.212
Stressful life events W7						
Stressful life events W6 → Stressful life events W7	0.439	0.025	0.397	0.388	0.487	< .001
Depression W6 → Stressful life events W7	0.021	0.007	0.056	0.008	0.035	.002
Gender → Stressful life events W7	-0.128	0.088	-0.025	-0.305	0.045	.147
Most disadvantaged quintile W6 → Stressful life events W7	0.137	0.112	0.022	-0.081	0.357	.223
Stressful life events W6						
Stressful life events W5 → Stressful life events W6	0.350	0.024	0.383	0.302	0.396	< .001
Depression W5 → Stressful life events W6	0.020	0.007	0.047	0.006	0.036	.006
Gender → Stressful life events W6	-0.009	0.073	-0.002	-0.153	0.131	.905
Most disadvantaged quintile W5 → Stressful life events W6	0.164	0.097	0.029	-0.023	0.355	.092
Most disadvantaged quintile W6						
Most disadvantaged quintile W5 → Most disadvantaged quintile W6	0.904	0.011	0.913	0.883	0.924	< .001

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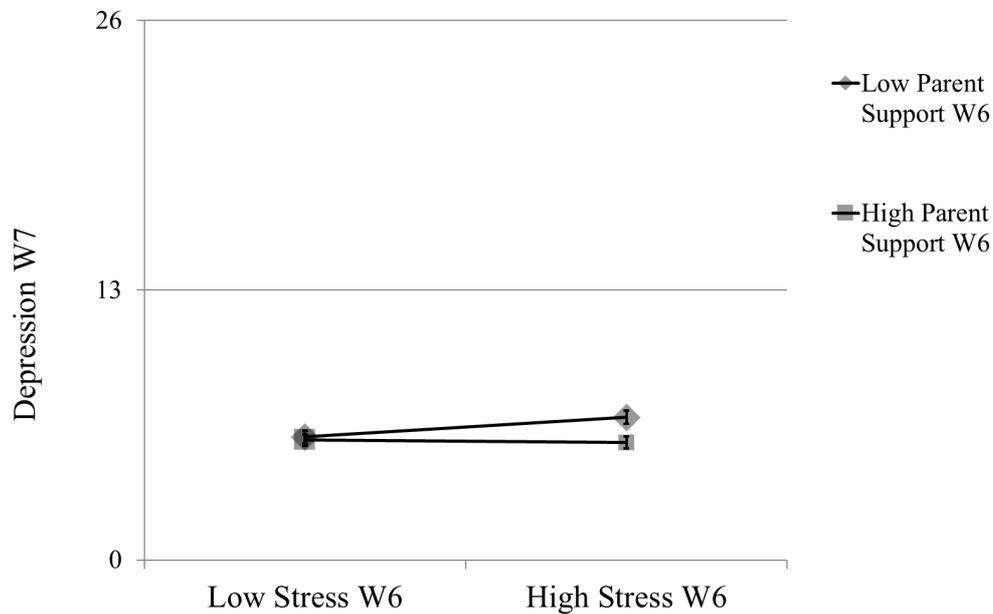


Figure 2. Plotted simple slopes for stressful life events at W6 predicting depressive symptoms at W7, moderated by parent support at W6.

Note. Y-axis displays full scale for depressive symptoms (0–26)

Next, we compare the point estimates of depression at W7 at low levels ( $-1$  SD) and high levels ( $+1$  SD) of stressful life events for low and high levels of parent support at W6. At low levels of stressful life events, there is no significant difference in depression at either low ( $M = 5.203$ , BC 95% CI = [4.549, 5.891]) or high ( $M = 5.029$ , BC 95% CI = [4.429, 5.681]) levels of parent support ( $M_{\text{Difference}} = 0.174$ , BC 95% CI = [-0.510, 0.847],  $p = .616$ ). However, higher levels of stressful life events, and lower parent support ( $M = 6.161$ , BC 95% CI = [5.464, 6.838]) is associated with significantly higher depression relative to those with higher parent support ( $M = 5.017$ , BC 95% CI = [4.446, 5.659];  $M_{\text{Difference}} = 1.143$ , BC 95% CI = [0.451, 1.838],  $p = .001$ ).

According to Hypothesis 3, social support should attenuate the effect of stressful life events in worsening depression symptoms, in other words, a *stress-buffering* effect. We observe a significant moderating effect of parent support on depression between W6 and W7. Specifically, for adolescents with higher parent support, experiencing more stressful life events does not increase depressive symptoms. However, for those with lower parent support, experiencing more familial stressful life events is associated with an increase in depression over time. Furthermore, amongst adolescents experiencing high levels of stressful events, youth with *lower* parent support had significantly *higher* depressive symptoms compared to those



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with more parent support. However, it is notable that although we detected a significant relationship, the effect is quite small.

#### *Mediation analyses*

Next, we assess whether parent, friend, or school connectedness longitudinally mediates the link between stressful life events and depression in adolescents. Two indirect effects emerge as significant across our cross-lagged panel model. Stressful life events at W5 predicted depression at W7, through depression at W6 ( $B = 0.034$ ,  $SE = 0.013$ , BC 95% CI = [0.011, 0.063],  $p = .007$ ). In other words, familial stressful life events experienced in early adolescence leads to worse depression in late-adolescence through persistent increases in depression during mid-adolescence.

There is also a significant indirect effect of stressful life events at W5, predicting W7 depression, through school connectedness ( $B = 0.024$ ,  $SE = 0.008$ , BC 95% CI = [0.011, 0.044],  $p = .003$ ). Stressful life events at early adolescence is related to increasing depression four years later. However, this is mediated through feelings of school connectedness during secondary school. Although stressful life events at W5 decreases feelings of school connectedness at W6, these feelings of connectedness nonetheless lessen the depressive symptoms two years later, through school connectedness.

Thus, according to Hypothesis 4, social support should mediate the link between stressful life events and later depression. Specifically, stressful life events may lead to poorer relationships at school which may also contribute to worse mental health. Of our three sources of support, only school connectedness mediated the association between stressful life events and depressive symptoms over time. Specifically, poorer school connectedness resulting from family stressors partially explains a decrease in depression over time.

## **4. Discussion**

The aim of this study was to test the stress-buffering effect of parent, friend, and school connectedness using a national longitudinal sample of Australian adolescents (Cohen & Wills, 1985; Wheaton, 1985). We expect that social support will be related to lower depression over time, regardless of stressful life events. Our results suggests how social support impacts depression amongst adolescents depends on the source of support. Specifically, having more support from more 'stable' sources such as parents and the school environment (i.e., teachers and classmates) is related to decreases in depression over time. These results



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align with a large body of research which has consistently found that more support from parents and schools provides mental health benefits to adolescents (e.g., Garipey et al., 2016; Kidger et al., 2011).

Inconsistent with our predictions, our findings suggest that having greater connections with one's friends is related to *higher* depression, when accounting for support from parents and schools, at least at early to mid-adolescence. Although contrary to our hypothesis which broadly predicts that support reduces depression symptoms, the negative effect of friend support is not entirely unsurprising. Past research has found that peer or friend support during adolescence is inconsistently related to depressive symptoms (Garipey et al., 2016; Rueger et al., 2016). Although some past research has suggested that better connectedness with friends could be related to improved mental health (e.g., McGraw et al., 2008), other research has suggested that friendships may do more harm than good. For example, relationships with peers can also *increase* poor mental health and suicidality amongst boys (Kerr et al., 2006) and increased interpersonal stress and depression amongst girls (Flynn & Rudolph, 2011; Rudolph, 2002). Possible explanations for this effect may be that other sources of support, such as parent relationships, differ in its function for adolescents compared to friend relationships. Specifically, relationships with parents provide nurturance whereas peer relationships function to develop social networks with equal others (Collins & Laursen, 2004). Thus, closer friendships amongst adolescents may not equate to the provision of emotional support but rather increased opportunity for close ties which may also carry with it additional interpersonal stress.

Next, we hypothesised that various social supports would buffer the negative impact of family life stressors on adolescent mental health. In testing the stress-buffering hypothesis, we find that only parent support moderates how stressful life events affect adolescence, and only during mid-to-late adolescence (aged 14/15 and 16/17), a finding that is consistent with past research from Australia (Pössel et al., 2018). Specifically, for adolescents who perceive higher levels of support from parents, their levels of depression are unaffected by increased familial stressful life events, thus buffered from its negative impact. In contrast, adolescents who experienced more familial stress as well as poor support from their parents saw an increase over time in their depression symptoms. The finding that only parent support provides a stress-buffering effect is unsurprising as past research suggests that, when a stress-buffering effect is observed, parent support is the most consistent and strongest buffer (Rueger et al., 2016).

Finally, we also examine the mediating role of different sources of support between experiences of familial stress and adolescent depression over time. We predicted that levels of support would provide



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a further explanation for the association between family stressors and depression over time for adolescents. We find that stressful life events in earlier years was related to depression later in adolescence through decreased feelings of school connectedness. In other words, greater challenges faced in the family may lead to less engagement with the school environment and reduced social networks (Wrzus et al., 2013) which subsequently leads to higher depression symptoms in later years. However, it is important to note that, despite having more depression symptoms later from earlier experiences of stress, feeling connected to one's school network nonetheless leads to lower depression over time. These findings extend on past research on the role of school factors in determining how stressful events affect adolescent mental health (Allen et al., 2018). Although school connectedness may foster improved psychological wellbeing amongst adolescents, it can also explain later changes in adolescent depression when faced with familial life stress.

Additionally, to our knowledge, our finding that stressful life events can decrease school connectedness is novel. Past research examining predictors of school connectedness has predominantly focused on school environment factors such as academic achievement and teacher involvement on fostering greater feelings of connectedness amongst students (Allen et al., 2018; Slater et al., 2016). Extant research on non-academic factors related to school connectedness does include parental factors such as social support in encouraging greater school connectedness (Allen et al., 2018). However, negative familial factors that may compromise adolescents' school connectedness—such as familial stressors—has not been previously explored. Thus, our findings highlight that broader, non-academic, familial factors can impact how youth adapt to their schools. This reduction in connectedness then has carry-on effects on overall adolescent mental health. However, it is still important to acknowledge that encouragingly, despite familial stressors decreasing school connectedness, support from the school environment can still provide recuperative benefits for adolescent mental health.

### *Limitations*

Although our study provides novel insights into how various social relationships and life stressors can impact adolescent mental health in differing ways, there are nonetheless limitations to our findings. The most notable limitation is the measure of stressful life events in LSAC. Although using a measure of cumulative life events is a common way research has examined the role of stressors in influencing mental health (Hammen, 2005), the measure of stressful life events was administered to parents rather than the adolescents themselves. Thus, our measure of stressful events reflects stressors experienced and perceived by the parents rather than adolescents' own direct experiences. Consequently, it will be the



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case that many of the events accounted for by this measure may not directly affect the adolescent themselves (e.g., worries about job security) while other events having a direct impact (e.g., loss of a spouse, natural disasters) or otherwise having potential spill-over effects (e.g., the financial impact of parental job loss on the family). However, given that adolescents are particularly affected by interpersonal stress (especially girls; Hammen, 1991; Liu & Alloy, 2010), a direct measure of stressful life events as reported by adolescents themselves may reveal a stronger association between stressful life events when specifically accounting for interpersonal stress.

### *Future Directions*

A key finding from our study is examining how familial stressful life events may lead to decreased school connectedness, leading to poorer mental health in adolescents. Future research can explore additional mechanisms that may buffer adolescents against decrements in school connectedness related to familial or other outside stressors. Additional avenues could include exploring additional mechanisms that may facilitate greater school connectedness or alternatively hinder the development of school connectedness. For example, adolescents with individual characteristics such as the personality trait of emotional stability, or other individual assets such as optimism and self-esteem may be better equipped for adapting to both school and changes in ones' environment (Allen et al., 2018) or have more adaptive coping mechanisms (Clarke, 2006). These findings may give insight into which adolescents may receive greater benefits from school-based support and thus better mental health.

### **Implications**

The findings from this study have a number of real-world implications in terms of adolescent mental health and coping with stressful life events. Most notably, our findings give insight into how adolescent resilience could be bolstered during the COVID-19 pandemic, a unique global event which combines both stressful life events and reduced social connectivity. In terms of adapting to COVID-19, outcomes such as greater social isolation due to social distancing requirements and stay-at-home orders, our findings highlight that schools may still be able to provide a unique opportunity to foster social support amongst affected adolescents, even when dealing with stress. For example, research has suggested that students utilising technology-based interactions in the midst of COVID-19 related lockdowns can still satisfy psychological needs, such as the need for autonomy and relatedness, and subsequent psychological wellbeing (Dimmock et al., 2021). Similarly, our findings highlight the importance of parents providing high quality social support to their adolescent children during the COVID-19 pandemic. Indeed,



our research resonates with a study from the United Kingdom which found that adolescents who reported more closeness with their parents during the pandemic also reported lower mental distress over time (Cooper et al., 2021).

## 5. Conclusion

Understanding ways in which good mental health can be fostered during adolescence is important given that depression and other forms of psychological distress rapidly increases during this developmental period (Thapar et al., 2012). Our findings suggest that adolescents who experience more stressful events in their family also have poorer mental health over time. Furthermore, our results suggest that disaggregating support sources provides a more insightful picture into how social support impacts adolescent mental health. Interestingly, support from friends can lead to more depression over time for youth, regardless of stressors. However, parental support and school connectedness decreases depression over time. Furthermore, our findings suggest that the stress-buffering effect exists for parent support. Receiving high quality social support from parents can reduce the negative impact of stressful events on adolescents' mental health, particularly during late adolescence. Additionally, the school environment plays a role in determining how family stressors can impact adolescent mental wellbeing. Although family stressors decrease school connectedness, quality connections made with teachers and classmates in the school environment nonetheless boosts adolescents' mental health over time. Together, our results highlight the importance of fostering support both in the home and at school to fortify adolescent mental wellbeing.



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## 6. Conclusion

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