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Tracking stress, depression, and anxiety across the final year of secondary school: A longitudinal study

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ABSTRACT

Levels of distress, which include stress, depression, and anxiety, are often heightened during the final year of secondary school and have been linked to major examinations that occur during this time period. However, relatively little is known about how these symptoms change over the course of the year or what moderates symptom severity. Using a longitudinal survey design, we tracked student outcomes and potential moderators (i.e., gender, test anxiety, self-efficacy, connectedness with peers, school and family, perceived use of fear appeals by teachers) associated with stress, depression, and anxiety once per term (i.e., 4 times total) over the final year of high school in seven Australian high schools. We hypothesised that student symptoms would increase over time and that symptom severity would be moderated by individual and environmental factors. Six hundred and thirty-eight unique students (*M* age = 16.95 years, SD = 0.56, range = 15–18 years, female = 474 [74.29%]) participated in at least one of the four surveys administered during each term of the final year of high school. Linear mixed models indicated that stress ($d = 0.2$) and anxiety ($d = 1.7$) increased over time. When all potential moderators of distress were entered into the full model, gender, test anxiety, emotional self-efficacy, and peer connectedness were all significant unique predictors of stress. Similar patterns were found for symptoms of depression and anxiety. Time 3 stress was predicted by unique variance in baseline stress, higher test anxiety, and academic self-efficacy. Overall distress increased over time and was moderated by gender, as well as by test anxiety, self-efficacy, and peer connectedness, which are areas that can then be targeted by interventions designed to maintain distress at optimum levels for wellbeing and academic performance.

Levels of distress, which include stress, depression, and anxiety, in the final year of formal high school has been shown to be heightened in many countries across the world. A recent systematic review (Wuthrich et al., 2020) found reports of heightened stress, depression, and anxiety in the final two years of high school in 17 different countries. Qualitative studies (e.g., Putwain, 2009, 2011) have shown that the increase in distress is often associated with the occurance of high stakes examinations associated with university entrance rankings, increased pressure to perform from teachers and parents, and overall workload increases. Although studies have reported high levels of stress, anxiety, and depression, it is not clear whether this distress increases or changes over time and whether or not it is predominantly associated with major examination periods. It is also not clear what other factors, such as individual or

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environmental factors, might be associated with individual differences in increased levels of distress.

As identified in Wuthrich et al.'s (2020) systematic review, most studies of distress have utilized cohort designs in which students' distress levels were examined only once during the final year of high school, often during the leadup to the major examination periods. Only five studies were found that measured student distress more than once during the final year; in general, these studies identified that distress levels increased in the leadup to the examinations. For example, Einstein et al. (2000) measured distress in Australian final year students both at 10 weeks prior to and also 10 days prior to a major examination period. They found that mean levels of student distress significantly increased between 10 weeks prior to the major examination period and 10 days prior to the major examination period. Similarly, Smith et al. (2002) found that Australian students depression and anxiety symptoms increased from February (i.e., Term 2, Year 12) to August (i.e., Term 3, Year 12), which was just preceeding the major trial examinations. Similar findings were reported by Peluso et al. (2010) in 154 Brazilian students who completed the Positive and Negative Affect Scale (PANAS; Watson et al., 1988) three times during the last year of high school. They found that negative affect scores significantly increased over time with no significant change in positive affect scores. Additionally, Lay et al. (1989) examined changes in stress levels following a final year examination period and found a decrease in student reported stress levels. Specifically, they found that mean state anxiety scores in final year Canadian students significantly increased between seven days prior to and one day prior to examinations and that levels of state anxiety scores then decreased during the five days after the examination period. In contrast, Locker and Cropley (2004) found no significant increases in distress in four UK samples from 6 to 8 weeks prior to examinations and one week prior to examinations, although there was 21% attrition leading to a large portion of missing data.

However, none of these longitudinal studies examined moderators of student distress over longer periods of time, which is important considering that evidence from these prior cohort studies indicated the presence of key factors that moderated student distress. These key factors include (a) demographic factors (e.g., gender, non-native language background, socioeconomic status, parental education factors, school type), (b) individual factors (e.g., anxiety proneness, negative thinking, perceived pressure), and (c) environmental factors (e.g., connectedness to peers, school, family, fear appeals by teachers to excel; Wuthrich et al., 2020). Relatively few studies have examined the unique variance of these factors in the same sample; however, there was some evidence that demographic factors explained only very small amounts of unique variance in student distress. For example, socioeconomic status and English as a second language were associated with very small effect size effects on increased distress ($\Delta R^2 = 0.01$; see Wuthrich et al., 2020), whereas the strongest evidence appears to be for factors such as pre-existing anxiety ($\Delta R^2 = 0.58$; large effect size, see Wuthrich et al., 2020), moderate effect sizes for connectedness to peers ($r = 0.26$), school ($r = 0.25$), family ($r = 0.38$; see Robinson et al., 2009), and some emerging evidence for freedom from negative thinking ($r = 0.49$; see Robinson et al., 2009). However, these factors have not been studied in the same sample and so it is not clear how these variables interact with each other and which factors are the most significant for understanding student distress over time.

General stress reduction interventions have been shown to reduce distress in university students (for a review, see Yusufov et al., 2019) and in final year high school students (Lowe & Wuthrich, 2021). These interventions have typically used general cognitive behavioural therapy, relaxation, and social support skills (Yusufov et al., 2019). By identifying key factors that moderate student distress, preventative measures can be established and interventions further enhanced to reduce distress onset. Although evidence suggests that most students in the final year of school experience *moderate* levels of distress, some students experience *extreme* levels of distress (Wuthrich et al., 2020), which impacts wellbeing and potentially academic performance (Chin et al., 2017; Putwain, 2008; Putwain et al., 2015).

Although a large number of factors have been examined in relation to moderating the effects of distress, several factors appear to be particularly relevant. Predisposing anxiety is a key factor with anxiety prone students shown to experience the highest levels of distress associated with final examination periods (Putwain et al., 2015). In a series of studies examining the impact of high test anxiety (i.e., anxiety proneness; Spielberger, 1980) in students, Putwain et al. (2015) have shown that the cognitive component of test anxiety, that is worry about performance on tests, moderates examination performance. Furthermore, Putwain and colleagues indicated that for anxious prone students, teachers' discourses around the importance of major examinations can further escalate student stress. In a novel series of experiments, Putwain and colleagues demonstrated that fear appeals (i.e., discourses on the importance of doing well in examinations so to avoid the negative consequences of doing poorly) by teachers in the lead up to examinations was associated with poorer examination performance in anxious prone students (Putwain & Symes, 2011a, 2011b). In contrast, there is also some evidence that efficacy appeals (i.e., discourses that emphasised students ability to do well) by teachers resulted in improved examination performance in university students (von der Embse et al., 2015).

Other research has focused on the impact of connectedness as a protective factor that can reduce distress in students during the final year of school. In particular, connectedness (i.e., the sense of belonging and availability of support) to school, peers, and family has been examined (e.g., McGraw et al., 2008). In general, stronger connectedness has been shown to be associated with lower levels of distress; however, results from studies have varied as to the relative importance of connectedness across peers, school, and family (see Robinson et al., 2009; Wuthrich et al., 2020). Finally, there is some emerging evidence that self-efficacy is also associated with student distress (e.g., Flett et al., 2011; Robinson et al., 2009). Self-efficacy refers to an individual's beliefs about their capacity to produce a desired outcome and has been operationalised to relate to academic tasks (i.e., academic self-efficacy), social interactions (i.e., social self-efficacy), and emotions (i.e., emotional self-efficacy; Bandura, 1997; Muris, 2001). Specific to distress, academic and emotional self-efficacy are likely to be key targets, and thus there are a range of individual and environmental factors to consider over time when examining student distress.

The aim of the present study was to further investigate the trajectory of distress among students in their final year of schooling and to investigate individual (i.e., demographic, psychological functioning, and self-efficacy) and environmental factors (i.e., school factors, social connectedness, and teacher fear appeals) associated with student distress. It was hypothesied that students would

experience an increase in distress over the year leading up to their final examinations (i.e., Higher School Certificate; HSC), and that being female, experiencing higher test anxiety (i.e., anxiety proneness), lower self-efficacy, lower social connectedness, and higher perceived threat from teacher fear appeals would be associated with higher distress (i.e., stress, depressive, and anxiety symptoms) over this period. Furthermore, it was hypothesised that test anxiety, self-efficacy, social connectedness, and perceived threat from teacher fear appeals at baseline would predict student distress prior to their major examinations.

1. Method

1.1. Participants

Students enrolled in Year 12 from seven participating high schools within the Greater Sydney Area, in the state of New South Wales, Australia were invited to participate. This study was part of a larger research project that also tracked teacher distress; however, only student data are reported here. A total of 638 students (Time 1 *M* age = 16.68 years, *SD* = 0.49, range = 15–18 years; female = 474, male = 160) took part in the study during at least one of the four time points. Schools included publically funded schools, privately funded schools, single sex, and co-educational schools. All students were completing their higher school certificate (HSC) in their final year of formal schooling in Australia. Inclusion criteria required that participating students (a) needed to be enrolled in Year 12 as of October 2018, and (b) had suffient English language literacy. All schools were sent the link to the surveys to distribute to all eligible students at their school at each of the four time points across the Year 12 academic year.

1.2. Measures

Due to the low numbers of student survey responses ($N = 66$) at Time 4, only data from surveys conducted during Times 1–3 were used in the analyses. Thus, Cronbach's alphas for Time 4 for each measure below are not provided.

1.2.1. Demographic Survey

Students completed questions that asked about their age, gender, type of school (i.e., single sex/co-educational; private/public), language background (i.e., English/non-English), and parents' highest educational level.

1.2.2. Depression Anxiety Stress Scale-21

The Depression Anxiety Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995) is a brief self-report measure of negative affect that comprises three subscales (i.e., Depression, Anxiety, Stress) consisting of seven items on each. To reduce participant burden, given that additional anxiety measures were administered, students in the current study only completed the Depression and Stress subscales. Students were instructed to rate their symptoms from the past week on a 4-point scale (0 = *Did not apply to me at all*, 3 = *Applied to me very much/most of the time*), with scores on the subscales ranging from 0 to 21. The DASS-21 has been found to possess good internal consistency and validity in adult samples and adolescents (Henry & Crawford, 2005; Lovibond & Lovibond, 1995; Willemsen et al., 2011). Cronbach's alphas in the current study for the Depression and Stress subscales, respectively, were 0.84 and 0.80 at Time 1, 0.86 and 0.89 at Time 2, and 0.89 and 0.84 at Time 3, indicating good internal consistency.

1.2.3. Spence Children's Anxiety Scale

The Spence Children's Anxiety Scale (SCAS; Spence, 1998) measures the severity of adolescent anxiety symptoms based on DSM-IV (American Psychiatric Association, 1994) criteria. The SCAS subscales for Social Anxiety (6 items), Generalized Anxiety (6 items), and Panic (9 items) were included in the current survey; these subscales were then combined to obtain an overall score for State Anxiety. Items are rated on a four-point scale (0 = *never*, 3 = *always*) with summed scores ranging from 0 to 18 for Social Anxiety and Generalized Anxiety and from 0 to 27 for Panic. The subscales have been found to have good to excellent internal consistency and excellent convergent and discriminant validity (Essau et al., 2011). For the current sample, Cronbach's alphas for SCAS overall combined score were as follows: Time 1 = 0.93, Time 2 = 0.94, and Time 3 = 0.93.

1.2.4. Brief Friedben Test Anxiety Scale

The Brief Friedben Test Anxiety Scale (B-FTAS; von der Embse et al., 2013) is a 12-item self-report questionnaire designed for high school students that measures test anxiety and is alligned with the biopsychosocial model. In the current study, B-FTAS was used as a measure of trait anxiety. Evidence suggests that scores on the B-FTAS are highly correlated with trait measures of anxiety and highly overlap with anxiety disorders (King et al., 2000). The B-FTAS comprises three subscales consisting of (a) Cognitive Obstruction (4 items; measuring effect of anxiety on cognitive process before or during a test; e.g., "During a test my thoughts are clear and I neatly answer all questions"), (b) Social Derogation (5 items; measuring worry about being socially impacted after failing a test; e.g., "If I fail a test I am afraid I shall be rated as stupid by my friends"), and (c) Physical Tenseness (3 items; physiological anxiety symptoms; e.g., "While I am sitting in an important test, I feel that my heart pounds strongly"). Items are rated on a 6-point scale (1 = *does not characterise me at all*, 6 = *characterises me perfectly*). Item responses are summed for each scale and scores range from 12 to 72 for the Total Score. This scale has been found to have very good internal consistency and factorial validity (von der Embse et al., 2013). Cronbach's alphas for the current sample were as follows: Time 1 = 0.89, 0.90, 0.80, and 0.87; Time 2 = 0.89, 0.92, 0.86, and 0.89; and Time 3 = 0.91, 0.89, 0.85, and 0.86 for the subscales of Cognitive Obstruction, Social Derogration, Physical Tenseness, and Total Score, respectively.

1.2.5. Self-Efficacy Questionnaire for Children

The Self-Efficacy Questionnaire for Children (SEQ-C; Muris, 2001) is a 24-item self-report measure of perceived academic, social, and emotional ability to produce a desired outcome. The SEQ-C comprises three subscales, including (a) Academic Self-efficacy, (b) Social Self-efficacy, and (c) Emotional Self-efficacy, and also includes a Total Self-efficacy Score. To reduce participant burden, only the Academic and Emotional Self-efficacy subscales were included in the current study. Each sub-scale is comprised of eight items (score range = 8–40) and the Total Score includes all 24 items (score range = 24–120). In the current study, students were asked to rate on a 5-point scale (1 = *not at all*, 5 = *very well*) how much each item applied to them. The SEQ-C has been observed to have very good internal consistency across cultures (Muris, 2001; Tan & Chellappan, 2018) and convergent validity with symptoms of depression and anxiety (Muris, 2001, 2002). Cronbach's alphas for the current study were as follows: Time 1 = 0.83, 0.84, and 0.89; Time 2 = 0.86, 0.87, and 0.91; and Time 3 = 0.86, 0.88, and 0.91 for Academic Self-efficacy, Emotional Self-efficacy, respectively, indicating good internal consistency.

1.2.6. Self in a Social Context-Social Connectedness Scale

The Self in a Social Context-Social Connectedness Scale (SSC-SC; Carroll et al., 2017) is a 45-item measure of social connectedness that includes subscales for (a) Friends, (b) Family, (c) School, and (d) Community. To reduce participant burden, in the current study, only the Friends (15 items), Family (11 items), and School (9 items) subscales were included. Students were asked to rate each item on a 4-point scale (1 = *not at all*, 4 = *always*). Items on each subscale were summed to obtain a Social Connectedness score ranging from 15 to 60 for Friends, 11 to 44 for Family, and 9 to 36 for School. These subscales have been found to have high internal consistency (Carroll et al., 2017). For the current study, Cronbach's alphas were as follows: Time 1 = 0.94, 0.93, and 0.90; Time 2 = 0.96, 0.93, and 0.91; and Time 3 = 0.95, 0.94, and 0.91 for the Friends, Family, and School subscales, respectively.

1.2.7. Teachers' Use of Fear Appeals Questionnaire

The Teachers' Use of Fear Appeals Questionnaire (TUFAQ; Putwain & Roberts, 2009) is a 14-item questionnaire measuring students perceived use of fear appeals by teachers in a classroom setting. The TUFAQ comprises three subscales, including (a) Perceived Frequency of Consequence Fear Appeals (7 items; e.g., "How often do your teachers tell you that you must get high grades in your year 12 major examinations to get a good job?"), (b) Perceived Threat from Fear Appeals (4 items; e.g., "Do you feel worried when your teachers tell you that your year 12 major examinations are getting nearer?"), and (c) Perceived Timing Frequency (3 items; e.g., "How often are you told the number of weeks or months until you start your year 12 major examinations?"). Items are rated on a 5-point scale (1 = *never*, 5 = *most of the time*). Scores for the Perceived Frequency of Consequence Fear Appeals subscale range from 7 to 35, scores from the Perceived Threat from Fear Appeals subscale range from 4 to 20, and scores from the Perceived Timing Frequency subscale range from 3 to 15. A Total Score was also derived that included all 14 items and ranged from 14 to 70. The TUFAQ has been found to have very good internal consistency, as well as convergent and discriminant validity (Putwain & Roberts, 2009). For the current sample, Cronbach's alphas were as follows: Time 1 = 0.94, 0.88, and 0.84; Time 2 = 0.94, 0.89, 0.83, and 0.94; and Time 3 = 0.93, 0.87, 0.78, and 0.92 for the Perceived Frequency of Consequence Fear Appeals subscale, Perceived Threat from Fear Appeals subscale, Perceived Timing Frequency subscale, and Total Score, respectively.

1.3. Procedure

Ethics approval was granted from the Macquarie University University Human Research Ethics Committee and the New South Wales Department of Education Ethics Committee (SERAP2018431). The study was advertised via school assemblies and newsletters. All eligible students were sent an email from the school inviting them to participate at each of the four time points. The email contained study information, consent information, and a link to the survey. Surveys were collected at four time points (once per school term) and included Time 1 (November/December 2018), Time 2 (March/April 2019), Time 3 (July/August 2019), and Time 4 (September/October 2019). The trial HSC examinations (worth up to 30% of final grade) occurred around Time 3, and the final high school examinations (worth 50% of final grade) for the HSC occurred after Time 4. Participation was voluntary and anonymous. Although not required to participate in the surveys, students were encouraged to participate in all four surveys. To encourage participation, students could win one of five $50 gift cards per school at each time point, with additional gift card prize draws available for students who completed all four surveys. Data were matched at each time point by a unique alpha-numeric code.

1.4. Statistical analyses

Statistical Package for Social Sciences (SPSS) Version 26 was used to analyze study results. Due to the low numbers of student survey responses ($N = 66$) in Term 4, only data from surveys conducted in Terms 1–3 were used in the analyses. However, the overall pattern of results when Term 4 data were included was almost identical. After exploring the data for assumptions of normality, preliminary analyses were conducted that examined descriptive statistics for students and teachers, which included calculating the proportions of students who reported normal, mild to moderate, or severe distress on DASS subscales at each time point.

Full information maximum likelihood Linear Mixed Model (LMM) analyses were utilized to examine hypotheses and to manage missing data with participant ID and intercepts set as random factors. School was not used as a nesting random factor as this was accounted for by the random participant ID factor, and as school did not interact with time on any outcome variable it was not included as a fixed effect for interaction terms (all p's > 0.05). All Time 1 predictor variables were centered around their Time 1 grand means and then entered into the LMMs as fixed variables with time. Time was entered as a categorical variable. A series of LMMs were utilized

to examine change in student distress (i.e., stress, anxiety, and depression) from Time 1 to Time 3, and whether the changes in distress differed depending on gender and school.

Three full information maximum likelihood LMM analyses including all predictor variables that significantly predicted either stress, anxiety, or depression at baseline or Time 3 were then conducted to investigate which of the hypothesised predictors accounted for the most variance in student distress (i.e., stress, anxiety, and depression) over time. Finally, hierarchical regression analyses were used to investigate whether key baseline measures identified in LMM analyses significantly predicted distress at the time of trial HSC examinations (i.e., Time 3).

2. Results

2.1. Descriptive statistics

Overall, the 638 students completed 945 surveys from Time 1 through Time 4. Due to clerical error, not all schools distributed the link to the survey at every time point, so some students had missing data at one or more time points, but not at others. Four schools distributed the survey at all time points, one school missed the Time 3 timepoint, one school missed the Time 4 timepoint, and one school missed both the Time 3 and Time 4 timepoints. In addition, at each time point, not all students completed all measures. For the regression analyses, only complete data sets were used. The number of completed surveys and demographics of students who provided complete surveys at each time point can be observed in Table 1. Fig. 1 further reports the breakdown of complete and missing data in the sample. Little's Missing Completely at Random test revealed that missing data were not completely at random ($\chi^2_{(51)} = 100.86$, $p < .0005$). It is not possible to statistically differentiate Missing at Random (i.e., missingness due to a known predictor, such as clerical errors related to schools distributing surveys) or Missing Not at Random (i.e. missingness due to unmeasured variables). However, given we have an identified cause of missing data (i.e., school failure to distribute surveys), we assumed that data were Missing at Random and thus we proceeded with full information maximum likelihood estimation of missing data.

Consistent with the longitudinal design, students' mean age increased significantly from 16.69 years at Time 1 to 17.36 years at Time 4, $t(430) = -10.50$, $p < .0005$. There were more female than male students at each time point (>68% female). Approximately 20%–30% of the students at each time point were from a non-English speaking background and spoke a language other than English at home. The majority of students (60%–70%) reported at least one parent had a university education, with approximately 20% having a post-graduate qualification at each of the time points. Non-English speaking background and parent's education level were not associated with anxiety, stress, or depression (all p-values >.05).

Means and standard deviations for all student measures are included in Table 2. A high proportion of students experienced normal levels of stress and depression at each time point (i.e., 30%–40%). A smaller proportion (~20%–25%) at each time point experienced severe to extremely severe levels of stress and depression. The peak proportion of students experiencing severe to extremely severe stress and depression was at Time 3, with 31.5% of students reporting severe stress and 22.5% of students reporting depression symptoms. Notably, most students were in the normal to moderate range in terms of DASS scores throughout the school year. Linear mixed model analyses of time and school for each outcome revealed that school location did not interact with time for any outcome ($ps > 0.05$), indicating that there was no school-specific variation in how outcomes were shifting from time point to time point. As such, school location was not included in any analytic model. Correlations between all measures at baseline are provided in the Supplementary Materials.

2.2. Change in student distress over the final year of school

Linear Mixed Models (LMM) were used to evaluate changes in distress over time. Analyses only included data from Time 1 to Time 3 due to a small number of responses at Time 4. Estimated marginal means and standard errors can be observed in Table 3. Over time, there was a significant overall increase in stress, $F(2, 475.49) = 6.56$, $p < .0005$ and anxiety $F(2, 346.21) = 546.67$, $p < .0005$; however, depression did not change between time points, $F(2, 496.77) = 0.49$, $p = .616$. Changes in stress, anxiety, and depression over time can be observed in Fig. 2. Specific to stress, further inspection of the data indicated that stress significantly increased from Time 2 to Time 3, T2 EMM = 9.03, SE = 0.27, T3 EMM = 10.13, SE = 0.29, $t = -3.21$, $p < .0005$ (Cohen's $d = 0.2$), but there was no significant change from Time 1 to Time 2, T1 EMM = 9.09, SE = 0.21, T2 EMM = 9.03, SE = 0.27, $t = -0.24$, $p = .811$ (Cohen's $d = 0.01$). Specific to anxiety, the overall observed increase in anxiety was also due to a significant increase from Time 2 to Time 3, T2 EMM = 21.03, SE = 0.65, T3 EMM 42.91, SE = 0.71, $t = -30.19$, $p < .0005$ (Cohen's $d = 1.7$), whereas there was a slight but significant decrease from Time 1 to Time 2, T1 EMM = 23.18, SE = 0.55, T2 EMM = 21.03, SE = 0.65, $t = -3.63$, $p < .0005$ (Cohen's $d = 0.1$).[1] Time 3 increases in distress were likely related to high stakes examinations conducted in most schools at Time 3 (see Discussion).

LMM's were conducted to investigate whether the effect of time on distress differed between schools. There was a main effect for school with regard to stress, $F(6, 664.01) = 6.46$, $p < .0005$; depression, $F(6, 654.58) = 2.69$, $p = .014$; and anxiety, $F(6, 607.32) = 4.53$, $p < .0005$. However, there was no interaction between school and time for any measure of distress: stress, $F(10, 484.85) = 1.12$, $p = .347$; depression, $F(10, 500.77) = 0.733$, $p = .693$; or anxiety, $F(10, 354.82) = 1.16$, $p = .320$. These results suggest

[1] When Time 4 data were included, Time 4 stress, depression, and anxiety scores did not significantly differ from Time 1, Time 2, or Time 3 scores, thus indicating that stress and anxiety significantly increased at Time 3 and then remained elevated (although not at a level that was significantly different from Time 1 and Time 2).

Table 1
Total number of surveys completed and demographics for students at each time point.

	Time 1	Time 2	Time 3	Time 4
N complete surveys	367	200	165	66
M age in years (*SD*)	16.7 (0.5)	16.9 (0.4)	17.4 (0.5)	17.4 (0.5)
Number females (%)	296 (80.7%)	170 (85.0%)	114 (69.1%)	45 (68.2%)
Non-English speaking background *n* (%)	89 (24.3%)	50 (24.9%)	37 (22.4%)	22 (33.3%)
Non-English spoken at home *n* (%)	73 (19.9%)	44 (21.9%)	36 (21.8%)	20 (30.3%)
Mother highest education				
High school or less *n* (%)	94 (25.6%)	43 (21.5%)	30 (18.2%)	11 (16.7%)
Diploma/apprenticeship *n* (%)	38 (10.4%)	23 (11.5%)	22 (13.3%)	9 (13.6%)
Undergraduate degree *n* (%)	138 (37.6%)	78 (39.0%)	69 (41.8%)	29 (43.9%)
Postgraduate degree *n* (%)	70 (19.1%)	46 (23.0%)	32 (19.4%)	17 (25.8%)
Not reported *n* (%)	27 (7.4%)	10 (5.0%)	12 (7.3%)	0 (0%)
Father highest education				
High school or less *n* (%)	77 (21.0%)	41 (20.5%)	26 (15.8%)	8 (12.1%)
Diploma/apprenticeship *n* (%)	50 (13.6%)	28 (14.0%)	23 (13.9%)	11 (16.7%)
Undergraduate degree *n* (%)	137 (37.3%)	67 (33.5%)	53 (32.1%)	23 (34.8%)
Postgraduate degree *n* (%)	72 (19.6%)	45 (22.5%)	47 (28.5%)	21 (31.8%)
Not reported *n* (%)	31 (8.4%)	19 (9.5%)	16 (9.7%)	3 (4.5%)

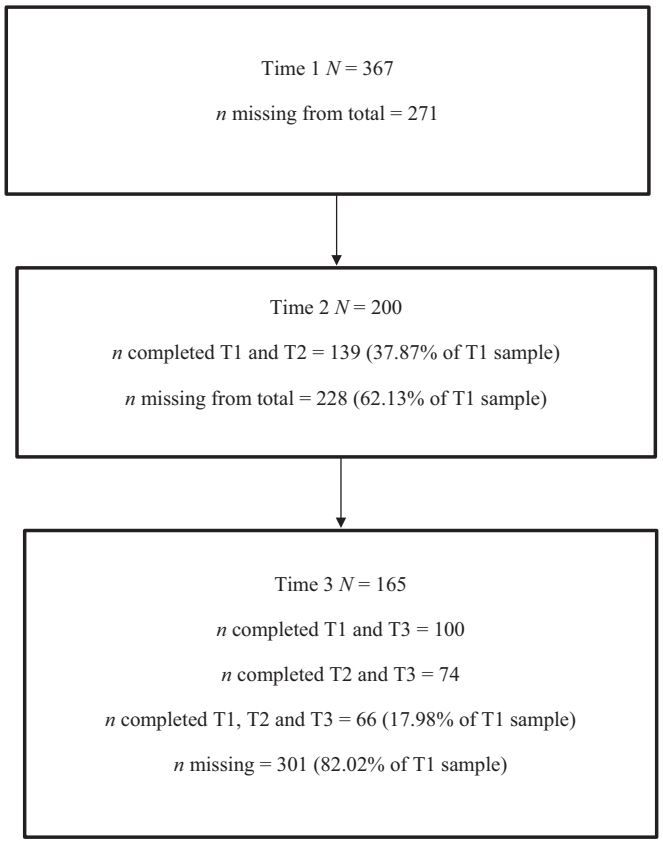

Fig. 1. Flow chart outlining the number of students who completed all measures at each time point and associated missing data.

that although schools differed in students' levels of distress, change in distress over time did not significantly differ between schools. Therefore, schools were not controlled for in further analyses as time by school interactions (i.e., fixed effect) would be difficult to interpret.

2.3. Full models: individual and environmental factors predicting distress

Full LMM's were conducted to understand how the variables predicted distress when considered all together. The models included gender, test anxiety, self-efficacy, connectedness, and perceived teacher fear appeals. Results of the full LMM's can be observed in

Table 2
Descriptive statistics for students at each time point.

Measure	Time 1 *M* (*SD*) *N* = 367	Time 2 *M* (*SD*) *N* = 200	Time 3 *M* (*SD*) *N* = 165	Time 4 *M* (*SD*) *N* = 66
DASS – Stress	9.07 (4.39)	9.13 (4.97)	9.87 (4.67)	9.06 (4.75)
DASS – Depression	7.23 (5.03)	7.49 (5.06)	7.47 (4.89)	7.17 (4.77)
SCAS – Combined Anxiety	22.82 (11.93)	21.85 (12.55)	42.10 (11.78)	21.50 (10.88)
B-FTAS – Total Score	42.50 (11.44)	41.42 (11.88)	40.87 (10.75)	42.12 (11.33)
SEQ – Emotional	22.87 (6.25)	23.54 (6.47)	23.35 (6.51)	24.32 (5.57)
SEQ – Academic	25.29 (5.87)	25.73 (6.13)	25.62 (6.32)	25.55 (6.40)
SSC-SC Friend	46.18 (9.02)	45.82 (10.50)	47.12 (9.11)	46.56 (8.38)
SSC-SC Family	35.57 (7.44)	35.40 (7.88)	35.95 (7.74)	36.23 (7.22)
SSC-SC School	28.17 (5.57)	29.46 (5.60)	29.38 (5.23)	28.95 (5.86)
TUFAQ - Consequences frequency	20.53 (8.02)	19.64 (7.76)	19.04 (7.02)	19.29 (7.12)
TUFAQ - Perceived threat	13.89 (4.50)	13.68 (4.56)	13.32 (4.16)	13.38 (4.47)
TUFAQ - Timing frequency	9.80 (3.23)	10.21 (3.04)	11.14 (2.58)	12.08 (2.51)

Note. Sample at each time point includes individuals who completed *all* measures for that time point. B-FTAS = Brief Freidenberg Test Anxiety Scale; DASS = Depression Anxiety Stress Scales; SSC-SC = Self in a Social Context-Social Connectedness Scale; SCAS = Spence Children's Anxiety Scale; SEQ = Self-Efficacy Questionnaire for Children; TUFAQ = Teacher Use of Fear Appeals Questionnaire.

Table 4.

The first model included stress as the dependent variable. Results indicated that time remained a significant predictor of stress when all variables were entered, $F(2, 371.11) = 4.68$, $p = .010$, as did gender, $F(1, 473.54) = 4.94$, $p = .027$. However, only test anxiety, $F(1, 491.25) = 50.13$, self-efficacy [academic, $F(1, 433.30) = 14.20$, $p < .0005$; emotional, $F(1, 466.63) = 32.62$, $p < .0005$], and connectedness with friends, $F(1, 425.95) = 8.39$, $p = .004$, remained significantly associated with stress when all predictors were entered into the model. These results indicate students experienced greater stress across the final year of school if they were more prone to anxiety, had lower emotional self-efficacy, and had less perceived connectedness with friends. Unexpectedly, higher academic self-efficacy (i.e., higher belief in academic ability) was associated with higher stress, Time 1, $\beta = 0.09$, SE = 0.04, $t(538.15) = 2.29$, $p = .022$. There were no significant interactions between predictor variables and time indicating these relationships did not change over time.

The second LMM included depression as the dependent variable. After including all predictors in the model, time and gender were non-significant. Test anxiety, $F(1, 487.48) = 10.25$, $p = .001$, emotional self-efficacy, $F(1, 462.38) = 21.56$, $p < .0005$, and connectedness with friends, $F(1, 421.05) = 4.66$, $p = .031$, were the only variables that remained significantly associated with depressive symptoms when all variables were entered into the same model. Similar to the findings for stress, these results suggest that students who were more anxiety prone, had lower emotional self-efficacy, and who reported lower connectedness with friends experienced higher depressive symptoms over the last year of school. There were no significant interactions between predictors and time ($p > .05$), thereby indicating that the aforementioned results did not significantly differ over time.

The third LMM included state anxiety as the dependent variable. After entering all predictors, including time, $F(2, 312.53) = 307.66$, $p < .0005$, and gender, $F(1, 497.93) = 7.75$, $p = .006$, remained significantly associated with state anxiety such that anxiety increased over time and females experienced higher anxiety symptoms as compared to males. However, there was a significant interaction between time and gender, $F(2, 309.42) = 3.34$, $p = .037$, which showed that although there was a significant decrease in anxiety between Time 1 and Time 2 for females (T1 EMM = 23.26, SE = 0.46, 95% CI [22.36, 24.15]; T2 EMM = 20.59, SE = 0.64, 95% CI [19.33, 21.86], $p < .0005$), males did not experience a significant change in anxiety symptoms from Time 1 to Time 2 (T1 EMM = 20.65, SE = 0.97, 95% CI [18.74, 22.56]; T2 EMM = 19.44, SE = 1.75, 95% CI [16.00, 22.89], $p = .480$). Test anxiety and emotional self-efficacy were the only other variables that remained significantly associated with state anxiety in the full model: test anxiety, $F(1, 513.15) = 35.28$, $p < .0005$; emotional self-efficacy, $F(1, 481.69) = 55.95$, $p < .0005$. However, there was a significant interaction between time and test anxiety, $F(2, 320.05) = 4.48$, $p = .012$, indicating that although higher test anxiety was associated with higher state anxiety at Time 1, this relationship reduced over time: Time 1, $\beta = 0.412$, SE = 0.05, $t(478.42) = 8.77$, $p < .0005$; Time 2, $\beta = 0.344$, SE = 0.08, $t(546.89) = 4.44$, $p < .0005$; Time 3, $\beta = 0.376$, SE = 0.04, $t(391.44) = 8.51$, $p < .0005$. No other interactions were significant.

2.4. Baseline predictors of Time 3 distress

Hierarchical regression analyses were conducted to investigate whether heightened student distress (i.e., stress, depression, and anxiety) at Time 3 could be predicted by baseline predictors. Due to the relatively small sample size (i.e., $N = 100$), specific predictors were chosen based on findings from the LMMs outlined above; these variables included test anxiety, emotional self-efficacy, academic self-efficacy, and peer connectedness. In the first step, gender and Time 1 distress (i.e., stress, anxiety, or depression) were entered. In the second step, predictors were entered. Results of these analyses can be observed in Table 5.

With regard to the first hierarchical regression, the first step including gender and Time 1 stress accounted for 45.1% of the variance in Time 3 stress $F(2, 97) = 39.43$, $p < .0005$. Gender was not a significant predictor, $t(99) = 1.20$, $p = .233$; however, higher Time 1 stress significantly predicted higher Time 3 stress, $t(99) = 8.44$, $p < .0005$. The second step accounted for a further 8.3% of the variance

Table 3
Estimated marginal means and standard errors for distress by time and gender.

	Time 1 Estimated Marginal Means (*SE*)			Time 2 Estimated Marginal Means (*SE*)			Time 3 Estimated Marginal Means (*SE*)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
DASS-Stress	7.74 (0.46)	9.45 (0.24)	9.09 (0.21)	7.89 (0.65)	9.30 (0.29)	9.03 (0.27)	8.55 (0.54)	10.71 (0.35)	10.13 (0.29)
DASS-Depression	6.64 (0.50)	7.30 (0.26)	7.18 (0.23)	6.03 (0.72)	7.41 (0.32)	7.18 (0.29)	6.85 (0.60)	7.71 (0.39)	7.51 (0.33)
SCAS-Anxiety	17.66 (1.16)	24.72 (0.61)	23.18 (0.55)	16.64 (1.55)	22.36 (0.70)	21.03 (0.65)	36.88 (1.33)	45.02 (0.81)	42.91 (0.71)

Note. DASS = Depression Anxiety Stress Scales, SCAS = Spence Children's Anxiety Scale, SE = Standard Error.

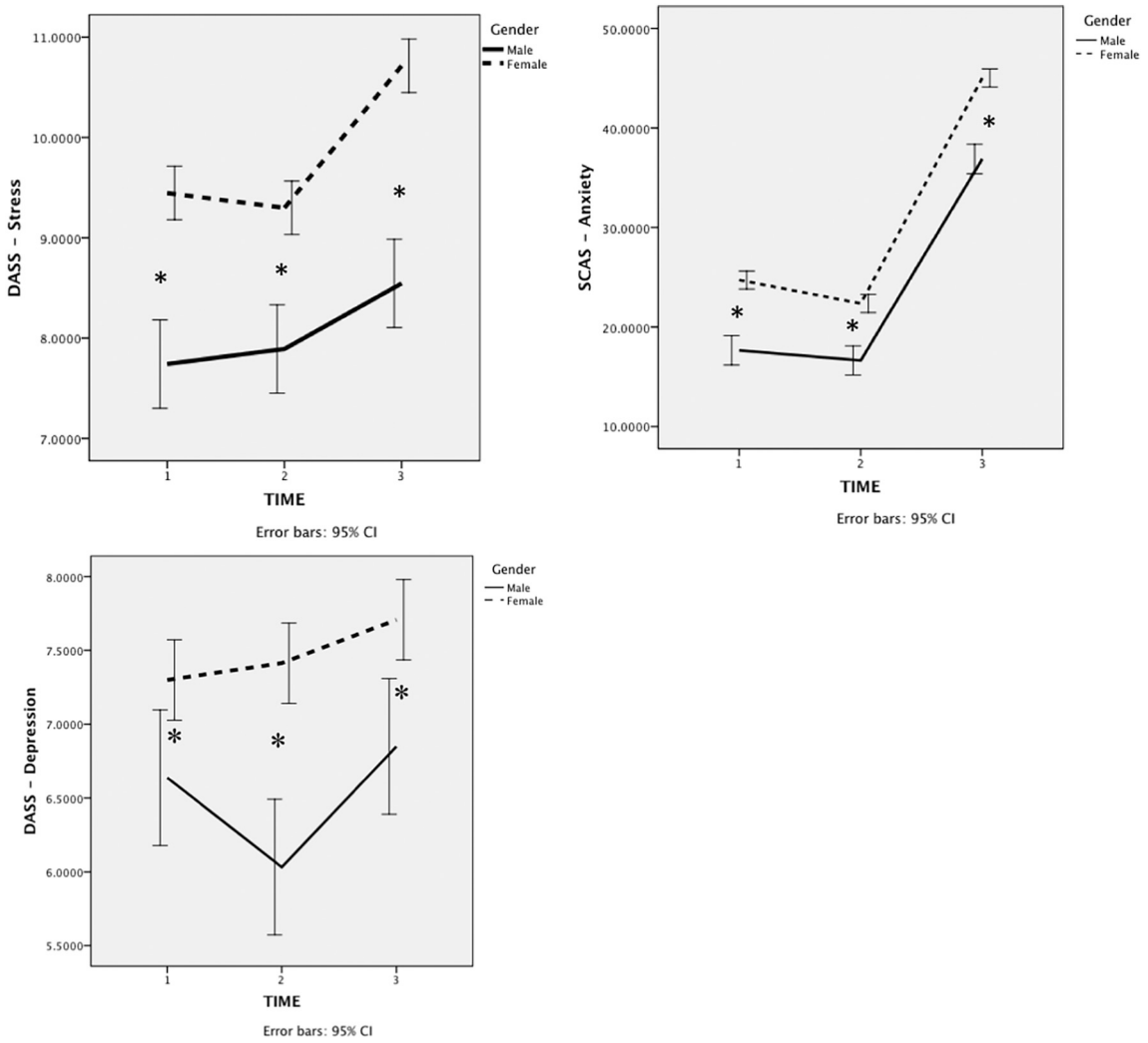

Fig. 2. Effect of time on stress, depression, and anxiety for male and female students.
Note. Error bars represent standard errors; *$p < 0.05$.

in Time 3 stress, $F(4, 93) = 4.13$ $p = .004$. Test anxiety and academic self-efficacy were the only baseline variables that accounted for a significant amount of variance in Time 3 stress: test anxiety, $t(99) = 2.17$, $p = .033$; academic self-efficacy, $t(99) = 3.84$, $p < .0005$. Unexpectedly and as seen in Table 5, higher Time 1 academic self-efficacy significantly predicted higher stress at Time 3. No other predictors accounted for a significant amount of variance in Time 3 stress.

The second hierarchical regression analysis predicted Time 3 depression. The first step included gender and Time 1 depression which accounted for 24.5% of variance in Time 3 depressive symptoms, $F(2, 97) = 15.71$, $p < .0005$. Time 1 depression, but not gender, predicted Time 3 depression: Time 1 depression, $t(99) = 5.59$, $p < .0005$; gender, $t(99) = -0.04$, $p = .970$]. Overall, the second step accounted for only 2.9% of variance in Time 3 Depression and this was not significant, $F(4\ 93) = 0.93$, $p = .452$. Furthermore, no predictor variables alone accounted for significant variance in Time 3 depression.

With regard to the third hierarchical regression, the first step that included gender and Time 1 anxiety accounted for 61.0% of the variance in Time 3 anxiety, $F(2, 96) = 75.02$, $p < .0005$. Higher Time 1 anxiety significantly predicted higher anxiety at Time 3, $t(98) = 11.39$, $p < .0005$. The second step of the regression analysis only accounted for an additional 3.1% of variance in Time 3 anxiety, $F(4, 92) = 1.96$, $p = .107$. Furthermore, as seen in Table 5, none of the predictor variables individually accounted for a significant amount of variance in Time 3 anxiety.

3. Discussion

The aim of this study was to investigate the trajectory of distress among high school students in their final year of formal schooling. Furthermore, we aimed to evaluate individual and environmental factors that influenced this trajectory. Results indicated that

Table 4
Full linear mixed models investigating the effect of test anxiety, self-efficacy, connectedness, and perceived teacher fear appeals on student distress.

Variable	Stress (DV)				Depression (DV)				Anxiety (DV)			
	Estimates		Type III Fixed Effects		Estimates		Type III Fixed Effects		Estimates		Type III Fixed Effects	
	T1 β (SE)	T1 95% CI	Overall *F*	X Time *F*	T1 β (SE)	T1 95% CI	Overall *F*	X Time *F*	T1 β (SE)	T1 95% CI	Overall *F*	X Time *F*
Intercept	9.14* (0.20)	8.74, 9.54	1285.32*	–	7.08* (0.24)	6.61, 7.54	635.48*	–	23.41* (0.46)	22.52, 24.31	2326.30*	–
Time	–	–	4.68*	–	–	–	1.09	–	–	–	307.66*	–
Gender	–	–	4.94*	2.09	–	–	0.01	1.44	–	–	7.75*	3.35*
B-FTAS	0.13* (0.02)	0.09, 0.17	50.13*	1.66	0.09* (0.02)	0.05, 0.14	10.25*	1.25	0.41* (0.05)	0.32, 0.50	35.28*	4.48*
SEQC-Academic	0.09 (0.04)	0.01, 0.17	14.20*	1.61	−0.06 (0.05)	−0.15, 0.03	0.09	1.98	0.17 (0.09)	−0.01, 0.34	1.35	0.38
SEQC-Emotional	−0.29* (0.04)	−0.36, −0.21	32.62*	1.02	−0.24* (0.05)	−0.33, −0.15	21.56*	0.32	−0.73* (0.09)	−0.90, −0.56	55.95*	0.22
SSC-SC Family	−0.01 (0.03)	−0.07, 0.05	0.34	0.65	−0.04 (0.04)	−0.11, 0.03	2.31	0.13	−0.01 (0.07)	−0.14, 0.13	0.34	0.87
SSC-SC Friend	−0.05 (0.02)	−0.09, −0.00	8.40*	0.66	−0.06* (0.03)	−0.12, −0.00	4.66*	0.24	−0.02 (0.06)	−0.13, 0.08	1.72	2.32
SSC-SC School	0.13* (0.05)	0.04, 0.22	1.89	1.19	0.01 (0.05)	−0.09, 0.11	1.88	2.13	−0.04 (0.10)	−0.24, 0.16	0.08	0.98
TUFAQ-Conseq.	−0.00 (0.04)	−0.08, 0.07	0.03	2.17	0.02 (0.05)	−0.07, 0.11	1.34	1.62	0.06 (0.09)	−0.12, 0.23	0.85	2.40
TUFAQ - Threat	0.13* (0.07)	−0.00, 0.27	0. 12	1.77	0.07 (0.08)	−0.08, 0.23	1.55	2.95	0.21 (0.15)	−0.09, 0.51	2.80	0.36
TUFAQ - Timing	0.00 (0.09)	−0.18, 0.17	0.02	0.05	0.13 (0.10)	−0.07, 0.34	1.69	0.32	0.33 (0.20)	−0.07, 0.72	1.03	0.89

Note. β = β at Time 1. * = $p < .05$, ns. = not significant $p > .05$. The estimates represents regression coefficients, similar to that of regression, and are reported for numeric variables only. The Type III Fixed Effects include an overall F statistic that for categorical variables is interpreted similar to an ANOVA F statistic, and for numeric variables is the equivalent to the square of the t-statistic that would typically be reported in a regression. The X Time F reports the Type III Fixed Effect statistic for the interaction of each hypothesised predictor with time. B-FTAS = Brief Freidenberg Test Anxiety Scale; CI = Confidence Interval, DASS = Depression Anxiety Stress Scales; DV = Dependent Variable, SSC-SC = Self in a Social Context-Social Connectedness Scale; SCAS = Spence Children's Anxiety Scale; SE = Standard Error; SEQ = Self-Efficacy Questionnaire for Children; TUFAQ = Teacher Use of Fear Appeals Questionnaire.

Table 5
Results of hierarchical regression investigating Time 1 predictors of stress, depression, and anxiety at Time 3.

Predictor	Stress		Depression		Anxiety	
	β	R^2 Δ	β	R^2 Δ	β	R^2 Δ
Step 1		0.451*		0.245*		0.610*
Gender	0.092 ns.		−0.003 ns.		0.109 ns.	
Time 1 Dependent variable	0.649*		0.495*		0.748*	
Step 2		0.083*		0.029 ns.		0.031 ns.
B-FTAS	0.197*		−0.136 ns.		0.149 ns.	
SEQC-Emotional	−0.088 ns.		−0.163 ns.		−0.133 ns.	
SEQC-Academic	0.321*		0.085 ns.		0.018 ns.	
SSC-SC Friend	−0.034 ns.		−0.038 ns.		0.126 ns.	

Note: *$p < .05$, ns. = not significant, B-FTAS = Brief Freidenberg Test Anxiety Scale; DASS = Depression Anxiety Stress Scales; SSC-SC = Self in a Social Context-Social Connectedness Scale; SCAS = Spence Children's Anxiety Scale; SEQ = Self-Efficacy Questionnaire for Children; TUFAQ = Teacher Use of Fear Appeals Questionnaire.

symptoms of stress and anxiety increased over time, with small effect size increases for stress, and very large effect size increases for anxiety. Notably, over 30% of students reported severe to extremely severe stress prior to their trial HSC examinations. These results are consistent with previous research that has documented an increase in distress prior to major examinations (e.g., Einstein et al., 2000; Peluso et al., 2010; Smith et al., 2002). There was no significant increase in depressive symptoms over the course of the year; however, approximately 20% of students reported severe to extremely severe depressive symptoms at each time point. Also consistent with past research (e.g., Wuthrich et al., 2020), these results suggest that in the current sample, a relatively high proportion of students experienced a clinical level of distress in the final year of school, with stress and anxiety increasing in the lead up to final examinations.

Previous cross-sectional research has identified various individual and environmental variables that are associated with distress among adolescents completing their HSC examinations (Wuthrich et al., 2020). The current study was the first to examine a number of these variables together in a longitudinal design across the final year of high school. Gender, anxiety proneness, self-efficacy, social connectedness, and perceived teacher fear appeals were entered into a full linear mixed model to examine the most important factors associated with student distress. Considered together in the full LMM, several variables emerged as significant unique predictors of distress. Female gender, anxiety proneness, and low emotional self-efficacy were associated with increased stress, depression, and anxiety across each of the three time points. Reduced peer connectedness was also associated with stress and depression, but not anxiety, when all variables were entered into the full LMM. However, our results showed that longitudinally, baseline distress was the strongest predictor of distress prior to HSC trial examinations and this is consistent with past research (McGraw et al., 2008). That is, if students were distressed at the beginning of the school year, they were more likely to be distressed prior to their trial HSC examinations. Test anxiety was the only other baseline variable to predict distress (stress only) prior to trial HSC examinations. These results suggest that early intervention targeted at increasing adolescents' skills to manage their emotions, including enhancing their abilities to cope with pre-existing stress, anxiety, and depression, as well as to build social skills and peer connections, may be particularly important to reduce distress initially (i.e., at the beginning of the year), thereby reducing the likelihood of increased distress as the year progresses. This is important in terms of not only improving emotional well-being, but also academic performance (Putwain et al., 2015; von der Embse & Hasson, 2012). A number of studies have already provided support for school-based prevention programs for anxiety and depression among adolescents, with small effect sizes post-treatment and at follow-up (Werner-Seidler et al., 2017), as well as for general stress reduction in senior school students with small effect sizes (Lowe & Wuthrich, 2021). The current research highlights the importance of continued research addressing the feasibility and effectiveness of targeted school-based prevention programs and potentially identifies mechanisms that are likely to maintain distress that can be also targeted in treatment (i.e., anxiety proneness and pre-existing stress, anxiety and depression, emotional self-efficacy, and peer connectedness). Current interventions focus on general cognitive and behavioural strategies for distress reduction (e.g., changing beliefs about the perceived threat of academic tasks and their ability to cope with stress, and through behavioural strategies to manage the symptoms of stress). The findings of this study suggest further enhancements may include strategies to build peer-connections, as well as more of a focus on early intervention to reduce distress exacerbation throughout the year.

Several variables were not associated with distress across time points when entered together in the full LMM or when considered as longitudinal predictors of distress, including academic self-efficacy, school connectedness, and family connectedness, as well as perceived frequency or threat from teacher fear appeals. Although academic self-efficacy was associated with stress when entered in the full model, and academic self-efficacy at baseline significantly predicted stress prior to HSC trial examinations, this was in the opposite direction to what was predicted. That is, higher academic self-efficacy was associated with higher stress. Although researchers have investigated self-efficacy and test anxiety among adolescents (e.g., Segool et al., 2013), research investigating academic self-efficacy and distress has mainly been qualitative (e.g., Putwain, 2009). It may be that once overlapping variance from anxiety proneness and emotional self-efficacy has been removed, students' beliefs that they will be able to attain high grades leads these students to engage in long hours of study and/or feel pressured to achieve their expected result, thereby increasing stress. It is important to note that this relationship was only observed in relation to stress and not anxiety or depression; therefore, this is not a consistent predictor of distress among students completing their final year of school and further research needs to be conducted to better understand how academic self-efficacy impacts student distress.

Family and school connectedness were not significantly associated with distress when considered in the full LMM. Rather,

consistent with past research (McGraw et al., 2008), peer connectedness emerged as the strongest predictor of distress (i.e., stress and depression). Thus, our results are consistent with past research that has suggested a significant influence of peer relationships on emotional wellbeing (e.g., Prinstein et al., 2000). These results highlight the importance of fostering connectedness between peers as a strategy to build resilience during times of high pressure and suggests that this is likely to be most effective when implemented at school level.

Contrary to one of our hypotheses, higher perceived frequency and threat from teacher fear appeals were not associated with distress when considered in the full LMM. This may suggest that shared variance between anxiety proneness and emotional self-efficacy as compared to perceived threat from teacher fear appeals accounts for the relationship between distress and perceived threat from teacher fear appeals. In fact, past studies examining teacher fear appeals have established that the *appraisal* of fear appeals determines the effect they have on student's motivation, performance, and distress; that is, when fear appeals are appraised as threatening the student anticipates a negative outcome (i.e., threat or harm) which leads to reduced motivation, performance, and distress (Putwain et al., 2016; Putwain & Symes, 2011b). Thus, anxious prone students and students with lower self-efficacy may have the tendency to perceive information as threatening that then accounts for the effect of teacher fear appeals on distress among students. However, further research on this topic is needed.

There are various limitations to consider when interpreting the results of the current study. The number of students who took part in all three surveys was low (i.e., $n = 66$) resulting in missing data across time points, and data were not Missing Completely at Random. Although there is evidence for the data being Missing at Random, it is not possible to distinguish this statistically from Missing Not at Random. Furthermore, although exploratory analyses indicated that results were similar when Time 4 was included, there were only a small number of students who took part in the survey at Time 4, which was prior to their final HSC examinations, thus resulting in these data not being used in the final analysis and limiting conclusions regarding the trajectory of distress. In addition, the current study did not include every variable that has been suggested to moderate distress among students leading up to high stakes examinations (Wuthrich et al., 2020); consequently, it is possible that factors such as negative cognitions and avoidant coping strategies may also play an important role in moderating distress and exploring a more inclusive model would be a worthy area of future research. Lastly, because academic performance was not measured within the current study, it would be of benefit for future studies to measure examination performance, in addition to distress, to further our understanding of the relationship between moderators of distress and academic performance.

In conclusion, the current study investigated the trajectory of distress among students over the course of their penultimate year of schooling and examined moderators of distress across three different time points throughout the year. Our results indicated that approximately 20%–30% of students experienced a severe amount of distress over the course of their final year of schooling with symptoms of distress and anxiety increasing throughout the year. The variables most strongly associated with increased distress at each time point included anxiety proneness, reduced emotional self-efficacy, and lower peer connectedness. However, only distress at the beginning of the year and anxiety proneness predicted distress prior to trial HSC examinations. This is the first study to simultaneously examine various hypothesised moderators of distress longitudinally across the penultimate year of study. Our results suggest that school psychologists, as well as educators in general, may want to consider the use of early interventions, particularly in students with existing symptoms of stress, anxiety, and depression. In addition, the results suggest that further benefits might result from including skills that also build general emotional self-efficacy and peer connectedness in these students. Our results also indicate that moderate levels of stress are relatively normal for students approaching major examinations; however, major examinations are also associated with an increase in severe levels of distress in approximately 20%– 25% of students and so additional monitoring of distress in Year 12 students, in particular girls, is warranted. As indicated by the Yerkes-Dodson law (Yerkes & Dodson, 1908), a moderate level of stress in the approach to major examinations might be the ideal level of stress, and as such interventions should target students with excessive levels of stress.

Declarations of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jsp.2021.07.004.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.).
Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.

Carroll, A., Bower, J. M., & Muspratt, S. (2017). The conceptualization and construction of the Self in a Social Context—Social Connectedness Scale: A multidimensional scale for high school students. *International Journal of Educational Research, 81*, 97–107. https://doi.org/10.1016/j.ijer.2016.12.001.

Chin, E., Williams, M. W., Taylor, J. E., & Harvey, S. T. (2017). The influence of negative affect on test anxiety and academic performance: An examination of the tripartite model of emotions. *Journal of Learning and Individual Differences, 54*, 1–8.

Einstein, D. A., Lovibond, P. F., & Gaston, J. E. (2000). Relationship between perfectionism and emotional symptoms in an adolescent sample. *Australian Journal of Psychology, 52*, 89–93.

Essau, C. A., Sasagawa, S., Anastassiou-Hadjicharalambous, X., Guzmán, B. O., & Ollendick, T. H. (2011). Psychometric properties of the Spence Child Anxiety Scale with adolescents from five European countries. *Journal of Anxiety Disorders, 25*, 19–27. https://doi.org/10.1016/j.janxdis.2010.07.001.

Flett, G. L., Panico, T., & Hewitt, P. L. (2011). Perfectionism, type a behavior, and self-efficacy in depression and health symptoms among adolescents. *Current Psychology, 30*, 105–116. https://doi.org/10.1007/s12144-011-9103-4.

Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 44*, 227–239. https://doi.org/10.1348/014466505X29657.

King, J. K., Ollendick, T. H., & Prins, P. J. M. (2000). Test anxious children and adolescents: Psychopathology, cognition, and psychophysiological reactivity. *Behaviour Change, 17*, 134–142. https://doi.org/10.1375/bech.17.3.134.

Lay, C. H., Edwards, J. M., Parker, J. D., & Endler, N. S. (1989). An assessment of appraisal, anxiety, coping, and procrastination during an examination period. *European Journal of Personality, 3*(3), 195–208.

Locker, J., & Cropley, M. (2004). Anxiety, depression and self-esteem in secondary school children. *School Psychology International, 25*(3), 333–345. https://doi.org/10.1177/0143034304046905.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the depression anxiety and stress scales* (2nd ed.). Psychology Foundation.

Lowe, C., & Wuthrich, V. M. (2021). Randomised controlled trial of Study Without Stress: A cognitive behavioural therapy program to reduce stress in students in the final year of high school. *Child Psychiatry & Human Development, 52*(2), 205–216.

McGraw, K., Moore, S., Fuller, A., & Bates, G. (2008). Family, peer and school connectedness in final year secondary school students. *Australian Psychologist, 43*, 27–37. https://doi.org/10.1080/00050060701668637.

Muris, P. (2001). A brief questionnaire for measuring self-efficacy in youths. *Journal of Psychopathology and Behavioral Assessment, 23*, 145–149.

Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and Individual Differences, 32*, 337–348.

Peluso, M. A., Savalli, C., Curi, M., Gorenstein, C., & Andrade, L. H. (2010). Mood changes in the course of preparation for the Brazilian university admission exam-a longitudinal study. *Revista Brasileira de Psiquiatria, 32*, 30–36.

Prinstein, M. J., Boergers, J., Spirito, A., Little, T. D., & Grapentine, W. L. (2000). Peer functioning, family dysfunction, and psychological symptoms in a risk factor model for adolescent inpatients' suicidal ideation severity. *Journal of Clinical Child Psychology, 29*, 392–405. https://doi.org/10.1207/S15374424JCCP2903_10.

Putwain, D. (2008). Do examinations stakes moderate the test anxiety–examination performance relationship? *Journal of Educational Psychology, 28*(2), 109–118.

Putwain, D. (2009). Assessment and examination stress in Key Stage 4. *British Educational Research Journal, 35*(3), 391–411.

Putwain, D. (2011). How is examination stress experienced by secondary students preparing for their General Certificate of Secondary Education examinations and how can it be explained? *International Journal of Qualitative Studies in Education, 24*(6), 717–731.

Putwain, D., Daly, A., Chamberlain, S., & Sadreddini, S. (2015). Academically buoyant students are less anxious about and perform better in high-stakes examinations. *British Journal of Educational Studies, 85*(3), 247–263.

Putwain, D., Remedios, R., & Symes, W. (2016). The appraisal of fear appeals as threatening or challenging: Frequency of use, academic self-efficacy and subjective value. *Educational Psychology, 36*, 1670–1690. https://doi.org/10.1080/01443410.2014.963028.

Putwain, D., & Roberts, C. M. (2009). The development of an instrument to measure teachers' use of fear appeals in the GCSE classroom. *British Journal of Educational Psychology, 79*, 643–661. https://doi.org/10.1348/000709909X426130.

Putwain, D., & Symes, W. (2011a). Perceived fear appeals and examination performance: Facilitating or debilitating outcomes? *Learning and Individual Differences, 21*(2), 227–232.

Putwain, D., & Symes, W. (2011b). Teachers' use of fear appeals in the mathematics classroom: Worrying or motivating students? *British Journal of Educational Psychology, 81*(3), 456–474.

Robinson, J. A., Alexander, D. J., & Gradisar, M. S. (2009). Preparing for year 12 examinations: Predictors of psychological distress and sleep. *Australian Journal of Psychology, 61*, 59–68. https://doi.org/10.1080/00049530701867821.

Segool, N. K., von der Embse, N. P., Mata, A. D., & Gallant, J. (2013). Cognitive behavioral model of test anxiety in a high-stakes context: An exploratory study. *School Mental Health, 6*, 50–61. https://doi.org/10.1007/s12310-013-9111-7.

Smith, L., Sinclair, K. E., & Chapman, E. S. (2002). Students' goals, self-efficacy, self-handicapping, and negative affective responses: An Australian senior school student study. *Contemporary Educational Psychology, 27*, 471–485.

Spence, S. H. (1998). A measure of anxiety symptoms among children. *Behaviour Research and Therapy, 36*, 545–566.

Spielberger, C. D. (1980). *Preliminary professional manual for the test anxiety inventory*. Consulting Psychologists Press.

Tan, S. K., & Chellappan, K. (2018). Assessing the validity and reliability of the Self-Efficacy Questionnaire for Children (SEQ–C) among Malaysian adolescents: Rasch model analysis. *Measurement and Evaluation in Counseling and Development, 51*, 179–192. https://doi.org/10.1080/07481756.2018.1435192.

von der Embse, N. P., & Hasson, R. (2012). Test anxiety and high-stakes test performance between school settings: Implications for educators. *Preventing School Failure: Alternative Education for Children and Youth, 56*, 180–187. https://doi.org/10.1080/1045988X.2011.633285.

von der Embse, N. P., Kilgus, S. P., Segool, N., & Putwain, D. (2013). Identification and validation of a brief test anxiety screening tool. *International Journal of School & Educational Psychology, 1*, 246–258. https://doi.org/10.1080/21683603.2013.826152.

von der Embse, N. P., Schultz, B. K., & Draughn, J. D. (2015). Readying students to test: The influence of fear and efficacy appeals on anxiety and test performance. *School Psychology International, 36*(6), 620–637. https://doi.org/10.1177/0143034315609094.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.

Werner-Seidler, A., Perry, Y., Calear, A. L., Newby, J. M., & Christensen, H. (2017). School-based depression and anxiety prevention programs for young people: A systematic review and meta-analysis. *Clinical Psychology Review, 51*, 30–47. https://doi.org/10.1016/j.cpr.2016.10.005.

Willemsen, J., Markey, S., Declercq, F., & Vanheule, S. (2011). Negative emotionality in a large community sample of adolescents: The factor structure and measurement invariance of the short version of the Depression Anxiety Stress Scales (DASS-21). *Stress and Health, 27*, e120–e128. https://doi.org/10.1002/smi.1342.

Wuthrich, V. M., Jagiello, T., & Azzi, V. (2020). Academic stress in the final years of school: A systematic literature review. *Child Psychiatry and Human Development, 51*(6), 986–1015. https://doi.org/10.1007/s10578-020-00981-y.

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology, 18*(5), 459–482.

Yusufov, M., Nicoloro-SantaBarbara, J., Grey, N. E., Moyer, A., & Lobel, M. (2019). Meta-analytic evaluation of stress reduction interventions for undergraduate and graduate students. *International Journal of Stress Management, 26*, 132–145. https://doi.org/10.1037/str0000099.