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ACADEMIC STRESS IN SENIOR SCHOOL

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2 Title: Academic Stress in the Final Years of School: A systematic literature review.

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4 Authors: Viviana M. Wuthrich^{1*}, Tess Jagiello¹ & Vanessa Azzi¹

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6 Affiliations: ¹Centre for Emotional Health, Department of Psychology, Macquarie University, Sydney,
7 Australia.

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9 * Corresponding Author: Viviana Wuthrich, Centre for Emotional Health, Department of Psychology,
10 Macquarie University, Sydney, Australia, 2019, (telephone) +61 2 9850 4866, (facsimile) +61 2 9850
11 8062, Viviana.Wuthrich@mq.edu.au

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Abstract

Heightened academic stress in the final years of schooling is a common concern, yet little is known about how stress changes over time and what individual, school and family factors are associated with distress. We conducted a systematic review to examine the nature of distress in students in their final two years of secondary school. Sixty studies were eligible for inclusion. The main findings indicated severity of distress differed across the 17 countries sampled and measures used. There was some consistencies suggesting about 1 in 6 students experienced excessive distress. Female gender and anxiety proneness were consistently associated with increased distress, and freedom from negative cognitions with reduced distress. There was some evidence that individual characteristics (perfectionism, avoidance, coping, self-efficacy, resilience), lifestyle (sleep, homework), school, family and peer connectedness were associated with distress. Overall at-risk students can be predicted by theoretical models of anxiety and distress targeted with psychological interventions.

Keywords: academic stress; examinations; senior school; test anxiety; high stakes testing

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1 Academic stress is a common concern for youth; with tests, homework and grades being the
2 biggest stressors reported by secondary school students [1, 2]. Academic stress in the final years of
3 high school has received particular attention and has been found to be associated with very high
4 levels of distress in large samples in Australia [e.g. 3], the Netherlands [4], the United Kingdom [e.g.
5 5], and the United States of America [6]. In these countries and others (e.g. broader Europe, East and
6 South Asia, Canada) the final year or two years of school involves a series of examinations and the
7 performance on these examinations forms the basis for an educational certificate, pre-university
8 program, or university entrance scores. Due to the large contribution of examination performance
9 on the overall mark (for example over 50% in Australia), these examinations are often referred to as
10 *high stakes tests*, and these examinations seem to be particularly relevant to increased levels of
11 stress reported by students [7-9].

12 Although there are many reports of heightened levels of distress in students in the final
13 years of secondary school, little is known about the nature of this distress, whether it is excessive
14 and what individual, school-based or family factors exacerbate or lessen this distress. This is an
15 important issue for educators who are responsible for the wellbeing of students, but also because
16 research indicates that heightened distress can impede academic performance [10]. It is also unclear
17 whether the distress is limited to the examinations per se, or is associated with other factors such as
18 increases in workload, increased expectations for independence in learning, or personal, family or
19 other school based factors. This is particularly unclear as most research has examined distress using
20 measures of test anxiety. Although test anxiety refers to a fear of completing tests or exams [11];
21 common measures of test anxiety have been shown to capture anxiety more broadly with high
22 scores overlapping with anxiety disorders (such as generalised anxiety disorder, social phobia), trait
23 anxiety and general anxiety proneness [for reviews see: 12, 13]. It is therefore not clear whether the
24 high levels of test anxiety found in senior school samples [e.g. 5] relates to examinations specifically,
25 or perhaps reflects general high levels of distress associated with the academic pressures of the final

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1 relevant to the review. Keywords selected for the search terms were related to hypothesised
2 predictors and outcomes of stress in final year high school students. The final search included terms
3 related to high school (high school, secondary school, senior school, HSC, high school certificate),
4 distress (anxiety, anxious, test anxiety, fear, stress, distress, coping, burnout, resilience), and
5 academic-related stress (exam, examination, test, academic pressure, academic hardiness,
6 academic buoyancy, fear appeal, perfectionism).

7 Eligible articles were: published in English in peer-reviewed journals, reported distress or
8 emotional wellbeing variables as related to academic stress in high school students in their final two
9 years of schooling (e.g. Grade 10/11, 11/12, 12/13 depending on the country). For studies that
10 included a broader school grade range they were included if they reported subgroup analyses
11 related to senior students in the final two years of schooling. Articles were excluded if they primarily
12 examined scale psychometrics, or were focused solely on special populations unrepresentative of
13 the general population (e.g. deaf students, students with cystic fibrosis) and were not specifically
14 related to understanding the distress associated the final years of school. Both qualitative and
15 quantitative studies were included.

16 ***Data Extraction and Analysis.***

17 All articles retrieved from the database searches were uploaded into citation management
18 software, EndNote. Duplicates were removed automatically. The inclusion and exclusion of articles
19 based on their title, then abstract, then full-text was overseen by two authors (VA, TJ) with
20 discrepancies discussed with VW. In addition, references from retrieved papers were checked for
21 relevant studies. A total of 60 articles were eligible for the current systematic literature review. Data
22 pertaining to the sample (participants, age, gender, type of school, country), study method
23 (qualitative, quantitative, measures used, timing of measurement), and outcomes (ranges and
24 means on relevant distress measures, relationships between key variables) were extracted.
25 Quantitative data on mean distress scores over time on the same outcomes measures were used

1 where possible to calculate overall mean distress for the total sample. Other findings were pooled to
2 form a narrative review of the findings. Figure 1 outlines the search and selection process based on
3 the PRISMA guidelines [18]. Appendix A summarises the studies included in the review.

4 The quality of the studies were assessed using the Critical Appraisal Skills Programme (CASP)
5 Cohort Study checklist [19] and Qualitative Study checklist [20]. The CASP checklists do not provide a
6 scoring system so instead each study was rated against each of five study quality criteria as
7 meeting/not meeting the criteria or rated as unclear. For Cohort studies the quality criteria were: 1)
8 Examined a Focused Issue, 2) Appropriate Sample, 3) Unlikely Measurement Bias, 4) Appropriate
9 Design/Confounds considered, and 5) Appropriate Analysis/ Interpretation of Results. Similarly, for
10 Qualitative Studies the quality criteria were: 1) Clear Aims, 2) Appropriate Sample, 3) Appropriate
11 Methodology, 4) Confounds considered, 5) Appropriate Analysis/Interpretation of results. Quality
12 was assessed by two raters (VW, TJ) and disagreements were solved through discussion. See Table 2
13 for the quality ratings.

14

15 **Results**

16 Sixty articles were found that met eligibility criteria (see Table 1). They reported on
17 qualitative and quantitative studies that investigated the distress experienced by students in the
18 final two years of schooling as well as the factors that influenced their distress.

19 ***Study Characteristics.***

20 Studies were conducted across 17 countries: Australia (n=12), United Kingdom (n=15), Turkey
21 (n=11), United States of America (n=7), Canada (n=3), the Netherlands (n=1), New Zealand (n=1),
22 Germany (n=1), Italy (n=1), Brazil (n=1), Nigeria (n=1), Iran (n=1), Portugal (n=1), Malaysia (n=1),
23 Ireland (n=1), India (n=1) and one study that compared cohorts in USA and Korea. Methodologies

1 varied across studies: five studies used a longitudinal design, 55 were cohort studies, and five used
2 qualitative analyses.

3 **Quality Assessment.**

4 The quality of the 60 included studies varied considerably (see Table 2). Only 26 studies were rated
5 highly on all categories. Most studies reported a clear study aim or described a focused issue of
6 study. Most studies also had adequate samples for the study aims. Measurement bias was not a
7 concern in the qualitative studies, with the risk of measurement bias mixed for the cohort studies,
8 with common concerns related to the reliability and validity of measures used. Confounds were
9 considered in only some studies, in particular confounds related to differences in timing of
10 measurement in relation to the exams, differences in schools or students sampled were often
11 ignored. Finally, the use of appropriate analysis and interpretation of results was consistently better
12 in the qualitative studies, with very mixed quality ratings in the cohort studies. In consolidating the
13 findings across studies, more emphasis is placed on the findings from the higher quality studies.

14

15 **Outcomes.**

16 **1. Distress Increases over the Senior School period**

17 **1.1 Cohort Studies.** Comparisons between student cohorts across different grades generally
18 found that the final year of high school was associated with more distress than the penultimate year
19 [21, 22], and the penultimate year was associated with more distress than the earlier years [23-26]
20 suggesting that distress is likely to increase through the senior years. Although the majority of
21 studies found increased distress in later school years, not all did [e.g. 27, 28], and this may relate to
22 differences in the timing of assessments or perceived stakes of the assessments. For example Locker
23 and Cropley [28] assessed UK students in year 11 and year 9 twice, both at the same time prior to
24 major exams and found no differences in distress. Therefore students might find all examination

1 periods equally distressing (regardless of school year). However, it is important to note likely cohort
2 effects between groups studied, as well as differences in the timing and type of distress
3 measurement particularly in terms of the proximity and types of upcoming examinations.
4 Longitudinal studies with repeated measurement in the same sample are needed to understand
5 changes in distress over time.

6 **Longitudinal Studies.** Five studies sampled distress in the same students throughout the final
7 year, with most finding increases in distress as major examinations approached [29-33], and
8 decreased distress after the examination period [30]. Einstein, Lovibond and Gaston [29] measured
9 distress using the Depression, Anxiety and Stress Scales [DASS; 34] in Australian year 12 students on
10 two occasions prior to upcoming major examinations; 10 weeks prior and again 10 days prior to the
11 same exam period. They found mean student distress increased significantly from the first testing to
12 the second testing from: moderate to severe anxiety, from severe to extremely severe stress, and
13 remained in the severe range (but significantly increased) from first to second testing for depression.
14 Similarly, Smith, Sinclair and Chapman [32] administered the DASS to 63 Australian students in
15 February (term 1 year 12) in and again in August (term 3) just before the major trial examinations.
16 Students' group means for DASS measured stress, anxiety and depression increased significantly
17 overall between the two testing occasions from mild to moderate depression, from mild to
18 moderate anxiety; however, remained at a mild level for stress across both occasions.

19 Similar findings were found by Peluso, Savalli, Curi, Gorenstein, and Andrade [31] in 154
20 Brazilian students using the Positive and Negative Affect Scale [PANAS; 35] administered three times
21 during the last year of high school. They found negative affect scores increased over time, with no
22 significant change in positive affect scores. Lay, Edwards, Parker, and Endler [30] also found that
23 mean state anxiety scores significantly increased from seven days prior, to one day prior to exams,
24 and then decreased five days after the exam period in final year students in Canada. In contrast,
25 Locker and Copley [28] found no significant increases in distress in a sample of students in four UK

1 high schools from six to eight week prior to exams, to one week prior to exams on the PANAS [35],
2 Children’s Depression Inventory [CDI; 36], Revised Manifest Anxiety Scale [RCMAS; 37], or Rosenberg
3 Self-Esteem Scale [38]. Although it is important to note that there was 21% attrition between the
4 two testing periods and this may have led to missing data at the higher distress levels. In general
5 studies have shown that stress is heightened in the senior years compared to lower years and
6 increases in the lead up to the major exam period.

7 **2. Severity of Distress**

8 Across a wide range of measures and countries, most studies reported that students had
9 high levels of distress with stronger similarities across samples when the same measure was used in
10 the same country (see Table 1). Determining how “high” the distress was across the samples is
11 difficult to ascertain as studies differed in the cut-offs used to define high distress, with many
12 applying cut-offs from adult normative samples. For example interpretation of scores on the TAI
13 were based on normative data from college students collected 40 years ago, and recent research
14 suggests these cut-offs are out of date for college students [39]. Similarly, interpretation of scores on
15 the DASS was based on normative data developed in adult samples, and despite its wide spread use
16 with adolescents, there are no adolescent norms available. Further, although the three factor
17 structure of the DASS (depression, anxiety, stress) has been generally supported in adolescent
18 samples with minor modifications [40, 41], it has not consistently been supported [42], and so
19 caution is needed in interpreting the results. It is also difficult to determine if the distress levels
20 reported across studies related to distress prior to an examination or general distress across the
21 senior school period. Studies differed in the timing of distress measurements to major examinations
22 and timing was often was not reported.

23 Due to the range of measures used, comparisons between studies are difficult; however, the
24 TAI was used in nine studies and the DASS in five studies enabling some comparisons across studies
25 to be made. Across the nine studies that used the TAI (most from the UK), distress was consistently

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1 reported to be high in final year students [e.g. 5]; however, different authors used different
2 definitions for “high” test anxiety. In the largest study, Putwain and Daly [5] administered the TAI to
3 2,435 students from 11 UK secondary schools in the final two years of schooling (years 10 and 11;
4 with a small sample in year 9 who were being accelerated) in the lead up to the final exam period.
5 High test anxiety was defined as scoring in the top 1/3rd of the score range, that is students who
6 reported experiencing anxiety somewhere from “often” to “almost always”. Using this definition,
7 they found 16.4% reported high test anxiety, with females reporting significantly higher test anxiety
8 than males (22.5% vs 10.3%). It is not clear whether the 16% of students reporting high levels of test
9 anxiety is significantly more than in other years. Similar findings were reported by the other studies
10 using the TAI.

11 Five studies (all Australian) reported on student levels of depression, anxiety and stress using
12 the DASS [34] in either its full (42 item) or shortened (21 item) form [3, 9, 22, 29, 32]. In adult
13 samples, scores can be interpreted as normal, mild, moderate, severe or extremely severe, with the
14 severe and extremely severe categories suggestive of clinical levels of distress [34], although it is not
15 known whether these cut-offs are applicable to adolescent samples. Robinson, Alexander, and
16 Gradisar [9] sampled 195 final year (year 12) students in South Australia one month prior to the
17 exams and found that male and female students (respectively) reported levels in the likely clinical
18 range (severe or extremely severe on the DASS-21) for: depression (15%, 22%), anxiety (11.7%,
19 29.9%) and stress (18.3%, 22.3%). This is similar to the findings by McGraw, Moore, Fuller, and Bates
20 [3] who surveyed 941 final year students (year 12) in term 3 in Victoria Australia and found the
21 proportion of students who reported distress in the likely clinical range (severe or extremely severe
22 on DASS-21) for: depression was 12.1%, anxiety (20.9%), and stress (11.3%). Smith and Sinclair [22]
23 also measured DASS scores in term 3 for year 11 and year 12 students in New South Wales,
24 Australia, and found the proportion of students reporting severe to extremely severe levels in the
25 two cohorts (Year 11, Year 12) being: 12.5% vs 24% for stress, 11% vs 19% for anxiety and 13% vs
26 24% for depression with clear increased distress in the final year students.

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1 Averaging across the five studies, final year (year 12) students' mean level of distress likely
2 to be in the clinical range (severe or extremely severe) was for stress 17.77% (means ranged from
3 11.39% to 21.07%), for anxiety 21.03% (means ranged from 17.90% to 24.30%), and for depression
4 18.12% (means ranged from 12.10% to 22.42%). Averaging the mean score across the scales, 19% of
5 students reported distress in the severe to extremely severe range (as per adult norms). This is
6 similar to the average of 16% with reported high test anxiety across 11 UK schools in the Putwain
7 and Daly [5] study reported above. So about 1 in 6 final year students is likely to have very high
8 levels of distress which might be of clinical concern.

9 The other studies examined distress severity using a range of other self-report symptom
10 scales and generally reported high proportions of distress in the student samples (in most cases as
11 indicated against adult norms). Two studies [21, 43] used the Global Health Questionnaire [GHQ: 44]
12 in its full and short (12 item) form. Hodge, McCormick and Elliott [21] applied a conservative clinical
13 cut-off (≥ 8) on the GHQ 30 item version to Year 11 and Year 12 students in New South Wales
14 Australia and found 42.4% Year 11 and 56.7% Year 12 students reported distress in the clinical range
15 (based on adult norms). Similarly, Lin and Yusoff [43] found 48% of senior students in Melak scored
16 in the clinical range on the GHQ 12 item (using a cut off of ≥ 4). One study examined depression using
17 the Patient Health Questionnaire-9 [PHQ-9: 45] and found 26% of final year students in North-East
18 USA scored above the clinical cut off of 10 based on adult norms [6], and one study used the Beck
19 Depression Inventory Revised [BDI-R: 46] and reported 45% of a Turkish sample were in the clinical
20 range for depression (based on adult norms using a cut off of >16) two months prior to their major
21 examinations [47]. Only three studies used a scale developed for children, the Children's Depression
22 Inventory [36], and the one study that reported scores in relation to clinical cut offs found that 36%
23 of final year Korean students were above the cut-off for clinical depression, compared to 16% of
24 American students [48]. Across these other measures the proportion of students experiencing very
25 high distress ranged from 16% to 57% although the majority used normative cut-offs based on adult
26 samples and so may not accurately reflect clinical distress.

1 **3. Factors Associated with Increased Distress**

2 Across the studies there was evidence that demographic, individual, family and school
3 factors were associated with increased distress in students in the final two years of school.

4 **3.1 Demographics.** Demographic factors such as gender (discussed below), low
5 socioeconomic status and studying in a second language were found to be associated with increased
6 student distress in the final years of school although when reported the effect sizes for these effects
7 were very small and difficult to differential as a range of demographic variables were often lumped
8 together. Four studies [21, 27, 49, 50] found a significant difference in distress associated with lower
9 socioeconomic status in Australia, United Kingdom and Portugal, but not Melaka [43], with only two
10 studies reporting the unique variance of this effect as very small (R-squared change = .06 -.006 [21,
11 50]. Five studies (in Australian, UK and USA samples) found increased distress related to coming
12 from a non-English speaking background [21, 29, 49-51], but not all [52], again with very small
13 effects (R-square change = .002) [e.g. 21]. Three studies examined the impact of parental education
14 and found no effect [9, 43, 53]; however, a protective effect was found for higher status of parental
15 occupation in the UK [52] and Nigeria [54], but not in Melaka [43]. Other demographic effects were
16 examined in only one or two studies making conclusions difficult. Birth order was not associated
17 with distress [9]; however, having a sibling was associated with significantly reduced distress [55].
18 No effect was found for parental marital status [43] whilst one found an effect of parent divorce on
19 males anxiety but not females [53], and increased anxiety in females with household stress but not
20 males [53]. One study compared final year students living in Korea to students living in America and
21 found that the Korean students had significantly higher depression [48].

22 **3.2. Individual Differences.**

23 The relationship between distress and individual factors were investigated. The strongest
24 evidence related to female gender, anxiety proneness and freedom from negative thoughts with

1 emerging evidence for: perfectionism, academic buoyancy, student motivation and coping, hours of
2 study and sleep.

3 **3.2i Gender.** Females reported significantly higher distress in the final years of high school
4 than males across a wide range of distress measures and samples [3, 9, 13, 21, 22, 27, 28, 30, 52, 53,
5 56-65]. Overall, in the senior school samples females consistently had higher scores for anxiety
6 symptoms than males [3, 22, 28, 53, 64, 65]. Similarly, females also had higher test anxiety scores
7 across a range of senior school samples such as in the UK [5, 13, 50, 52], in Chinese students [58],
8 American students [64, 65], Greek students [61], Iranian students [60], Portuguese students [27],
9 Turkish students [56, 57, 62, 63, 66], but in one study male and female Nigerian students did not
10 differ significantly on test anxiety [54]. Females had higher depression scores than males in some
11 samples [22], but not in others [3, 28]. Females also had higher scores for DASS stress [3, 22]. These
12 findings could relate to the higher emotionality of females and higher prevalence of anxiety (and
13 depressive) disorders in adolescent female samples [67, 68], or gender differences in willingness to
14 report emotional distress.

15 **3.2ii Anxiety proneness.** It was consistently found that greater distress in the final years of
16 school was associated with or predicted by higher *trait* anxiety suggesting anxious prone students
17 are more likely to experience distress. For example, higher state trait anxiety was found to predict
18 58% of variance in distress (measured on the GHQ) in senior students over and above demographics,
19 school type, coping and gender [21]. Similarly, negative affect was shown to predict higher test
20 anxiety in senior school students in New Zealand [69]. Studies have also reported that high test
21 anxiety, which is a measure of *trait* anxiety [11] and hence anxiety proneness is associated with
22 increased distress, lower self-efficacy and self-esteem in final year students [54, 56, 70], and lower
23 examination performance [10, 71, 72]. Therefore, anxiety proneness is likely to be a significant
24 predictor of senior school distress.

1 **3.2iii Negative Cognitions.** Qualitative and quantitative studies across a number of different
2 countries (Australia, Canada, Ireland, Italy, Turkey, Melaka, United Kingdom, United States of
3 America) found heightened distress in the final years of school was strongly associated with negative
4 cognitions, fear of failure, fear of examinations, homework concerns and fear of not getting into
5 university [6, 8, 30, 43, 73-77]. The significance of negative cognitions was particularly highlighted in
6 a study of 195 year 12 students in South Australia [9], in which 12 internal and external factors
7 associated with resilience were examined. In females, freedom from negative cognitions was the
8 largest predictor of resilience to depression, anxiety and stress, with family connectedness and
9 confidence also being important. For males, freedom from negative cognitions, confidence, family,
10 peer and school connectedness were significant predictors of resilience.

11 Negative cognitions in test anxiety have also been shown to be strongly associated with
12 distress. Test anxiety has been conceptualised as having a cognitive component (e.g. worry about
13 failure) and an affective-physiological component (e.g. somatic symptoms of anxiety) [78]. The
14 cognitive component of test anxiety has been specifically found to be associated with test
15 performance in a range of studies [10, 50, 51, 79, 80], with higher scores being predictive of poorer
16 test performance on major exams in senior students from the UK, New Zealand, USA, India, and
17 Turkey [10, 50, 57, 69, 80, 81]. In a large study, 705 UK students in the final year of school (Year 11)
18 completed measures of test anxiety and academic buoyancy (see below) four months prior and
19 again two months prior to the final exams [10]. The worry component of test anxiety at baseline was
20 associated with lower exam performance four months later. Similar findings in a number of UK
21 studies have shown negative cognitions mediate the relationship between test anxiety and
22 examination performance [79, 82]. Therefore, heightened negative cognitions and worry about tests
23 appears to be particularly associated with student distress as well as reduced examination
24 performance.

1 **3.2iv Perfectionism.** Theoretically, perfectionism is conceptualised as having dimensions
2 incorporating cognitions and behaviours associated with a need to do things perfectly [83, 84].
3 Hewitt and Flett [84] described perfectionism as being driven by personal desires for high standards
4 for the self (self-oriented), for others (other-oriented), or a perception that others hold unrealistic
5 standards for one's behaviour (socially-prescribed). Perfectionism can be adaptive (high standards
6 without excessive negative self-evaluation) or maladaptive (high standards coupled with excessive
7 negative self-evaluation) and maladaptive perfectionism has been associated with distress and
8 psychopathology [83]. A small number of studies have examined the impact of perfectionism on
9 student distress in the final years of high school, and have generally found that higher levels of
10 perfectionism were associated with increased distress and test anxiety [63, 85], mirroring findings in
11 university students [86]. In an Australian sample, Einstein et al. [29] found socially-prescribed
12 perfectionism (perceived perfectionistic standards expected by others e.g. parents) was associated
13 with increased distress, but self-oriented and other-oriented perfectionism were not. Therefore,
14 there is some evidence that perfectionistic standards which result in negative evaluation of self or
15 *perceived* negative evaluation by others, is associated with increased distress in students. As
16 discussed above, it is likely that the negative cognitions that drive maladaptive perfectionism are an
17 important component in student distress, and more research is needed to examine this further.

18 **3.2v Coping.** Students who reported using more avoidant or non-adaptive coping styles
19 (wishful thinking, self-blame, suppression) had higher distress and test anxiety scores [21, 30, 43, 66,
20 76, 87], with adaptive coping (problem solving, task orientation, reappraisal) associated with lower
21 distress [21, 76, 81, 87]. Further, Italian final year students who reported decreased beliefs about
22 their ability to cope with upcoming examinations had the highest distress [76]. These findings mirror
23 other research showing that maladaptive coping, particularly avoidance, is associated with increased
24 distress and psychopathology generally [88].

1 **3.2vi Motivation.** Four studies looked at the impact of student motivation to approach or
2 avoid performance tasks on distress severity in the final years of school. A performance-approach
3 goal refers to the motivation to outperform peers, whereas a performance-avoidance goal refers to
4 motivation to avoid demonstrating lack of ability. Smith and Sinclair [22] looked at the impact of
5 performance-approach goal orientation, performance-avoidance goal orientation, as well as self-
6 efficacy and self-handicapping coping strategies on levels of depression, anxiety or stress in year 11
7 and 12 students. They found higher performance-avoidance goal orientation was associated with
8 higher depression and anxiety in year 11 males, and anxiety and stress in year 12 males, and
9 depression in year 12 females. Similarly, Putwain and Symes [89] also found in 273 final year UK
10 students that higher test anxiety was associated with more performance-avoidance and mastery-
11 avoidance (avoidance of increasing competence). In a sample of Indian students in their penultimate
12 year of high school, those who reported higher test anxiety also indicated poorer study habits and
13 using self-handicapping coping strategies [80]. These findings are similar to the findings above
14 related to greater distress being associated with using avoidance as a coping strategy, as well as
15 negative beliefs about their ability and the consequence of poor performance.

16 **3.2 vii Academic Self-Efficacy.** In qualitative interviews students reported that stress in the
17 senior years related specifically to how confident and competent they felt about specific subject
18 matter [8], with higher confidence in their competence for exam and assessment tasks relating to
19 lower distress. The relationship between higher academic confidence and lower distress was also
20 found in quantitative studies; Higher self-efficacy was associated with lower test anxiety scores in
21 American [70], Australian [9], and Turkish senior school students [55], as well as higher self-esteem
22 in Nigerian [54] and Turkish senior students [56] and lower depression levels in Canadian senior
23 students [85]. However, test competence was not a significant predictor of unique variance in
24 examination performance when tested in a model also containing test worry, academic buoyancy
25 and perceived control, suggesting that it is test related worry that is most relevant [82].

1 **3.2viii Academic Buoyancy.** Academic buoyancy is defined as the capacity to withstand
2 routine types of academic setbacks, challenges, and pressures experienced by students during their
3 education such as dealing with competing deadlines, poor grades and examination pressure [90]. It
4 has been shown to be comprised of higher self-efficacy, higher planning ability, greater beliefs about
5 control, persistence and low anxiety [91], and therefore includes many of the elements discussed
6 above. Given that, it is perhaps not surprising that academic buoyancy has been found in a number
7 of studies to be associated with lower test anxiety and distress, greater enjoyment of school, class
8 participation, self-esteem, and better examination performance [10, 81, 87, 90, 92, 93]. Although
9 academic buoyancy was found to explain unique variance (5-10%) in test anxiety in senior school
10 students over and above coping [87], when the role of academic buoyancy was considered in
11 conjunction with other predictors of examination performance, only worry about tests (strongest
12 predictor) and perceived control (smaller predictor) were significant predictors of unique variance,
13 with academic buoyancy and test competence being non-significant [82]. Therefore, academic
14 buoyancy is an important concept in understanding senior school distress; however, it is unclear
15 what the relationship is of academic buoyancy to the other main predictors of senior school distress
16 such as the absence of negative cognitions and anxiety proneness, and further studies are needed to
17 understand the specific and unique contribution of academic buoyancy on student distress.

18 **3.2ix Time Spent Studying.** Four studies examined the relationship between the number of
19 hours spent studying and student distress and found that more hours studying was associated with
20 greater distress and negative mood [31, 48, 59, 94]. However, the causal relationship between
21 distress and time spent studying is not clear. In an interesting cultural comparison, Lushington et al.
22 [59] found the relationship between greater hours of study and greater distress was only evident in
23 Caucasian-Australian senior students and not in Asian-Australian senior students, and that hours of
24 study only related to stress levels and not depressed mood. Lee and Larson [48] found that increased
25 time spent on homework was only related to increased depression in those students (Korean and
26 American) who experienced increased negative affect *during* homework. This suggests that students'

1 attitudes or negative cognitions towards or during homework might be a mediating factor between
2 hours of study and distress. Lee and Larson [48] also found that more time spent in active leisure
3 was associated with reduced depression, suggesting that it might not be the amount the number of
4 hours spent studying specifically, but the portion of hours studying compared to hours spent doing
5 pleasant (mood enhancing) activities. Interestingly, a study with Turkish senior students found that
6 poorer time management when completing school assignments was associated with increased
7 anxiety [95]. More research is needed to understand the relationship between study time and
8 distress, and to examine individual differences in study patterns, emotional wellbeing and academic
9 performance.

10 **3.2x Sleep.** Three studies examined the relationship between sleep and stress in final year
11 students and found links between increased stress and poorer sleep. In a small sample (n=24) in the
12 Netherlands, stress experienced in the final examination period was found to be associated with
13 significantly reduced total sleep time (17.5 ± 8.2 minutes), sleep efficiency and increased wake bouts
14 [96]. Similarly, in a large (n=195) Australian sample final year students one month prior to their final
15 exams reported high rates of inadequate sleep, with more distressed students reporting greater
16 rates of daytime napping [9]. Also Lushington et al. [59] found that 20% of students (n=398) had
17 missed class in the previous month because they had overslept, and that increased daytime
18 sleepiness was associated with increased stress and depressed mood. Across the studies, it is not
19 clear whether sleep is a predictor of distress or a consequence of distress. Both are likely true as
20 there is clear evidence that inadequate sleep is associated with increased anxiety and depressed
21 mood [97-99], as well as anxiety and depression being associated with poorer quality sleep and
22 fatigue [100, 101]. More research is needed to understand the link between distress and poor sleep
23 in senior students, what role excessive study might play in the reduced hours of sleep, and whether
24 it is chronic or acute sleep deprivation that is most significant.

1 **3.3 Family, Peer and School Factors.** The evidence related to the impact of school type,
2 family, peer and school connectedness, perceived pressure, and fear appeals are examined in
3 relation to distress in senior students.

4 **3.3i Type of school.** In general no significant differences were found in distress levels across
5 different school types or boarding compared to day students [6, 62]. Two studies found significantly
6 igher mean anxiety scores in single sex girls' schools compared to coeducational and single sex boys'
7 schools [25, 28], and one also found single sex girls' schools had significantly greater negative affect
8 scores [28]. This school type effect is likely to be accounted for by the findings that females scored
9 higher on anxiety and depression measures, rather than the school type specifically. One Turkish
10 study reported school based differences in test based anxiety [56]; however, how the school types
11 differed was not clearly described and so it is difficult to draw conclusions. In general it appears that
12 school based differences are minor, with the main differences related to single sex girls' schools
13 having higher distress, which likely reflects the strong effect of female gender on distress, although
14 further research is needed to understand if female gender coupled with an all-female school
15 environment increases the distress.

16 **3.3ii Family, Peer and School Connectedness.** Student distress varied by how strongly
17 connected students felt with their schools (sense of belonging to their school community), their
18 peers (satisfaction with peer relationships) and with their family (satisfaction with care and support
19 from family, family cohesion). All five studies found that a more positive relationship with school was
20 associated with reduced distress in final year students [3, 9, 26, 63, 102]. Strong peer connectedness
21 was also shown to be associated with reduced distress. For example, in a large study of 941 Year 12
22 Australian students in their final year of school, McGraw et al. [3] found after controlling for gender
23 that connection with school, peers and family were associated with reduced depression (accounting
24 for 42% of the variance), with the strongest predictor being connection with peers. Male gender,
25 peer connectedness and family connectedness were all significant protective factors for anxiety and

1 stress (explaining 21-22% of the variance respectively), with peer connectedness again being the
2 strongest protective factor. Peer connectedness was also related to increased resilience in an
3 Australian sample [102]. In Turkish senior students, perceived support from peers (and teachers)
4 was associated with less test anxiety [63]. Robinson et al. [9] also found that peer, school and family
5 connectedness were predictive of resilience to distress in males in the final year of school, while only
6 family connectedness (and not peer or school connectedness) was protective of distress in female
7 students. In an American sample, students in higher grades reported lower school connectedness
8 and higher anxiety than younger students [26]. Therefore, a strong sense of connectedness with the
9 school, family and peers is important for reduced distress in senior students.

10 **3.3iii Fear Appeals and Perceived Pressure.** Fear appeals refer to attempts by teachers (or
11 parents) to motivate students by highlighting the consequences of failing or doing poorly [103]. The
12 impact of fear appeals on students' levels of distress and on subsequent examination performance
13 has been mixed and differs depending on how students' interpret the fear appeals. For example, in a
14 sample of 132 UK students in their final two years of schooling, fear appeals by teachers to year 10
15 students (penultimate year of high school) were found to be associated with increased worry and
16 tension related to their major mathematics exam later in Year 11, but this was only true for students
17 who *perceived* the fear appeals to be threatening [103]. For other students, perceived threat from
18 fear appeals in year 10 was associated with increased fear of failure but also an increased motivation
19 to improve their competence (mastery-approach), hence the fear appeals helped to increase their
20 commitment to study. Similarly, in a sample of 273 final year UK students, Putwain and Symes [89]
21 found that fear appeals by teachers that were perceived as threatened associated with a greater
22 performance-avoidance approach, and resulted in poorer examination performance. Although
23 research recently found that when fear appeals were used more frequently, the tendency to
24 appraise them as threatening increased [104], with related research in university students
25 suggesting that efficacy appeals (instead of fear appeals) resulted in reduced distress and increased
26 examination performance [105]. More research is needed to understand the links between fear

1 appeals, threat perception, and examination performance. The emerging research that efficacy
2 appeals might produce better emotional outcome and test performance is particularly important.

3 Similarly, qualitative studies found students with perceived pressure from parents, teachers
4 and peers reported higher distress [6, 8, 73, 75]. Çırak's [73] study in Turkish senior students
5 identified that the pressure from parents related to a desire by students to not disappoint their
6 parents who had often made significant sacrifices to give them an educational opportunity. As
7 reported earlier, Einstein et al. [29] found that higher socially-prescribed perfectionism, which
8 captured perceived pressure to achieve unrealistic goals determined by significant others, was a
9 significant predictor of distress (depression and anxiety) in final year students prior to a set of major
10 exams. Therefore the findings suggest that *perceived* pressure by teachers to do academically well is
11 predictive of heightened distress in the final years of school and mediated the impact on student
12 distress and examination performance.

13 **Discussion**

14 This review aimed to understand the nature of, severity of, and correlates of distress in
15 secondary students undergoing the final years of schooling. The global interest in this topic was
16 demonstrated by studies represented student samples from 16 different countries, with the majority
17 reporting high levels of distress in students. There was evidence that distress increased as
18 examination periods approached, however, it is unclear whether the severity of distress experienced
19 by these students is dissimilar to younger students approaching examinations that might be
20 considered to be associated with lower academic stakes [4]. More research using longitudinal
21 designs and carefully timed assessment of distress in examination and non-examination periods
22 across grade levels is needed.

23 Given consistent reports that many students reported very high levels of distress, the
24 question of whether distress experienced by students in their final years is *too much* is a topical one.
25 This question is difficult to answer given the differences in measurement tools used and use of age

1 appropriate normative cut-offs were generally absent. Examining the data from the two countries
2 with the most research, using the TAI in the UK an average of 16% of students might be considered
3 to have distress that was excessive, and using the DASS in the Australian data an average of 19%
4 might be considered to have excessive distress. This equates to approximately one in six students.
5 This rate of distress is very similar to the findings from two large Australian national surveys. In the
6 Youth Mental Health Report [2] 21.2% of adolescents aged 15-19 years reported high levels of
7 distress, and in the Australian National Survey of the Mental Health of Children and Adolescents [68]
8 19% of adolescents reported very high or high levels of distress. It is not clear if the distress captures
9 in these national surveys predominately captures school based stress, or if the distress captured in
10 the studies in this review capture distress that is different from normal. It is unclear what proportion
11 of the one in six students with high levels of distress identified in this review had distress that was in
12 the clinical range, and whether that was higher than expected. The recent Australian National Survey
13 of the Mental Health of Children and Adolescents [68] found that 14.4% of 12-17 year olds met
14 criteria for a mental disorder in the previous 12 months, and 7% met criteria for an anxiety disorder.
15 Therefore it is likely that at least this proportion of students in the final years of school are likely to
16 be clinically distressed. Although this distress might be transient, it is clear that some students are
17 very distressed and would benefit from additional assistance to manage their distress. Establishing
18 methods to identifying these students as soon as possible is an important direction for the future.

19 In addition, to the proximity of examinations, a number of other factors were found to be
20 associated with increased distress in high school students in the final years. The most consistent
21 effects related to individual differences such as female gender, anxiety proneness and freedom from
22 negative cognitions. The higher prevalence of distress in females fits with gender based differences
23 in emotionality and incidence rates of internalising mental disorders [67, 68]. Findings that greater
24 anxiety proneness was associated with increased distress fits with longitudinal research that shows
25 early child anxiety predicts later adolescent anxiety [106, 107]. It also fits theoretically with the
26 Diathesis-Stress models [108] that assert that the combination of a diathesis or predispositional

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1 vulnerability coupled with a sufficient stressor results in psychological disorder or other poor
2 psychological outcomes. As such the heightened stress associated with major exams or increased
3 academic demands when coupled with a predisposing vulnerability towards distress, results in
4 heightened distress that may be of clinical severity. Therefore, anxiety proneness is likely to be a
5 significant predictor of senior school distress, and early identification of anxiety proneness in early
6 school years could be used to predict students likely to experience excessive distress prior to the
7 start of the senior years and thus be targeted for interventions prior to the senior school years.

8 The finding that freedom from negative thinking was a significant protective factor aligns
9 with the findings that the cognitive elements of test anxiety and worry were the strongest predictors
10 of student distress. The presence of negative cognitions are theorised to play a prominent role in the
11 development and maintenance of child and adolescent anxiety disorders [16, 17]. For example,
12 anxious students are likely to have the tendency to misinterpret ambiguous information (e.g.
13 average marks), overinflate the likelihood and consequences of perceived negative events (e.g. “I
14 will fail”, and “It will be a disaster if I fail”), and have poorer coping strategies for dealing with this
15 heightened distress (e.g. avoidance, procrastination), exacerbating and maintaining distress.
16 Furthermore, a number of studies demonstrated that students with greater worry about tests
17 actually had poorer examination performance. This highlights the need to intervene with students
18 who show high distress or report high levels of worry about tests early so that they are not
19 disadvantaged educationally. Given the important role of negative cognitions in test anxiety,
20 distress and subsequent examination performance, more attention needs to be paid to interventions
21 that target negative cognitions particularly in the lead up to high stakes tests. There is some
22 evidence that cognitive behavioural interventions are effective in reducing distress in senior years
23 when delivered as prevention programs [109] or as targeted programs for those experiencing acute
24 academic distress when delivered in school settings [110, 111], and perhaps even in single session
25 universal interventions [112]. These cognitive behavioural interventions focus on teaching students

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1 how to manage negative cognitions, feelings of stress, and how to reduce avoidant behaviours,
2 which are the key factors identified in this review as predictors of distress.

3 Given evidence for the impact of peer, family and school connectedness on student distress,
4 future interventions might include strategies to bolster peer, school and family relationships. There
5 was also emerging evidence for other significant predictors of distress including maladaptive
6 perfectionism, poor sleep and excessive time spent on homework, with academic self-efficacy,
7 academic buoyancy and resilience being protective factors. Although more research is needed to
8 understand the unique contribution of these additional predictors over and above gender, anxiety
9 proneness and freedom from negative cognitions, and how these factors interact with each other.

10 Finally, there was also emerging evidence for the role of perceived pressure from parents and
11 teachers (through fear appeals) on student distress, although fear appeals were associated with
12 increased distress and poorer examination performance only in some students. It is likely that
13 anxious prone students are likely to interpret fear appeals or pressure from parents and teachers to
14 perform as threatening and subsequently experience greater distress, although more research is
15 needed to examine this relationship. Further research might also look at the underlying factors
16 associated with the use of fear appeals by teachers and parents. It is likely that teacher/parental
17 concerns related to suboptimal student performance drives this effect. As academic performance
18 metrics are being used more frequently in the United Kingdom, Australia and elsewhere in
19 accountability practices to judge school and teacher effectiveness [113], there is also emerging
20 evidence for increasingly high levels of stress experienced by teachers who feel pressured to help
21 their students get excellent results [114], this might result in teacher behaviours (such as the use of
22 fear appeals that exacerbate student distress and reduce academic performance). Future research
23 might track teacher stress and use of fear appeals and other teacher behaviours longitudinally to see
24 how it relates to student's distress in large studies. Strategies to reduce teacher distress might also
25 prove a future target for interventions to relieve student distress.

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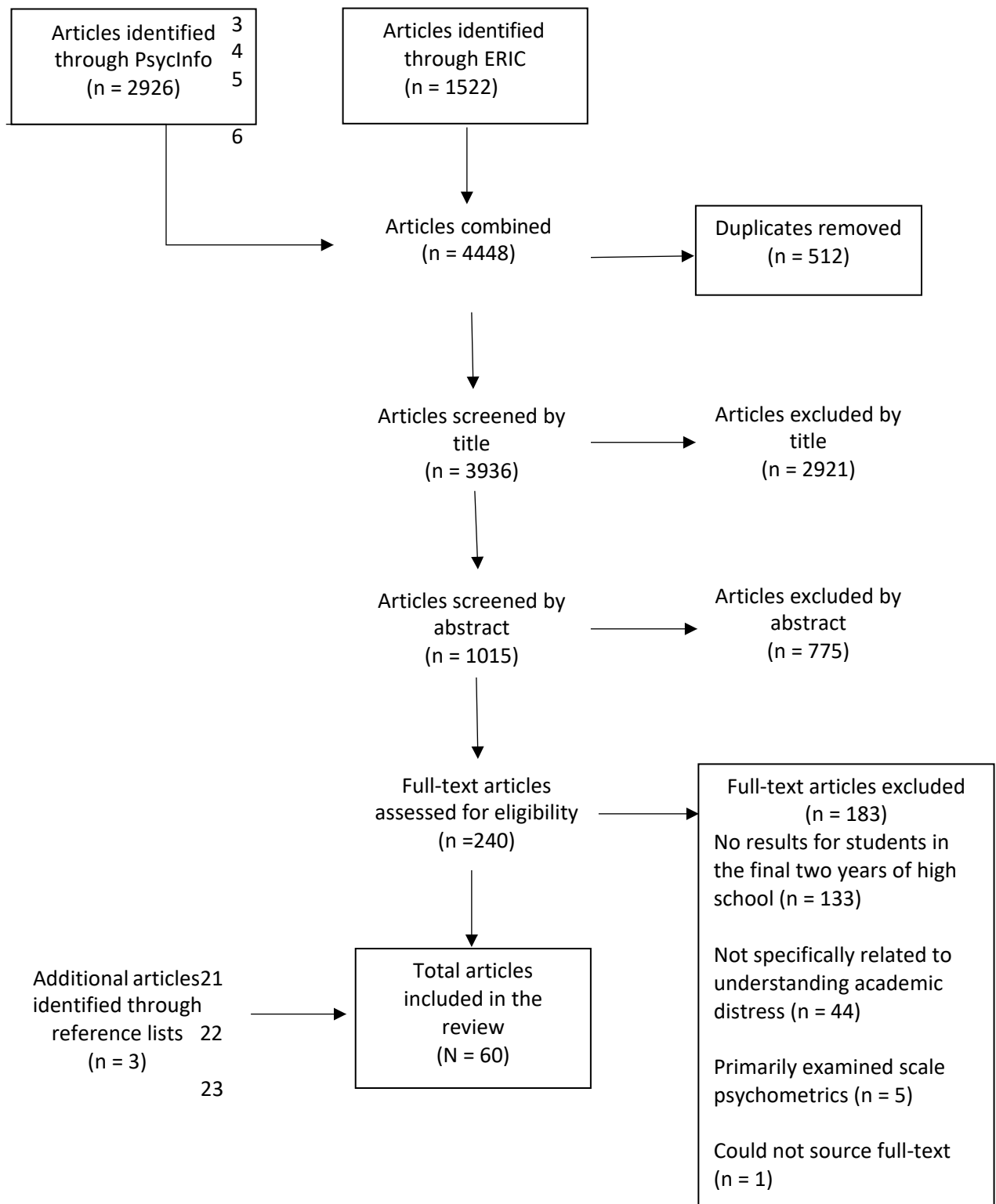
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1 Figure 1: Flow Diagram

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1 Table 1: Articles included in the review

Authors	Sample	Sample size	Sample age	Measures Used	Summary of findings for senior students
Akca [23]	Turkish students preparing for the High School Placement Test (HSPT) and University Entrance Exam (UEE)	319 preparing for HSPT 389 preparing for UEE	Range 12 – 14 years (Preparing for HSPT) Range 16 – 19 years (Preparing for UEE)	Learned Helplessness Scale for Children Test Anxiety Scale	Females had significantly higher test anxiety than males. Test anxiety and learned helplessness was significantly higher for students preparing for HSPT than UEE. Suggests older students are better able to cope. No relationship between test anxiety and learned helplessness.
Akcoltekin [95]	Turkish high school students in grade 12 (final year)	270	Unreported	Time Management Inventory Research Anxiety Scale	Poorer time management was associated with higher research anxiety.
Astill et al. [96]	Amsterdam high school students (final year)	24	$M = 17.63$ ($SD = 0.10$)	Actigraphy Daily questions on stress, fatigue, and subjective sleep quality Daily number of exams and alcoholic and caffeinated drinks	Sleep time, efficiency, and subjective quality was significantly reduced during stressful exam periods, relative to exam-free periods.
Aysan et al. [66]	Turkish high school students (juniors and seniors) preparing for exams	59 juniors 54 seniors	$M = 15.8$ (juniors) $M = 17.4$ (seniors)	Perceived Health Scale Test Anxiety Inventory Coping Strategies Scale	Students with higher test anxiety perceived their health to be poorer. Students who engaged in self-blame, wishful thinking, or avoidance coping strategies tended to have higher test anxiety.
Byrne [53]	Australian high school students (grades 7, 9, 12)	224	Range 12 – 18 years ($M = 15.05$, $SD = 4.63$)	The Fear Survey Schedule for Children The Rosenberg Self-Esteem Scale	No gender differences in self-esteem in year 12.

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				State-Trait Anxiety Inventory - Trait Scale Home life (parental employment, number and gender of sibling, family structure)	From year 7 to 12, anxiety significantly increased for girls and decreased for boys. In year 12, boys and girls used different coping strategies: Girls were significantly more anxious than boys, boys' coping strategies appeared to reduce anxiety and fear.
Chin et al. [69]	New Zealander high school students (grades 12, 13)	188	Range 16 – 19 years (<i>M</i> = 16.80, <i>SD</i> = 0.72)	Affect and Arousal Scale Reactions to Tests Examination Performance	Negative affect contributed to higher test anxiety. Higher test anxiety was associated with poorer exam performance. Compared to boys, girls had higher exam grades and higher levels of test anxiety and emotionality.
Christensen [65]	American high school students (senior year)	94	Range 16 – 19 years (<i>M</i> and <i>SD</i> unreported)	Debilitating Anxiety Scale – Revised	Students in accelerated classes had lower test anxiety than students in “low stream” (low achieving) classes. Compared to boys, girls had higher test anxiety.
Chukwuorji and Nwonyi [54]	Nigerian secondary school students (candidates for high-stakes examinations)	281	Range 16 – 19 years (<i>M</i> = 17.05, <i>SD</i> = 1.87)	State Self-Esteem Scale Test Anxiety Inventory Socio-demographic information	Students whose parents had higher-status jobs were more test anxious. Students with lower self-esteem had higher test-anxiety. No gender differences in test anxiety.
Çirak [73]	Turkish high school students (final year)	23	Range 17 – 18 years (<i>M</i> and <i>SD</i> unreported)	Semi Structured Interviews	Students frequently reported emotional and physiological anxiety about exams. Test anxiety was related to perceived pressure from family expectations and the idea of absolute success or failure.
Cunha and Paiva [27]	Portuguese high school students (grades 10, 11, 12)	449	Range 15 – 21 years (<i>M</i> = 16.28,	Socio-demographic information Test Anxiety Inventory	Lower test anxiety was associated with higher self-reassurance, acceptance, and mindfulness.

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			<i>SD</i> = 1.17)	Forms of Self-Criticising and Self-Reassuring Scale Social Anxiety and Avoidance Scale for Adolescents Children’s Acceptance and Mindfulness Measure	Higher test anxiety was associated with high self-criticism, high social anxiety, low self-reassurance, and low acceptance and mindfulness skills. Girls had higher test anxiety than boys. Test anxiety was significantly higher for students with mid-SES levels, relative to high-SES students.
Daly, Chamberlain, and Spalding [115]	English sixth-form college students (in their first year of their A-level qualification)	39	<i>M</i> = 17.31 (<i>SD</i> = .047)	Raw mark on a mock A-level examination Results in the GCSE Test anxiety questionnaire Heart rate data	Students with higher levels of test anxiety performed worse in their GCSE, on average. No relationship found between heart rate and test anxiety.
Einstein et al. [29]	Australian high school students (grade 12)	772	Range 15 – 24 years (<i>M</i> = 17.6, <i>SD</i> = 0.6)	Multidimensional Perfectionism Scale Depression Anxiety Stress Scales Self-report of hours spent studying, motivation, country of birth	Depression, anxiety, and stress symptoms increased significantly as exams came closer, with 20% of the sample falling into the severe range. Students of immigrant parents reported higher socially-prescribed perfectionism, which was positively related to depression and anxiety.
Erzen and Odaci [56]	Turkish students in their final year of high school	180	Range 16 – 19 years (<i>M</i> = 17.3, <i>SD</i> = 0.53)	Test Anxiety Inventory Relationships Scales Questionnaire Self-Efficacy Scale Personal Information Form	A secure attachment style was related to lower test anxiety. A fearful or dismissing attachment style was related to higher test anxiety. Students with low self-efficacy had higher test anxiety. Female students had higher test anxiety than males.

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Flett et al. [85]	Canadian secondary school students (grades 11 and 12)	73	Range 16 – 18 years (<i>M</i> = 16.8, <i>SD</i> unreported)	<p>Child-Adolescent Perfectionism Scale</p> <p>Adolescent and Adult Type A Behavior Scale</p> <p>Perceived Self-Efficacy Scale</p> <p>Children’s Depression Inventory</p> <p>Psychosomatic Symptom Scale</p>	Depression was associated with higher self-oriented perfectionism, more Type A behaviour, and lower self-efficacy.
Guner-Kucukkaya and Isik [24]	Turkish high school students in grades 9, 10, and 11	728	Unreported	<p>Demographic information form</p> <p>Brief Symptom Inventory, Global Severity Index (GSI)</p>	Students in year 11 had significantly higher GSI scores than students in grades 9 and 10.
Hodge et al. [21]	Australian high school students (grades 11 and 12)	445	Unreported	<p>Questionnaire on: Biographical and personal characteristics, school characteristics, academic self-concept and expectation of HSC outcome, coping practices, and perceptions of support.</p> <p>State-Trait Anxiety Inventory – Trait</p> <p>General Health Questionnaire (GHQ)</p> <p>Adolescent Coping Scale – Short Form</p> <p>Self-Description Questionnaire III</p>	<p>Almost half of all the students reported “at risk” levels of distress. Year 12 students about to undertake major examinations reported the highest levels of distress. Females had higher levels of distress than males, and students from a non-English speaking background had higher levels of stress than students from English speaking backgrounds.</p> <p>Students who had higher trait anxiety, lower self-confidence, lower socio-economic status, lower academic self-concepts, or less effective coping strategies were more likely to report higher levels of distress.</p> <p>Trait anxiety was the strongest predictor of examination distress.</p>

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Karatas et al. [57]	Turkish high school students (final year)	194	$M = 17.5$	Test Anxiety Inventory Scores on the university entrance exam Grade Point Average (GPA)	Females had significantly higher test anxiety than males. Females with higher test anxiety performed worse on their university entrance exam.
Kouzma and Kennedy [94]	Australian senior high school students	369	Range 16 – 18 years ($M = 16.6$, $SD = 0.60$)	1-week homework diary Self-report stress scale Profile of Mood States	Compared to boys, girls spent significantly more time doing homework, and reported significantly higher levels of stress and mood disturbance. Hours spent on homework was significantly positively associated with stress and mood disturbance.
Kouzma and Kennedy [74]	Australian final year students (year 12)	423	Range 16 – 18 years ($M = 17.3$, $SD = 0.6$)	Academic Stress Questionnaire	Main sources of stress included examinations and results, too much to do, worry over future, making choices about career, studying for examinations, amount to learn, need to do well imposed by others, and self-imposed need to do well.
Lay et al. [30]	Canadian students in final year (Year 13)	63	Unreported	Endler Multidimensional Anxiety Scales (state and trait forms) Procrastination scale Threat, challenge, harm, and gain appraisals Ways of Coping Scale	State anxiety was positively related to threat appraisals and harm appraisals. Emotion-focused coping was related to higher state anxiety. Prior to and during a stressful exam period, students reported the highest levels of threat appraisals. State anxiety was highest one day before their first final exam. State anxiety was lowest five days after their last exam.
Lee and Larson [48]	Korean and USA high school seniors preparing for	56 in Korea, 62 in USA	$M = 17.8$ (Korea)	Children's Depression Inventory	Korean students had significantly higher levels of clinical depression than USA students.

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	university entrance exam (year 12)		<i>M</i> = 17.0 (USA)	Experience Sampling Method self-report diary (activities, affect)	Korean students spent significantly more time (2x) on schoolwork. USA students spent more time in leisure activities. Korean students reported more negative emotional states during daily activities and schoolwork, which was related to depression.
Leonard et al. [6]	USA senior private school students (year 11)	128	<i>M</i> = 16.37 (<i>SD</i> = 0.62)	Socio-demographic and background information mtvU/Associated Press survey Help with stress (developed by authors) Self-Report Coping Scale Academic Motivation Scale Parental Expectations subscale of the Multidimensional Perfectionism Scale Quick Depression Assessment of PHQ-9 Communities that care youth survey	Greatest sources of stress were grades, homework, and preparing for college. Grades were a significantly greater source of stress for females than males. 49% of students reported feeling a great deal of stress on a daily basis. Females reported significantly higher stress than males. Females more likely to use problem-focused coping and emotion-focused internal avoidance coping. Males more likely to report emotion-focused external avoidance coping. Greatest source of support identified as friends, followed by family members, followed by school staff. 26% of students had clinical levels of depression. 38% of students reported drinking alcohol to get drunk in the last week. Substance use was significantly associated with high levels of stress.

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Lin and Yusoff [43]	Malaysian students in final year of high school (upper 6)	382	Aged 19 (<i>M</i> , <i>SD</i> and range unreported).	Sociodemographic information GHQ-12 Secondary School Stressor Questionnaire Brief Coping Orientation of Problem Experienced	47.6% of students reported psychological distress (2.5x higher than WHO expected). The top ten stressors perceived by students were related to academia (e.g. "Afraid of not getting university placement"). Positive reinterpretation was a protective factor (negatively correlated with the development of distress). Risk factors included behavioural disengagement, self-blame, denial, venting, self-distraction (significant positive relationship with distress).
Locker and Cropley [28]	English high school students (grades 9 and 11)	508	(Reported separately for gender and school-type) <i>M</i> = 13.9 – 16.8 (<i>SD</i> = .428 - .725)	Positive and Negative Affect Schedule Children's Depression Inventory Revised Children's Manifest Anxiety Scale Rosenberg Self-Esteem Scale	Immediately prior high-stakes examinations, females were significantly more anxious (in terms of worry and physiological anxiety) than males. Females also showed higher levels of negative affect and distress at this time. Students at all girls schools had higher anxiety and negative affect prior to exams, relative to students attending mixed and all boys schools.
Lushington et al. [59]	Australian students in senior high school (years 11 and 12)	398	(Reported separately for gender and ethnicity)	Questionnaire (demographics, sleep habits, extracurricular activity, academic expectations, stress, mood, coping, diet, pubertal development) 6-item Depressive Mood Scale 4-item Brief Resilient Coping Scale	No main effects for culture or gender on sleep quality. Females had significantly higher depressive mood and study/interpersonal stress than males. Among Caucasian Australians, higher study stress was related to higher daytime sleepiness.

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				4-item Study and Interpersonal Stress subscale from the Student-life Stress Inventory	On school nights, Asian Australians slept less (went to bed later and woke up earlier) than Caucasian Australians.
Manley and Rosemier [64]	American school students (grades 7 to 12)	2,086 (Grade 12 n=351, Grade 11 n=291)	Unreported	Test Anxiety Scale for Children General Anxiety Scale for Children	Girls had significantly higher test anxiety than boys at every grade level. No significant differences in test anxiety between grades 11 and 12.
McCann and Meen [72]	Canadian high school students (grades 11 and 12)	222	Unreported	State-Trait Anxiety Inventory (STAI) Intellectual ability (Raven's Progressive Matrices and Canadian Lorge-Thorndike intelligence test) Academic achievement (final English grades)	Higher anxiety was associated with lower intellectual ability. Higher anxiety was associated with lower achievement for students with lower intellectual ability. Higher anxiety was associated with greater achievement for students with higher intellectual ability.
McGraw et al. [3]	Australian high school students (grade 12)	941	Range 16 – 19 years (<i>M</i> = 17.4, <i>SD</i> = 0.6)	Demographics Psychological Sense of School Membership Family Connectedness Self-Report UCLA-R Loneliness Scale Depression Anxiety Stress Scales – 21	More than 12% were severely or extremely depressed. More than 20% were severely or extremely anxious. More than 10% were severely or extremely stressed. Lower connectedness to school, family and peers was associated with higher levels of stress, depression, anxiety, and negative affect. Higher connectedness to school, family and peers was a protective factor against stress, anxiety, and depression. Girls reported stronger peer connectedness than boys, but were significantly more stressed and anxious.

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Moulds [25]	Australian high school students (grades 7, 9 and 11)	1,137	Unreported	Main daily hassle in current term Student Stress Inventory Actual Classroom Environment Scale Rosenberg Self-Esteem Scale Demographic information	Students in grade 11 were significantly more anxious than those in grades 7 and 9.
Peluso et al. [31]	Brazilian senior high students preparing for the university admission exam	222	Median age = 17 years (<i>M</i> and <i>SD</i> unreported)	Positive and Negative Affect Schedule – Expanded form (PANAS-X) Time spent studying	Negative affect significantly increased as the high-stakes exam drew nearer. Mood correlated with time spent studying: Negative affect was higher for students who spent more time studying.
Putwain [8]	English secondary school students (grades 10 and 11)	34	Range 14 – 16 years (<i>M</i> and <i>SD</i> unreported)	Semi-structured interviews	Examination anxiety was reportedly influenced by an anxious disposition and perceived assessment importance. Academic stress was reportedly influenced by deadlines, workload, motivation to achieve, and fear of failure. Examination anxiety reportedly resulted in difficulty remembering information during exams.
Putwain [52]	English high school students (grades 10 and 11)	1,348	Unreported	Test Anxiety Inventory Student Profile Questionnaire	Females had significantly higher test anxiety than males. Ethnicity influenced test anxiety; Students from White ethnic backgrounds had lower levels of test anxiety than students from Black, Asian, and other ethnic backgrounds.

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					Students for whom English was their second language had higher test anxiety.
Putwain [49]	English secondary school students (grades 10, 11)	615	Range 14 – 16 years (<i>M</i> and <i>SD</i> unreported)	State Test Anxiety Scale Examination Performance Examination Stakes (high, mid, low)	Higher test anxiety, worry, and emotionality were all associated with poorer exam performance. Students reported lowest levels of test anxiety and attained highest grades for mid-stakes exams.
Putwain [50]	English high school students (grade 11)	557	Range 15 – 16 years (<i>M</i> and <i>SD</i> unreported)	Test Anxiety Inventory Office for National Statistics categorical scale of socio-economic background Grade on GCSE examinations	Females had significantly higher test anxiety than males. Higher test anxiety was associated with poorer exam performance. Students from a higher socioeconomic background had lower test anxiety and higher exam grades than students from lower socioeconomic backgrounds.
Putwain [75]	English secondary school students (grades 10, 11)	34	Range 14 – 16 years (<i>M</i> and <i>SD</i> unreported)	Semi-structured Interviews	Gender differences in self-efficacy were evident across different subjects. Test anxiety was reportedly caused by fear of failure, high career aspirations, pressure from teachers, and low self-efficacy. Preparation, self-confidence, and an expectation of success appeared to be protective factors against test anxiety.
Putwain and Aveyard [82]	English students in their final year (Year 11)	270	<i>M</i> = 15.01 (<i>SD</i> = 0.89)	Revised Test Anxiety Scale Academic Buoyancy Scale	At low levels of worry, students with higher perceived control performed better on the exam, relative to students with low perceived control.

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				Motivation & Engagement Scale Study Management and Academic Results Test Examination grades (GCSE)	At high levels of worry, level of perceived control did not influence exam performance.
Putwain and Daly [5]	English secondary school students (grades 9, 10, 11)	2435	Range 14 – 16 years (<i>M</i> and <i>SD</i> unreported)	Revised Test Anxiety Questionnaire Friedben Test Anxiety Scale	16.4% of all students reported high levels of test anxiety. Girls were more likely than boys to be highly test anxious, worried, tense, and concerned about being negatively judged by others.
Putwain and Symes [89]	English secondary school students (grade 11)	273	<i>M</i> = 15.5, (<i>SD</i> = 0.45)	Teacher's Use of Fear Appeals Questionnaire Revised Test Anxiety Questionnaire Achievement Goals Questionnaire Exam performance	Students who perceived teachers' fear appeals as threatening performed worse in the high-stakes exam. Students with a mastery-approach achievement goal performed better on the exam than students with a performance-avoidance achievement goal.
Putwain and Symes [103]	English secondary school students (grades 10, 11)	132	Grade 10 <i>M</i> = 14.7 (<i>SD</i> = 0.5) Grade 11 <i>M</i> = 15.5 (<i>SD</i> = 0.5)	Teacher's Use of Fear Appeals Questionnaire Revised Test Anxiety Scale Achievement Goals Questionnaire	Students who perceived teachers' fear appeals as threatening showed higher test anxiety.
Putwain et al. [79]	English high school students (grade 11)	244	<i>M</i> = 15.6 (<i>SD</i> = .49)	Revised Test Anxiety Scale Children's Negative Cognitive Error Questionnaire Grade on GCSE examinations	Higher test anxiety was related to academic cognitive distortions. Students with cognitive distortions also obtained a lower grade in GCSE examinations.

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Putwain et al. [87]	English high school students (grades 10 and 11)	298	$M = 14.9$ ($SD = .70$)	Revised Test Anxiety Questionnaire Coping with Pre-exam Anxiety and Uncertainty Academic Buoyancy Scale	Students with greater academic buoyancy reported lower test anxiety. Highly test anxious students tended to use more social support and avoidance coping strategies.
Putwain et al. [10]	English secondary school students (grade 11)	705	$M = 15.03$ ($SD = 0.58$)	Revised Test Anxiety Scale Academic Buoyancy Scale Scores on GCSE examinations	Girls had higher test anxiety and academic buoyancy than boys. No gender differences in exam performance. Academic buoyancy was a protective factor against test anxiety and enabled better exam performance.
Putwain et al. [81]	English secondary school students (grade 11)	325	$M = 15.3$ ($SD = 0.61$)	Revised Test Anxiety Scale Academic Buoyancy Scale Coping with Pre-exam Anxiety and Uncertainty Scale GCSE Scores	Higher test anxiety was associated with poorer exam performance. Students with lower academic buoyancy were more likely to be test anxious and then perform poorly on their exams.
Rahafar et al. [60]	Iranian high school students (final year)	158	$M = 17.5$ ($SD = 0.51$)	Grade Point Average Reduced morningness-eveningness questionnaire NEO five-factor inventory – Conscientiousness subscale Test Anxiety Inventory	Students with higher levels of conscientiousness had lower test anxiety and higher GPAs, and were more likely to be “morning-type” people. Females had higher test anxiety than males.
Riekie et al. [102]	Australian students in year 11	618	Range 16 – 17 years	Interviews	If students felt supported by teachers and their peers and valued at the school, they had a greater sense of resilience.

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			(<i>M</i> and <i>SD</i> unreported)	<p>Index of Community Socio-Educational Advantage</p> <p>What is happening in this school questionnaire</p> <p>Wellbeing, resilience, and moral identity questionnaire</p> <p>WHO-Five Wellbeing Index</p> <p>Resilience scale (adapted)</p> <p>Moral Identity Scale</p>	<p>School connectedness had a direct relationship on student wellbeing. School connectedness had the most significant impact on student resilience.</p>
Ringeisen and Buchwald [61]	German high school students in their final year	82	Range 17 – 20 years (<i>M</i> = 18.06, <i>SD</i> = 0.81)	<p>German test anxiety inventory</p> <p>Negative / positive state emotion</p> <p>T1 (3 weeks before final exam), T2 (three weeks after exam).</p>	<p>Test anxiety was strongly related to state threat emotions before the exam but not after.</p>
Robinson et al. [9]	Australian high school students (grade 12)	195	Range 16 – 19 years (<i>M</i> = 17.74, <i>SD</i> = 0.44)	<p>Adolescent Resilience Questionnaire</p> <p>Subjective Stress</p> <p>Depression Anxiety Stress Scales – 21</p> <p>Measure of Sleep</p>	<p>24% boys & 36% girls reported severe or very severe symptoms of depression, anxiety, and stress (more than twice that of the normative sample). Girls had greater anxiety than males. Many students had poor sleep. Resilience and freedom from negative cognitions were protective factors.</p>
Sarason [71]	American high school students (grades 11 and 12)	460	Unreported	<p>Test Anxiety Scale (TAS)</p> <p>Need for Achievement Scale</p> <p>School and College Ability Test</p>	<p>Higher test anxiety was associated with lower academic performance, and this relationship was stronger for females.</p>

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Sari et al. [62]	Turkish high school students (preparing for university entrance exams)	724	Range 16 – 19 years (<i>M</i> and <i>SD</i> unreported)	Sociodemographic questionnaire Rosenberg Self-Esteem Scale Revised Test Anxiety Scale	Females had higher test anxiety than males. Students with higher self-esteem reported lower levels of test anxiety.
Schmidt et al. [76]	Italian students in their final year of high school	610	Range 18 – 23 years (<i>M</i> = 18.7, <i>SD</i> = 0.90)	Appraisals of high school exit exam (18 items developed by authors) Intensity of emotions (18 items developed by authors) Emotion regulation strategies (18 items adapted from existing questionnaires)	Three weeks before exams the strongest emotions were anxiety, fear, hope. Feeling anxious/fearful was positively correlated with frustrated/powerless. Feeling anxious/fearful or frustrated/powerless was associated with evaluating the final exam as important and ability to cope as low. Students who reported higher anxiety/fear reported a greater tendency to focus on the exam and to use drugs. Students who reported more positive emotions used more reappraisal and problem-focused coping strategies.
Segool et al. [70]	USA students in year 11 (required to take a standardised high school exam)	1,248	Unreported	Survey questions (developed by authors) about self-efficacy, special education status, academic achievement, minority status, socio-economic status, gender, school climate, career goals, and test importance. Friedben test anxiety scale	Females reported higher test anxiety than males. Students with lower self-efficacy reported higher test anxiety. Students who perceived higher teacher & peer anxiety reported higher test anxiety. Students with lower academic achievement had higher test anxiety.
Smith and Sinclair [22]	Australian high school students (grades 11, 12)	130	Unreported	Depression Anxiety Stress Scales – 21 Patterns of Adaptive Learning Scale	> 40% of Year 12 students and 25% of Year 11 students had symptoms of depression, anxiety and/or stress above the normal range.

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					Girls had greater anxiety, depression, and stress symptoms than males. Boys with a performance-avoidance goal orientation were more anxious, depressed, and stressed. High self-efficacy was protective against stress, anxiety, & depression in girls.
Smith et al. [32]	Australian high school students (grade 12)	63	Unreported	Patterns of Adaptive Learning Survey Depression Anxiety Stress Scales	As final exams drew nearer, students became significantly more anxious and depressed, used more self-handicapping and performance-avoidance strategies, and their self-efficacy decreased. Girls had higher anxiety and stress than boys. Boys used more performance-avoidance and self-handicapping strategies than girls. Students with a performance-approach goal combined with limited use of self-handicapping strategies had more stress.
Smyth and Banks [77]	Irish students in the Junior Certificate exam year and Leaving Certificate exam year	12 case-study schools	Unreported	Interviews (k = 47 lower secondary, k = 53 upper secondary) Questionnaire survey (n = 897 lower secondary, n = 748 upper secondary)	Students preparing for final Leaving Certificate reported “particularly high levels of pressure and stress” Students preparing for the Junior and Leaving Certificate both reported they “wanted teachers who were patient and willing to explain things clearly”
Sud & Sujata [80]	Indian high school students (grade 11)	200	Unreported	Self-Handicapping Questionnaire Test Anxiety Inventory-Hindi Study Habit Inventory Academic performance (grades)	Higher test anxiety was associated with greater worry, emotionality, self-handicapping, and with poorer study habits. The cognitive component of test anxiety (worry) was negatively related to academic performance.

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Ünal-Karagüven [55]	Turkish senior high school students	336	Range 17 – 20 years ($M = 18$)	Demographics questionnaire Academic Motivation Scale Test Anxiety Inventory Communal Mastery Scale	Students with higher perceived academic achievement had lower test anxiety. Test anxiety was significantly negatively correlated with communal mastery (believing that one can achieve things with the help of others), having siblings, and perceived academic achievement.
von der Embse and Witmer [51]	American high school students (grade 11)	1134	Unreported	Friedben Test Anxiety Scale Demographics Exam performance	Higher test anxiety was associated with poorer exam performance.
Wilkinson-Lee et al. [26]	American school students (grades 6 to 12)	4,198	Unreported	Emotional distress (Modified Depression Scale CDC Compendium) Family obligations (CSAP Core Measures) School connectedness (CDC Classroom Climate Scale) Academic achievement (grades)	Students in grades 11 and 12 were significantly more distressed than students in earlier grades (6, 7, 8 and 9). Students in higher grades had lower school connectedness.
Yeni Palabiyik [33]	Turkish students in their final three years (Years 10, 11, and 12)	62	Unreported	Maslach Burnout Inventory-student survey Quick Placement Test	For 12 th grade students, emotional exhaustion was significantly higher than overall burnout. Non-significant increase in burnout levels from grade 10 to 12. Male 12 th grade students had the highest level of burnout.
Yildirim et al. [47]	Turkish students preparing for university entrance examinations	984	Range 17 – 21 years ($M = 18.4$, $SD = 2.3$)	Beck Depression Inventory (BDI) Personal information questionnaire (demographics)	Depressive symptoms were significantly greater in females than males. Students with lower academic GPA's had higher levels of depressive symptoms.

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1 Table 2. Quality ratings of articles included in the review.

Quantitative Studies	Focused Issue	Adequate Sample	Unlikely Bias	Appropriate Design	Adequate Analysis/Interpretation
Akca [23]	Yes	Yes	Yes	No	Unclear
Akcoltekin [95]	Yes	Unclear	Unclear	Unclear	Unclear
Astill et al. [96]	Yes	Yes	Unclear	Yes	Yes
Aysan et al. [66]	Yes	Yes	Yes	Yes	Yes
Byrne [53]	Yes	Yes	Yes	Yes	Yes
Chin et al. [69]	Yes	Yes	Yes	Yes	Yes
Christensen [65]	Unclear	Unclear	Unclear	Unclear	Unclear
Chukwuorji & Nwonyi [54]	Yes	Yes	Yes	Yes	Yes
Cunha & Paiva [27]	No	Yes	Yes	Unclear	Unclear
Daly et al. [115]	Unclear	No	Yes	No	No
Einstein et al. [29]	Yes	Yes	Yes	Yes	Yes
Erzen & Odaci [56]	Yes	Yes	Yes	Yes	Yes
Flett et al. [85]	Yes	Yes	Yes	Yes	Yes
Guner-Kucukkaya & Isik [24]	Yes	Yes	No	No	No
Hodge et al. [21]	Yes	Yes	Yes	Yes	Yes
Karatas et al. [57]	Yes	Yes	Yes	No	No
Kouzma & Kennedy [74]	No	Yes	No	No	No
Kouzma & Kennedy [94]	Yes	Yes	Unclear	No	No
Lay et al. [30]	No	Yes	Yes	Yes	Unclear
Lee & Larson [48]	Yes	Yes	Yes	Yes	Yes
Leonard et al. [6]*	Yes	Yes	Unclear	Yes	Yes
Lin & Yusoff [43]	Yes	Yes	Yes	Yes	Yes
Lushington et al. [59]	Yes	Yes	Unclear	Unclear	Yes
Manley & Rosemier [64]	Unclear	Yes	Yes	Yes	Unclear
McCann & Meen [72]	Yes	Unclear	Yes	No	No
McGraw et al. [3]	Yes	Yes	Yes	Yes	Yes
Moulds [25]	Yes	Yes	Unclear	Yes	Yes
Peluso et al. [31]	Yes	Yes	Yes	Yes	Yes

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Putwain [49]	Yes	Yes	Yes	No	No
Putwain [50]	Yes	Yes	Yes	Unclear	Yes
Putwain [52]	Yes	Yes	Yes	Yes	Yes
Putwain & Aveyard [82]	Yes	Yes	Yes	Yes	Yes
Putwain & Daly [5]	Yes	Yes	Yes	Yes	Yes
Putwain & Symes [89]	Yes	Yes	Yes	Yes	Yes
Putwain & Symes [103]	Yes	Yes	Yes	Yes	Yes
Putwain et al. [10]	Yes	Yes	Yes	Yes	Yes
Putwain et al. [79]	Yes	Yes	Yes	Yes	Yes
Putwain et al. [81]	Yes	Yes	Yes	Yes	Yes
Putwain et al. [87]	Yes	Yes	Yes	Yes	Yes
Rahafar et al. [60]	No	Yes	Yes	No	No
Riekie et al. [102]	Yes	Yes	Unclear	Unclear	No
Ringeisen & Buchwald [61]	Yes	Yes	Unclear	Unclear	Unclear
Robinson et al. [9]	Yes	Yes	Unclear	Yes	Yes
Sarason [71]	Yes	Unclear	Unclear	No	No
Sari et al. [62]	Yes	Yes	Yes	Yes	Yes
Schmidt et al. [76]	Unclear	Unclear	No	Unclear	No
Segool et al. [70]	No	Yes	No	Unclear	No
Smith & Sinclair [22]	Yes	Yes	Yes	Yes	Yes
Smith et al. [32]	Yes	Yes	Yes	Yes	Yes
Smyth & Banks [77]*	Unclear	Yes	Unclear	Unclear	Unclear
Sud & Sujata [80]	Yes	Unclear	Yes	Yes	Yes
Ünal-Karagüven [55]	Unclear	Yes	Yes	Unclear	Unclear
von der Embse & Witmer [51]	Yes	Yes	Yes	Yes	Yes
Wilkinson-Lee et al. [26]	Yes	Yes	Unclear	Yes	Yes
Yeni Palabiyik [33]	Yes	Yes	Yes	Yes	Yes
Yildirim et al. [47]	Yes	Yes	Unclear	Yes	Unclear
Qualitative Studies	Clear Aims	Adequate Sample	Appropriate Method	Unlikely Confounds	Adequate Analysis/Interpretation
Çirak [73]	Yes	Yes	Yes	Unclear	Yes
Leonard et al. [6]*	Yes	Yes	Yes	Yes	Yes
Putwain [8]	Unclear	Yes	Yes	Unclear	Yes

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Putwain [75]	Yes	Yes	Yes	Yes	Yes
Smyth & Banks [77]*	Unclear	Yes	Yes	Unclear	Yes

1 Note: * These studies had both quantitative and qualitative results. Yes = met criterion, No = didn't meet criterion, Unclear = unclear if criterion was met.