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The relationships between school climate and adolescent mental health and wellbeing: A systematic literature review



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ABSTRACT

Promoting adolescent mental health is a global priority, and schools have an important role to play. This systematic mixed- methods literature review examined relationships between the psychosocial school climate and adolescents' mental health, mapping the scope and quality of recent research. Forty-eight relevant primary studies published in 2000–2017 were identified and analysed. These studies highlight associations between the school climate and student mental health, although the lack of experimental and longitudinal studies precludes causal claims. Future research directions include: further investigation of the roles of school safety and the psychosocial academic environment on adolescent mental health; greater consistency in the conceptualisation of both school climate and mental health; and clarification of the influence of demographic variables on individual students' experiences.

1. Introduction

Improving people's mental health and wellbeing has been identified as one of the most important public health issues of the present day (Kieling et al., 2011; Knifton & Quinn, 2013). Increasing evidence supports the significant impact of mental health and wellbeing on emotional, social, economic, quality of life, physical health, and productivity outcomes (for overviews, see Herrman, Saxena, & Moodie, 2005; World Health Organization, 2001). As such, the World Health Organization (2013, p. 6) has stressed that "there is no health without mental health", and both the World Health Organization (1946) and the United Nations (1966) have affirmed that experiencing the best possible mental health is a universal human right.

Despite the importance of mental health and wellbeing, all is not 'well' for adolescents. Longitudinal data shows an increasing prevalence of mental health problems among youth (Mission Australia, 2016; Twenge, 2015; UK Office for National Statistics, 2017) while young people's wellbeing is either steady (UK Office for National Statistics, 2017; UNICEF, 2013) or decreasing (The Prince's Trust, 2017). Globally, up to 20% of adolescents have mental health problems that affect their life functioning (World Health Organization, 2001, 2005).

To improve adolescent mental health and wellbeing, the World Health Organization (2014, p. 8) has called for a "coordinated response from many sectors," noting that, "among all the sectors that play critical roles in adolescent health, *education is key*" (p. 8, emphasis added; see also Drew, Funk, Pathare, & Swartz, 2005; Mulloy & Weist, 2013; World Health Organization, 2009). There are several reasons for this. First, the developmental processes associated with many mental health problems, and the high proportion of lifetime mental health issues that first appear during adolescence, suggest that early prevention, intervention, and care are important (Collins et al., 2011; Kim-Cohen et al., 2003; World Health Organization, 2014). Second, aspects of young people's social environments (such as their school environments) can be deliberately leveraged and modified, to influence health-related outcomes – even to

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the extent of offsetting the effects of other risk factors such as poverty or deprivation (Currie et al., 2012). Finally, the large amount of time that students spend in school makes schools a practical context for reaching young people for prevention, intervention, and care (Mulloy & Weist, 2013; Soutter, 2011).

Given this backdrop, then, the climate created at a school has the potential to promote adolescent mental health and wellbeing. To examine whether this was the case, in the form of a systematic review, the study reported in this article examined the existing evidence base related to the relationships between school climate and adolescent mental health and wellbeing. Incorporating research involving any research method or research design, the review aimed to:

1. Examine the extent, origins, quality, and findings of the recent research base;
2. Analyse the specific constructs that have been used to draw conclusions regarding the relationships between school climate and adolescent mental health and wellbeing; and
3. Identify directions for future research.

Given our interest in mapping research across multiple designs and methods and, further, given the range of variables involved in the overarching constructs of school climate and mental health, meta-analysis approaches were not considered appropriate for this review.

The findings of this review could inform ongoing research relating to the impact of school climate on adolescent mental health and wellbeing. The findings may also indicate ways in which school climates can enhance students' mental health and wellbeing – and, consequently, a range of additional outcomes including academic achievement (Adelman & Taylor, 2010; World Health Organization, 2014).

2. Background

2.1. Definitions

Across the associated fields, none of the key constructs relevant to this study – school climate and adolescent mental health and wellbeing – is interpreted or used consistently (Anderson & Graham, 2016; Gillett-Swan, 2014; Goldman & Grob, 2006; Keyes, 2005; Kutsyuruba, Klinger, & Hussain, 2015). School climate is sometimes considered to incorporate constructs such as the physical or natural environment and the quality of teaching and learning (Cohen, 2006; Loukas, 2007; Wang & Degol, 2016); however, other definitions of school climate consider psychosocial characteristics only (Brookover et al., 1978). For the purpose of this study, *school climate* was defined as encompassing the norms, expectations, and beliefs that contribute to creating a psychosocial environment that determines the extent to which people feel physically, emotionally, and socially safe (Brookover et al., 1978; Cohen, McCabe, Michelli, & Pickeral, 2009). As such, school climate was considered to be synonymous with *school environment* (or *school-level environment*) but distinct from classroom-level climate.

In some literature, the term 'mental health' refers only to the presence or absence of mental problems and disorders (Keyes, 2005); however, it has been demonstrated that, in fact, "mental health and mental illness are not opposite ends of a single continuum; rather, they constitute distinct but correlated axes" (Keyes, 2005, p. 546). Wellbeing is also differentially interpreted in different fields and research disciplines (Camfield, Streuli, & Woodhead, 2009; Soutter, 2011) and by different cultural or social groups (Manderson, 2005). Further, the relationship between mental health and wellbeing is poorly-defined: Sometimes wellbeing is viewed as a component of mental health (Hanlon & Carlisle, 2013; Huppert, 2005; Keyes, 2005), yet, elsewhere, mental health is viewed as a component of overall well-being (Lehtinen, Ozamiz, Underwood, & Weiss, 2005; World Health Organization, 1946).

For the purpose of our study, delineating the distinctions or hierarchical relationships between mental health and wellbeing was not of primary importance, particularly since our interest lay with affective or psychosocial (rather than physical) wellbeing. As such, the constructs of mental health and wellbeing were used together to ensure that the review considered a range of aspects of adolescents' affective states, including positive mental health, mental health disorders, and mental health problems (that is, issues not sufficiently severe to be formally diagnosed as disorders; Keyes, 2005) as well as subjective and psychosocial wellbeing (Diener, Oishi, & Lucas, 2003; Mulloy & Weist, 2013). For simplicity in the remainder of this article, we use the term 'mental health' to encompass all of these constructs.

2.2. Theoretical background

The current study was particularly informed by an ecological perspective on adolescent development and a health promotion stance. Whilst these two theoretical positions are described briefly in this section, we note that a range of theoretical perspectives can contribute to research in the areas of school climate and mental health. For more detailed discussions, we refer readers to the work of Wang and Degol (2016) for school climate and that of Herrman et al. (2005) and Camfield et al. (2009) for mental health.

Highlighting the role of schools in promoting adolescent mental health is consistent with an ecological perspective on adolescent development (Bronfenbrenner, 1979; Zubrick & Kovess-Masfety, 2005). Such a perspective recognises that adolescents are influenced by a complex interplay of contextual factors (Garbarino, 2014; World Health Organization, 2014). Bronfenbrenner's (1979) ecological model depicts a nested series of systems with which people interact; Fig. 1 shows how these systems range from the most immediate (microsystems) to the broadest (macrosystems). Schools (along with other microsystems, including the family) are among adolescents' microsystems – their most immediate developmental contexts – and consequently exert the greatest influence on

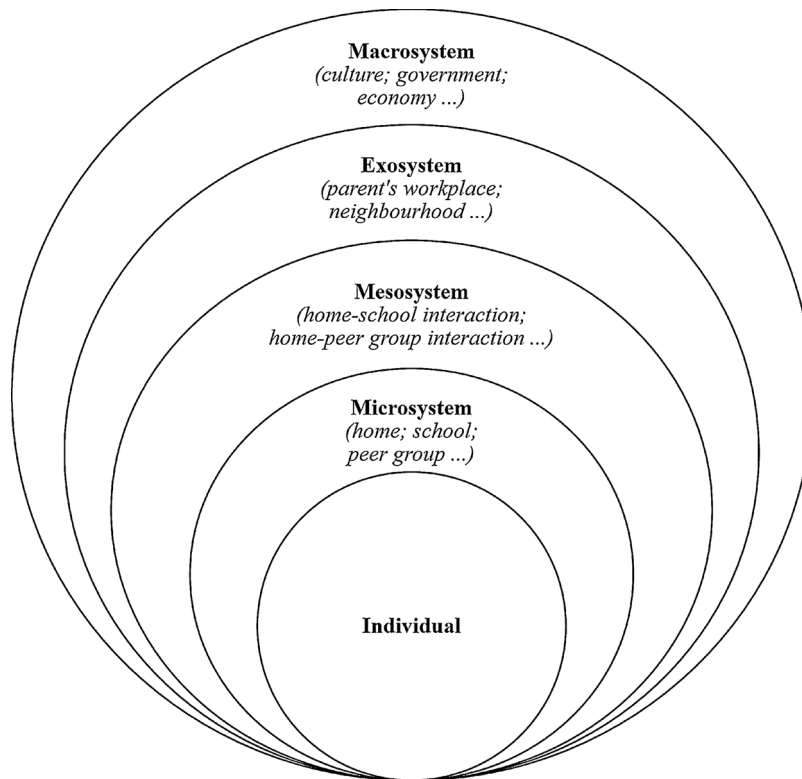


Fig. 1. Ecological model of adolescent development (based on Bronfenbrenner, 1994; Garbarino, 2014).

adolescents' development (Atkins, 2010; Bronfenbrenner, 1979).

From a public health perspective, modern health promotion philosophies (including, but not limited to, *mental health*) emphasise the development of positive health-related habits and behaviours across the whole population (Mittelmark, Peska, O'Byrne, & Tang, 2005; Tones, 2005; World Health Organization, 1986). The aim of such efforts is to shift the entire (normally-distributed) population in a positive direction, leading to reductions in negative outcomes and increases in positive outcomes. A health promotion stance, therefore, suggests that mental health initiatives in schools should not focus only on diagnosing and treating individual cases of mental *illness*; but also involve significant investment in approaches that may result in improvements in the mental health of all students, regardless of their pre-existing state of health (Adelman & Taylor, 2010; Huppert, 2004, 2005; Reinke, Stormont, Herman, Puri, & Goel, 2011; Weare & Nind, 2011; Wells, Barlow, & Stewart-Brown, 2003; World Health Organization, 2009). Efforts to promote adolescent mental health through improving the school climate constitute one such school-wide approach.

2.3. Past reviews of literature related to school climate and adolescent mental health

The study reported in this article brought together the fields of school climate and adolescent mental health. As such, literature related to both of these fields, as well as literature related to the intersection of these fields, informed the study. This section examines past reviews of literature (published since the year 2000) to provide pertinent background information and to explain how our review departs from these, thereby clarifying the distinctiveness of our study. Specifically, we examine:

- Reviews of literature related to school climate;
- Reviews of literature related to adolescent mental health; and
- Reviews of literature related to the links between school climate and adolescent mental health.

In terms of school climate, four past literature reviews (summarised in Table 1) all found clear evidence that aspects of the school climate are associated with a range of adolescent affective, behavioural, academic, health-related, and interpersonal outcomes (Cohen & Geier, 2010; Cohen et al., 2009; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013; Wang & Degol, 2016). However, a number of concerns were noted in these reviews. In terms of practice, Cohen et al. (2009) found that, to date, insufficient attention has been given to school climate. Many students do not feel safe at school (Cohen & Geier, 2010), yet adults typically underestimate the extent to which students feel this way (Thapa et al., 2013). There is, as yet, no consensus as to the key aspects of school climate that affect student outcomes (Cohen & Geier, 2010; Thapa et al., 2013; Wang & Degol, 2016), and much school climate research lacks explicit theoretical underpinnings (Thapa et al., 2013). There are calls for increased diversity (Thapa et al., 2013) and greater rigour

Table 1
Analysis of recent reviews of literature related to school climate.

Review	Scope	Key findings relevant to the present study	Relevant areas identified for further work
Cohen et al. (2009)	<ul style="list-style-type: none"> ● Narrative review and history of the field ● Not adolescent-specific ● No restriction on date or location of research 	<ul style="list-style-type: none"> ● Aspects of school climate are associated with a range of student outcomes (affective, behavioural, academic, and interpersonal). ● Positive school climates are associated with the effectiveness of risk prevention and health promotion efforts. ● To date, schools, educational authorities, and teacher education programmes have not given sufficient attention to school climate. 	<ul style="list-style-type: none"> ● Understanding why school climate has these effects. ● Reducing the research-practice gap.
Cohen and Geier (2010)	<ul style="list-style-type: none"> ● Narrative review and history of the field ● Not adolescent-specific ● No restriction on date or location of research 	<ul style="list-style-type: none"> ● Improved school safety promotes learning and healthy development, yet many students do not feel safe (physically, socially, emotionally or intellectually) at school. ● Positive relationships with peers and adults at school are associated with adolescent health, academic, behavioural, and affective outcomes. 	<ul style="list-style-type: none"> ● Developing consensus regarding the key sub-constructs that contribute to school climate.
Thapa et al. (2013) ^a	<ul style="list-style-type: none"> ● Literature from 1970 onwards ● No restriction on location of research ● Not adolescent-specific 	<ul style="list-style-type: none"> ● School climate has a profound impact on students' mental and physical health and can mitigate the negative effects of socioeconomic status in these respects. ● Poor levels of school safety jeopardise students' wellbeing, school engagement, and academic achievement. However, adults typically underestimate the severity of school safety issues. ● Positive student-teacher and student-student relationships are associated with reduced behavioural problems and mental health issues, and improved self-esteem, school engagement, and academic achievement. ● School connectedness (students' sense of belonging and being cared for by those at school) is associated with adolescent health and academic outcomes ● While teachers tend to focus on classroom-level climate, students are more sensitive to school-level factors. 	<ul style="list-style-type: none"> ● Developing consensus regarding the key sub-constructs that contribute to school climate. ● Wider use of explicit models and theoretical frameworks for school climate, and more consistent conceptualisations of school climate. ● Greater diversity in research designs, including more longitudinal studies. ● Examining how individual, group, and organisational (climate) factors shape and predict violent behaviour in schools.
Wang and Degol (2016)	<ul style="list-style-type: none"> ● No restriction on date or location of research ● Not adolescent-specific 	<ul style="list-style-type: none"> ● Scholars agree that school climate is multidimensional, but there is no consensus on the specific sub-constructs that comprise school climate. Further, many studies fail to provide empirical or theoretical justification for their selection of sub-constructs to measure school climate. ● School climate affects adolescents' academic, behavioural, and psychological outcomes, making school climate an important influence on adolescent development. ● The overall research base is unbalanced, with ample research supporting some associations and limited research related to other associations. 	<ul style="list-style-type: none"> ● Developing consensus regarding the key sub-constructs that contribute to school climate. ● More consistent conceptualisations of school climate. ● More studies to demonstrate the individual contributions of each sub-construct of school climate, and the interactions between those sub-constructs. ● More rigorous and complex research designs.

^a Another version of this paper was published as Thapa, Cohen, Guffey, and Higgins-D'Alessandro (2012). Due to the similarity of the findings of these two papers, they are not examined separately in this table; we have chosen to report based on the peer-reviewed 2013 version of the paper.

and complexity (Wang & Degol, 2016) in research designs, as well as for further investigation of how distinct elements of school climate affect student outcomes both individually and in combination (Wang & Degol, 2016), and how these elements are complemented by individual- and group-level factors (Thapa et al., 2013). Given this background, our review makes a unique contribution by examining both the nature and the findings of the existing literature on how various sub-constructs of school climate influence student mental health.

In terms of adolescent mental health, four prior reviews (summarised in Table 2) all showed that school-wide efforts can improve adolescent mental health (Barry, Clarke, Jenkins, & Patel, 2013; Harden et al., 2001; Kieling et al., 2011; Wells et al., 2003). Both Barry et al. (2013) and Wells et al. (2003) found that the most effective efforts were long-term and involved promotion of positive mental health for the whole school population, although Kieling et al. (2011) noted the need for targeted interventions for at-risk or disordered students as well as long-term, whole-school efforts. These reviewers called for: further work on approaches to promoting positive mental health (Wells et al., 2003); further work using risk and protective factors to inform interventions (Kieling et al., 2011), including approaches that centre on the quality of students'

relationships with peers and teachers (Harden et al., 2001); increased efforts by those in non-health sectors (such as education) to

Table 2
Analysis of recent reviews of literature related to child or adolescent mental health.

Review	Scope	Key findings relevant to the present study	Relevant areas identified for further work
Barry et al. (2013)	<ul style="list-style-type: none"> ● Mental health promotion for young people ● Systematic review of interventions conducted since 2000 ● Restricted to low- and middle-income countries ● Both school and community settings ● Not adolescent-specific 	<ul style="list-style-type: none"> ● School- and community-based interventions can have significant positive effects on children and adolescents' mental health and wellbeing. ● Comprehensive, positive mental health promotion interventions were more effective than interventions that targeted particular problems. ● Interventions of longer duration are more effective than short-term efforts. 	<ul style="list-style-type: none"> ● Clarifying possible gender and age effects on outcomes of mental health interventions.
Harden et al. (2001)	<ul style="list-style-type: none"> ● Barriers and facilitators of good mental health among young people ● Particular focus on suicide, self-harm, depression, self-esteem, and coping strategies ● Restricted to studies of interventions and systematic reviews of such studies ● Most (72%) of the reviewed interventions occurred in school settings ● No restriction on date of research 	<ul style="list-style-type: none"> ● Individual-level factors were more commonly researched than community- or society-level factors. ● Some, but not all, interventions were successful in improving young people's mental health. ● Little research privileged young people's perspectives and opinions. ● Young people reported a wide range of concerns related to mental health, but interventions did not always align with these areas of concern. ● Support at different levels (classroom, school, home, community, society) is important for promoting young people's mental health and preventing mental ill-health. 	<ul style="list-style-type: none"> ● Interventions that address students' academic achievement, engagement in school, relational support, and experiences of violence and bullying. ● Research methods that centre on young people's perspectives and views. ● Interventions that improve social relations between teachers and students. ● Interventions that centre on supportive peer relationships among young people. ● Interventions that aim to modify the school environment in order to promote student mental health.
Kieling et al. (2011)	<ul style="list-style-type: none"> ● Mental health of children and adolescents ● Systematic review ● Emphasis on low- and middle-income countries, or disadvantaged populations in higher-income countries ● Restricted to randomised controlled trials and non-randomised experimental studies ● Literature published since 2000. 	<ul style="list-style-type: none"> ● Preventative interventions that target overall child development can have positive effects on mental health and wellbeing specifically. ● School-based interventions can enhance children and adolescents' mental health. ● Holistic recognition of the indivisibility of mental and physical health is crucial. ● Child and adolescent mental health services should not be restricted to the health sector; other sectors including education, social care, and criminal justice also have important roles to play. ● Both targeted interventions (for at-risk or disordered children and adolescents) and broader psychosocial strategies (for all children and adolescents) are needed. ● Investments in the mental health of children and adolescents yield high health, economic, and psychosocial returns. 	<ul style="list-style-type: none"> ● Further investigation of risk and protective factors, based on a developmental approach, in order to inform interventions. ● Increased efforts by those outside the health sector (e.g. education sector) to partner in promoting child and adolescent mental health.
Wells et al. (2003)	<ul style="list-style-type: none"> ● Mental health promotion in schools ● Systematic review ● Restricted to randomised controlled experimental studies ● Literature published before 1999 ● Not adolescent-specific 	<ul style="list-style-type: none"> ● Experimental results demonstrate that it is possible to have a positive impact on students' mental health through school-based efforts. ● The most successful programmes involved promotion of positive mental health (rather than preventing mental illness) and lasted for extended periods of time (one year or longer). ● Few studies met the stringent inclusion criteria due to the difficulty of conducting controlled experimental studies in school contexts. 	<ul style="list-style-type: none"> ● More comprehensive approaches to promoting positive mental health

contribute to promoting child and adolescent mental health (Kieling et al., 2011); further research into whether modifying aspects of the school environment can contribute to adolescents' mental health (Harden et al., 2001); a greater emphasis on adolescents' own perspectives within research on adolescent mental health promotion (Harden et al., 2001); and further clarification of the influence of gender and age on the outcomes of mental health interventions (Barry et al., 2013). Our study offers contributions in all of these areas.

No past reviews were located that specifically examined the influence of school climate on adolescent mental health. As such, our review makes a distinctive contribution to the literature base. However, two further reviews (examined in Table 3) contributed useful insights. The first, by Jamal et al. (2013), considered how school climate influenced student health (not only mental health). The second, by Kutsyuruba et al. (2015), reviewed

literature related to school climate, student achievement, and wellbeing; however, the review's authors did not directly examine

Table 3

Analysis of recent reviews of literature related to the relationships between school climate and mental health.

Review	Scope	Key findings relevant to the present study	Relevant areas identified for further work
Jamal et al. (2013)	<ul style="list-style-type: none"> ● School climate and student health (broadly – not only mental health) ● Systematic review and meta-ethnography ● No restriction on date or location of research ● Not adolescent-specific 	<ul style="list-style-type: none"> ● Risk behaviours provide status, bonding, agency, or protection (through withdrawal from the school environment) for adolescents who feel marginalised or unsafe at school. Such behaviours are concentrated in unsupervised ‘hotspots’ around the school, as teachers tend to focus on classroom spaces and activities. ● Positive relationships with teachers promote student wellbeing and limit risk behaviour. However, in many schools, policies and school organisation constrain these relationships. ● A lack of acknowledgement of student voice undermines school rules and, in some cases, leads to increased health-risk behaviour. 	<ul style="list-style-type: none"> ● Further examination and theorisation of how school climate affects mental health specifically. ● More research focusing on whole-school populations rather than singling out adolescents in the most extreme situations.
Kutsyuruba et al. (2015)	<ul style="list-style-type: none"> ● School climate, student achievement, and wellbeing ● Systematic review ● North America and Europe only ● Sources published between 1963 and 2013 ● Not adolescent-specific 	<ul style="list-style-type: none"> ● Positive relationships promote positive perceptions of school safety and reduce antisocial behaviour. ● Student involvement in school decision-making promotes school connectedness, which in turn predicts health-related, behavioural, and academic outcomes. ● Acknowledging and responding to students’ mental health and wellbeing needs improves the school climate 	<ul style="list-style-type: none"> ● Research that examines multiple sub-constructs of school climate ● Research that considers the multiple contexts of students’ adolescent experiences (classroom, school, peer group, neighbourhood, etc.)

how school climate affected student mental health (in this case, conceptualised as ‘wellbeing’), arguing, instead, that “acknowledging and respectfully responding to the mental health needs and well-being of students ... improves the social and academic dimensions of school climate” (p. 122). Both of these reviews examined literature related to school-aged children that stretched back over many decades; the review by Kutsyuruba et al. (2015) was predominantly restricted to studies from North America and Europe. Our study is, therefore, unique given our specific focus on literature relating to adolescents as well as our use of international literature published since the year 2000 (thereby providing a more up-to-date summary of research findings).

Table 3 also shows that the reviews by Jamal et al. (2013) and Kutsyuruba et al. (2015) both highlighted the importance of two aspects of the school climate for promoting student mental health and reducing risk (including health-risk) behaviour; these being, positive relationships within the school and opportunities for students to have a voice and contribute to decision-making at school. However, Jamal et al. (2013) called for further examination and theorisation of how school climate affects students’ mental health specifically, as well as further research on whole-school (rather than targeted) health promotion efforts. Finally, Kutsyuruba et al. (2015) affirmed the need for research that examines the roles of distinct sub-constructs of school climate. Our review contributes in each of these respects.

It is noteworthy that none of the past reviews reported in this section involved meta-analysis techniques. In our view, this finding reflects the nature of research in the areas of both school climate and mental health: Where research topics involve broad constructs that each encompass a large number of distinct variables, where research methods and designs are varied, or where the extent of existing research is not yet large, meta-analytic techniques are not appropriate (Cooper, Patall, & Lindsay, 2013; Crano & Brewer, 2002). The review reported in this article encountered the same factors and, therefore, involved a mixed-methods review including frequency analyses and a narrative synthesis, as reported in the next section.

3. Methods

The study reported in this article was informed by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines, which detail 27 items that should be reported to demonstrate the quality and transparency of systematic literature reviews (Liberati et al., 2009; Moher, Liberati, Tetzlaff, & Altman, 2009). Early and ongoing consideration of the items on the PRISMA reporting checklist ensured that the present study was designed, conducted, and reported according to recognised best practices for systematic reviews. Given that this was a literature review and not a primary study, adhering to these published guidelines was considered an appropriate way to ensure the ethical rigour of the study.¹

3.1. Inclusion criteria

The primary criteria for the selection of studies for this review were as follows: *Studies should be peer-reviewed journal articles,*

¹ Although this review was systematic in nature and conformed to the PRISMA guidelines, a formal review protocol was not published and the review was not registered.

published since the year 2000, reporting primary research that related one or more aspects of school climate to one or more aspects of the mental health of adolescents (using the inclusive definition of mental health outlined in Section 2.1). Within this overarching framework, studies involving any research method or research design were accepted. Although such an approach makes the synthesis of findings more complex than for traditional (experimental-only) review methodologies, “the challenge is worth the effort, since comparing the findings of different kinds of studies shows how different research designs can learn from one another, and which research approaches and topics might usefully be developed in future” (Harden et al., 2001, p. 4; see also Pluye & Hong, 2014).

Our decision to examine literature published since the year 2000 was informed by our analysis of past research reviews, as reported in Section 2.3. The majority of the past reviews either placed no restriction on the age of research (Cohen et al., 2009; Cohen & Geier, 2010; Harden et al., 2001; Jamal et al., 2013; Wang & Degol, 2016) or included research from a lengthy or somewhat dated time frame (Kutsyuruba et al., 2015; Thapa et al., 2013; Wells et al., 2003). In contrast, two reviews focused on more recent literature, both of which were restricted to studies conducted since the year 2000 (Barry et al., 2013; Kieling et al., 2011). We felt that our review could make the most useful contribution by focusing specifically on recent research.

Given our interest in adolescents, we included studies that involved middle or high school students (either exclusively or as part of a broader range, such as Kindergarten to Grade 12). We excluded studies that: (a) involved only primary/elementary school, kindergarten, or tertiary students; (b) were concerned with topics such as teacher wellbeing or the work of school counsellors, psychologists, or psychiatrists. To be included in the review, articles needed to involve data that was collected directly from students, who have previously been identified as “an untapped resource in contemporary wellbeing research” (Soutter, 2011, p. 3; see also Gillett-Swan, 2014)

Given our definitions of school climate and mental health, we rejected studies that:

- involved only constructs such as physical school environments, classroom-level climates, home or family environments, health literacy, values or religious education, and physical health;
- contained information about aspects of school climate and mental health but that did not examine links between these constructs;
- did not provide sufficient detail to allow identification of specific aspects of school climate, mental health, or wellbeing; or
- used only an aggregate ‘school climate’ variable that superficially combined a number of elements of school climate that have been demonstrated, in previous literature, to be distinct constructs (Wang & Degol, 2016).

We included articles that reported behavioural indicators of mental health (such as suicidal behaviour, prosocial behaviour, and risk behaviour) as well as articles that reported direct measures of mental health (such as perceived life satisfaction, anxiety, and depressive symptoms).

3.2. Search procedure

Nine electronic academic databases were searched to find potentially relevant and eligible studies: ERIC, PsycINFO, MedLine, Scopus, Proquest Sociological Abstracts, Informit, JSTOR, SAGE, and Taylor and Francis Online. Each database was searched to find articles published since 2000 whose title, abstract, or keywords contained any of *school climate*; *school environment*; or *school-level environment* as well as any of *student mental health*; *adolescent mental health*; *student wellbeing*; *adolescent wellbeing*; *student suicidal behaviour*; or *adolescent suicidal behaviour*. We acknowledge that our selection of search terms may have led to the exclusion of some studies (in particular; any studies that examined only specific sub-constructs of school climate and/or mental health); this is discussed further in Section 7. Database searches and subsequent article screening were initially conducted during September and October 2016; the search was repeated in August 2017 to check for newly-published articles.

The authors reviewed the eligibility of all articles located as a result of this search procedure according to the inclusion criteria defined above. Titles and abstracts were used for initial screening, leading to the rejection of articles that were clearly ineligible. For all other articles, the full text was obtained and used to make the final eligibility assessment. The first author reviewed the second author’s eligibility assessments of the first 93 articles (resulting from the first three databases searched); the second author’s judgements were considered to be appropriate and accurate. Thereafter, the second author proceeded with the majority of article screening, and the first author was consulted in cases where the eligibility of articles for inclusion in the present study was not clear.

3.3. Data analysis

3.3.1. Initial data extraction

Initial data analysis involved extracting key attributes of each article into an Excel spreadsheet. This was done by the second author and checked by the first author; queries were resolved together until 100% agreement was reached.

The following attributes were recorded for each study: citation details; source (database); journal discipline; the country in which the research was conducted; the gender and age of students from whom data was obtained; the numbers of students and schools participating in the study; the school type (public, private, or both); the variables, methods, and instruments used to measure aspects of school climate and mental health; and the research design. In addition, we recorded a summary of the overall findings of each study, focusing on the presence and nature of any links found between school climate and mental health and any other findings initially considered relevant (such as other variables having a significant influence on the results).

Table 4
MMAT assessment criteria.

Study design	MMAT assessment criteria (Pace et al., 2012; Souto et al., 2015)
Qualitative	1.1 Qualitative objective or question 1.2 Appropriate qualitative approach or method 1.3 Description of the context 1.4 Description of participants and sampling 1.5 Description of data collection and analysis 1.6 Discussion of researchers' reflexivity
Randomised controlled experimental	2.1. Clear description of the randomization (or an appropriate sequence generation) 2.2. Clear description of the allocation concealment (or blinding when applicable) 2.3. Complete outcome data ($\geq 80\%$) 2.4. Low withdrawal/drop-out ($< 20\%$)
Non-randomised experimental	3.1 Recruitment in a way that minimised confounders 3.2 Intervention and control group comparable 3.3 Evidence of an absence of contamination 3.4 Complete outcome data ($\geq 80\%$)/acceptable response rate ($\geq 60\%$).
Observational descriptive ^a	4.1 Appropriate sampling and sample 4.2 Justification of measurements (valid or standard) 4.3 Acceptable response rate ($\geq 60\%$).
Mixed methods	<i>To evaluate the qualitative component of the study:</i> Use criteria 1.1–1.6 above. <i>To evaluate the quantitative component of the study:</i> Use criteria 2.1–2.4, 3.1–3.4, or 4.1–4.3 above, according to the quantitative design. <i>To evaluate the use of mixed methods:</i> 5.1 Combination of qualitative and quantitative data collection or analysis approaches 5.2 Justification of the mixed methods design 5.3 Integration of qualitative and quantitative data or results

Note. Each study is assigned a yes/no score for each relevant criterion. The overall quality assessment is the total number of 'yes' scores divided by the total number of relevant criteria, expressed as a percentage. For example, an observational study that met criteria 4.1 and 4.2 but not 4.3 would receive an overall quality assessment of 67%.

^a The 'observational descriptive' assessment criteria apply to associational and/or longitudinal studies involving quantitative research methods.

3.3.2. Analysis of attributes of the literature

To examine key attributes of the literature reviewed for the present study, the articles were organised into various sub-categories, and the frequencies associated with these categories were compared. Specifically, we examined: the origins of the studies (geographically and in terms of the field of research); the research designs used; and the relationships reported between various sub-constructs of school climate and mental health.

Thematic analysis (as described by Braun & Clarke, 2006) was used to examine the sub-constructs that were used to investigate relationships between school climate and adolescent mental health in the studies reviewed. A number of *a priori* sub-constructs were identified (that were expected to appear in relation to school climate and mental health); studies were coded against these sub-constructs where appropriate. However, we added to this pre-existing set of codes as we examined studies whose sub-constructs did not align with our original codes. As such, both inductive and deductive methods were used (Braun & Clarke, 2006). After the initial coding of the sub-constructs identified within each article, we followed an iterative process of collating codes into potential thematic groupings, and then reviewing the codes and groupings, until the codes had been organised into an exhaustive set of meaningful sub-constructs of school climate and mental health.

As recommended within the PRISMA guidelines for systematic reviews (Liberati et al., 2009; Moher et al., 2009), the methodological quality of each article was assessed. The Mixed Methods Appraisal Tool (MMAT), developed by Pace et al. (2012) (see also Souto et al., 2015) was used for this purpose. The MMAT provides multiple sets of criteria that allow for evaluation of studies with qualitative, randomised controlled, non-randomised, observational descriptive, and mixed methods designs; these criteria are reproduced in Table 4. The resulting quality assessment percentage scores allow comparison across studies with diverse designs.

It is important to note that "the MMAT has been designed to appraise the methodological quality of the studies included in a systematic review, not the quality of their reporting (writing)" (Souto et al., 2015, p. 501). As such, where information needed for the quality assessment was not provided within the articles, we made a concerted effort to contact the authors and request the necessary information (as recommended by Souto et al., 2015).

3.3.3. Synthesis of findings of the literature

While the analyses described in Section 3.3.2 provided useful information about aspects of the existing research base, the primary goal of any literature review is to provide a robust synthesis that integrates the major findings of the existing literature and summarises the existing state of knowledge (Crano & Brewer, 2002). In the case of the present review, the range of variables used to measure aspects of school climate and mental health within the included studies precluded the use of meta-analysis, a technique which "requires a relatively large number of studies, with all of them focused on [a single] critical relationship" (Crano & Brewer,

2002, p. 334; see also Cooper et al., 2013). Instead, a narrative review of the findings of the literature was constructed and complemented by an analysis of the frequencies with which the reviewed studies had shown evidence of relationships between the various sub-constructs of school climate and adolescent mental health. Although the statistical limitations of 'vote-counting' methods in research syntheses are well-documented (see, for example, Card, 2012; Cooper et al., 2013; Petticrew & Roberts, 2006), such analysis remains a useful descriptive tool (provided that its limitations are acknowledged) within narrative literature syntheses and where more rigorous meta-analysis is not possible (Centre for Reviews and Dissemination, 2009; Rodgers et al., 2009).

4. Results

The database searches led to the identification of 551 articles; 151 of these were duplicates, leading to an initial corpus of 400 articles. Initial screening of titles and abstracts led to the exclusion of 243 articles that did not meet the inclusion criteria for the study; a further 108 articles were excluded after their full text was reviewed. One additional article² was not able to be located either online or through efforts to contact the authors. This resulted in a final corpus of 48 articles that were eligible for inclusion in this review; this selection process is summarised in Fig. 2. Details of the 48 eligible articles are provided in Appendix A.

4.1. Attributes of the literature

4.1.1. Origins of the literature

The 48 articles included in this review reported studies conducted in 16 countries. Of these, 28 studies (58%) were conducted in North America, 8 studies (17%) in Europe (including the UK), and 7 studies (15%) in Australia, as shown in Fig. 3. As such, the majority (90%) of the existing literature originated from developed, Western countries. Just five studies (10%) originated from non-Western countries; these were conducted in China, Taiwan, Vietnam, South Africa, and Israel.

The origins of the articles reviewed were also examined in relation to the broad field of research associated with the journal that published each article. As shown in Fig. 4, psychology (37%), education (20%), and educational psychology (21%) were the predominant fields of research, with smaller numbers of articles being published in health (12%), education and health (4%), and sociology (2%) journals. Two articles were published in journals that were not associated with any of the above fields: namely, *Computers in Human Behaviour* (Kubiszewski, Fontaine, Potard, & Auzoult, 2015) and the *Journal of Marriage and Family* (Gerard & Buehler, 2004).

4.1.2. Research design

A range of research designs, methodologies, variables and measures were represented within the 48 articles reviewed. As shown in Table 5, the majority (43 studies; 91%) were solely quantitative; three studies (6%) were solely qualitative and one (2%) involved mixed methods. Across all methodologies, all but one study (98%) used non-experimental designs; as such, most studies were only able to demonstrate that aspects of school climate were associated with aspects of student mental health (but were not able to provide evidence of causal links).

4.1.3. Sub-constructs investigated

Thematic analysis of the elements of school climate and mental health investigated in each study led to the identification of four sub-constructs for each of school climate and mental health. For school climate, the sub-constructs identified were: (1) social connectedness/relationships; (2) school safety; (3) school connectedness; and (4) academic environment. For mental health, the sub-constructs were: (1) psychosocial wellbeing; (2) preventative/prosocial behaviours; (3) mental health issues; and (4) risk behaviours. Table 6 provides an overview of the types of variables that were grouped into each of these sub-constructs.

Having identified these eight sub-constructs, the frequency with which each sub-construct was investigated, across the 48 studies reviewed, was determined. These results are shown in Fig. 5. There was a significant imbalance in the research attention given to the various elements of both school climate and mental health. This difference was most pronounced among the school climate sub-constructs: The most frequently-researched sub-construct, social connectedness/relationships, was investigated in 39 of the 48 studies (81%), whereas the remaining three sub-constructs of school climate were each only investigated in between 5 and 14 of our reviewed studies (between 10% and 29%). For mental health, the most frequently-researched sub-construct, mental health issues, was included in 34 studies (71%); the least frequently-researched sub-construct, preventative/prosocial behaviours, was included in only 5 studies (10%).

4.1.4. Quality assessments

Using the MMAT criteria appropriate for the design of each study (detailed in Table 4), quality assessments were made; the results are summarised in Fig. 6 and reported in full in Appendix A. Overall, the quality of the reviewed studies was excellent: 29 of the 48 studies (60%) met all the MMAT quality criteria, and a further 17 studies (35%) met all but one of the quality criteria relevant to their research type. Just two studies scored 50% or below on the MMAT criteria. The quality criteria that were most commonly not met were: providing a discussion of researchers' reflexivity (criteria 1.6; not met in any of the 4 qualitative or mixed methods studies), and

² Azam, A.A.S., & Shaikh, F.A. (2011). Resilience among adolescent boys: Role of home and school environment. *Indian Journal of Community Psychology*, 7(2), 306–315; indexed in the PsycINFO database.

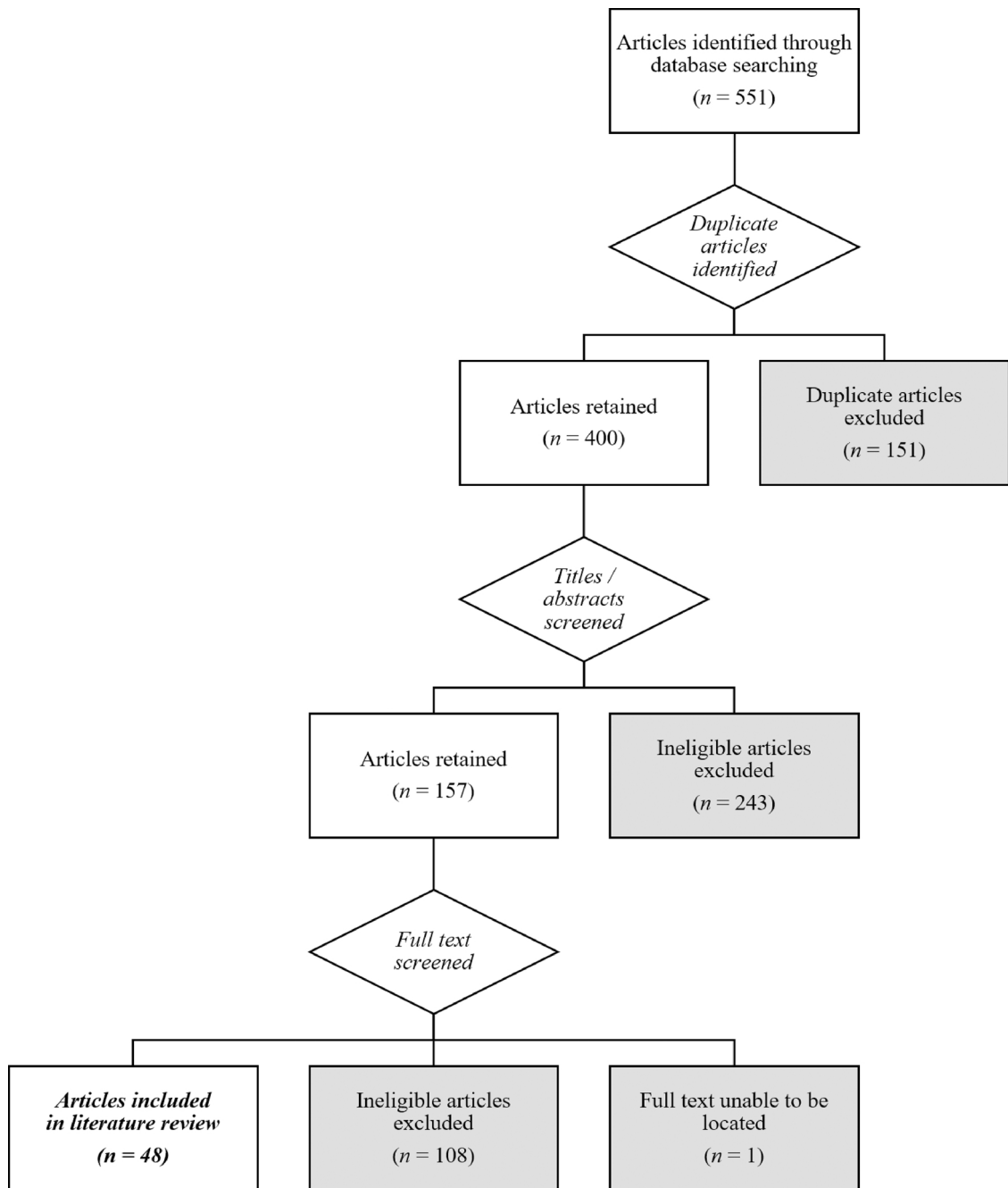


Fig. 2. Flow diagram showing identification and screening of literature for the study.

achieving a response rate of at least 60% (criteria 4.3; not met in 15 of the 44 observational-descriptive and mixed-methods studies).

4.2. Findings of the literature: relationships between school climate and mental health

4.2.1. Evidence of relationships between school climate and mental health

Across the 48 articles included in our review, 46 (96%) presented evidence of relationships between constructs of school climate and adolescent mental health (the exceptions are discussed at the end of this section). Although in most cases these relationships were only captured in terms of associations, correlations, or qualitative descriptions (see Section 4.1.2), taken together these 46 articles nonetheless constitute a sizeable body of evidence that school climate is, indeed, related to students' mental health. In particular, the

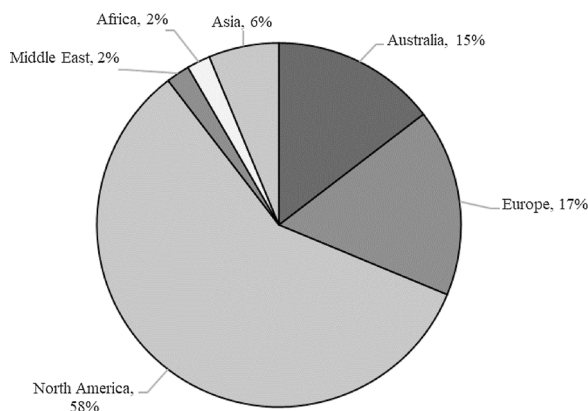


Fig. 3. Geographic origin of 48 reviewed articles.

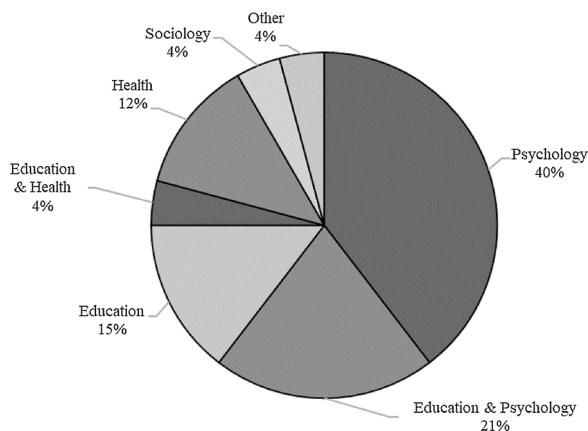


Fig. 4. Fields of research for 48 reviewed articles.

Table 5
Research designs and methods used in 48 reviewed studies.

Research methods	Research design			Total
	Associational	Associational, longitudinal	Non-randomised experimental	
Quantitative	34	9	1	44
Qualitative	2	1	0	3
Mixed methods	1	0	0	1
Total	37	10	1	48

studies that were reviewed indicated³ that:

- Positive relationships with teachers and peers (including respect, connectedness, support, positive attitudes toward diversity, and an absence of bullying or victimisation) were associated with increases in adolescents’ psychosocial wellbeing and pro-social/preventative behaviours and decreases in the prevalence of mental health issues and risk behaviours.
- Positive perceptions of school safety (including policies, rule clarity, rule enforcement, reporting/help-seeking mechanisms, and normative behaviours at the school) were likewise associated with improvements in adolescents’ psychosocial wellbeing and pro-social/preventative behaviours and reductions in the prevalence of mental health issues and risk behaviours.
- Positive perceptions of school connectedness (that is, adolescents’ sense of belonging and attachment to school) were associated with increased psychosocial wellbeing and pro-social/preventative behaviours among adolescents and with decreased prevalence of mental health issues and risk behaviours.
- An academic environment characterised by high demands was associated with an increased prevalence of both mental health

³ See Appendix B for lists of the specific studies supporting each of these findings.

Table 6
Synthesised sub-constructs of school climate and mental health based on 51 reviewed studies.

School climate		Mental health	
Sub-construct	Sample variables	Sub-construct	Sample variables
Social connectedness/relationships	<ul style="list-style-type: none"> ● Peer support ● Peer relationships ● Teacher-student relationships ● Social climate/community ● Affirming diversity ● Bullying/victimisation 	Psychosocial wellbeing	<ul style="list-style-type: none"> ● Wellbeing ● Life satisfaction ● Self-esteem ● Self-efficacy ● Positive mental health
School safety	<ul style="list-style-type: none"> ● School safety policies ● Rule enforcement ● School safety ● Sexual harassment ● Rule clarity ● Reporting/help seeking processes 	Preventative/prosocial behaviours	<ul style="list-style-type: none"> ● Resilience ● Prosocial behaviours ● Positive coping strategies ● Disclosure ● Help seeking actions
School connectedness	<ul style="list-style-type: none"> ● School connectedness ● Attachment to school ● School belonging 	Mental health issues	<ul style="list-style-type: none"> ● Mental health difficulties ● Depressive symptoms ● Anxiety ● Body image ● Negative thoughts or attitudes
Academic environment	<ul style="list-style-type: none"> ● Academic demands or pressure ● Effort-reward balance ● Social-emotional learning ● Motivation and learning ● Competitiveness 	Risk behaviours	<ul style="list-style-type: none"> ● Suicidal behaviour ● Suicidal ideation ● Non-suicidal self-injury ● Antisocial behaviours ● Dysfunctional behaviours ● Risk behaviours

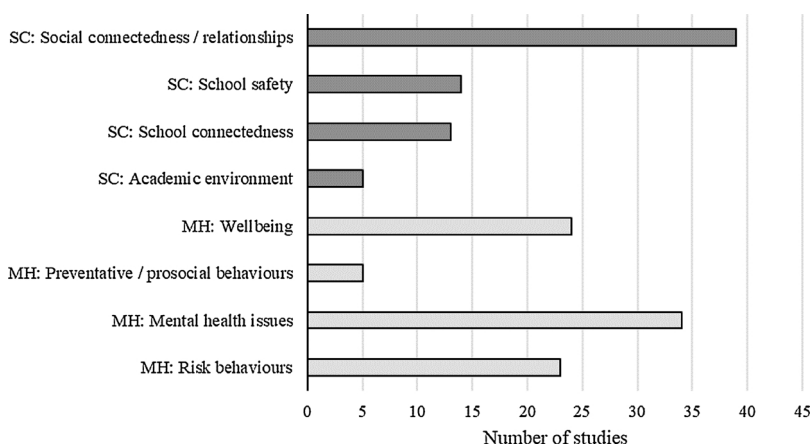


Fig. 5. Sub-constructs of school climate and mental health investigated in 48 reviewed studies.

issues and risk behaviours, although an environment with a strong learning focus was associated with decreases in certain emotional symptoms in one study (Kasen, Cohen, Chen, Johnson, & Crawford, 2009).

Across the 46 studies indicating the existence of relationships between constructs of school climate and mental health, there was a clear imbalance in the research attention that had been given to the links between the various combinations of sub-constructs. Fig. 7 provides a visual summary of the links shown between school climate and mental health constructs across the 46 studies; the number of studies that provided evidence of each relationship is overlaid on the corresponding connecting line and is reflected in the thickness of the line.

As portrayed in Fig. 7, the greatest numbers of studies providing evidence of associations between sub-constructs related to the links between social connectedness/relationships and: mental health issues (22 studies); psychosocial wellbeing (18 studies); and risk behaviours (15 studies). In comparison, no studies provided evidence of relationships between academic environment and either psychosocial wellbeing or prosocial/preventative behaviours; further, six associations between sub-constructs were supported by only two or three studies each. The nature of the associations (inverse or direct) may be identified from the summary provided in the bulleted list at the beginning of this section.

Although the range of methods used in the reviewed articles precluded the comparison of effect sizes, the quality assessments of the individual studies (reported in Section 4.1.4) were used to provide an indication of the strength of the evidence associated with

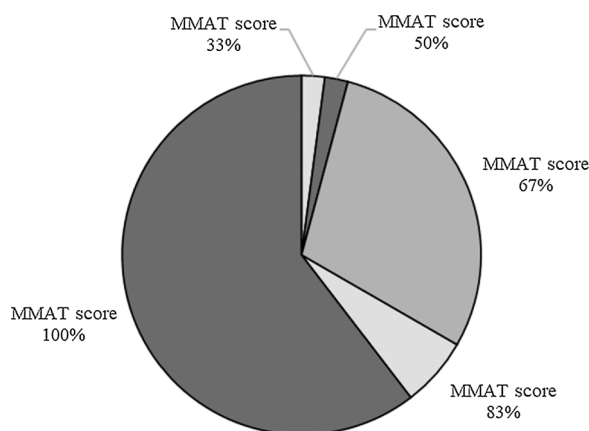


Fig. 6. Summary of MMAT quality assessment scores for 48 reviewed studies.

each of the links shown in Fig. 7. The results of this analysis are presented in Appendix B. Given that seven of the school climate–mental health combinations were only supported by between two and four studies (see Fig. 7), it was of particular interest to examine the quality of the evidence associated with these combinations. It was found that, in each of these cases, at least two of the supporting studies had quality assessment scores of 100%, indicating that, while the evidence was small in quantity, it was of satisfactory quality.

Whereas the majority of the studies in our review identified relationships between school climate and mental health, two studies did not. Eisman, Stoddard, Heinze, Caldwell, and Zimmerman (2015) found that friend support (classified within our social connectedness/relationships sub-construct of school climate) was not associated with adolescent depressive symptoms over time. Instead, adolescents' depressive symptoms were explained by factors outside of the school climate: sex, race, experiences of observing violence, family conflict, and mother support. Similarly, Nalls, Mullis, and Mullis (2009) found that school safety was not significantly associated with either depressive symptoms (classified in our mental health issues sub-construct) or alcohol/marijuana use (classified in our risk behaviours construct) in adolescents; rather, these outcomes were explained by adolescents' perceptions of safety in their neighbourhood (which was the only other independent variable examined). Although these findings are in contrast to the majority of the studies included in our review, we note that, at a broader level, even these studies nonetheless support an ecological model of adolescent development (described in Section 2.2) given that they highlight other environmental factors as influencing aspects of adolescent mental health.

4.2.2. Mediating factors

As well as investigating direct links between aspects of school climate and adolescent mental health, six of the 32 reviewed studies also indicated that selected sub-constructs may function as mediators of the relationships between school climate and mental health.

- McMahon, Parnes, Keys, and Viola (2008) found that school belonging was a mediating factor between their school stressors and social resources variable and various mental health variables.
- Plenty, Östberg, Almquist, Augustine, and Modin (2014) found that, while teacher support and students' perceptions of school academic demands were both direct predictors of mental health variables, school demands also functioned as a mediator between teacher support and conduct problems (risk behaviour).
- Loukas, Suzuki, and Horton (2006) found that school connectedness was a mediator of the relationships between various school climate measures (friction among students; cohesion among students; competition among students) and risk behaviours (conduct problems).
- Sarkova et al. (2014) found that students' experiences of bullying behaviour (whether they were bullies, victims, both bullies and victims, or non-involved) moderated the relationship between teacher support and students' psychological well-being and self-esteem, with these relationships being less important for students who bully others.
- Finally, studies by Aldridge et al. (2016) and Riekie et al. (2017) indicated that adolescents' resilience mediated the relationships between students' perceptions of the school climate and their psychosocial wellbeing.

4.2.3. The impact of demographic variables

Some of the reviewed studies indicated that demographic variables affected school climate or mental health; however, the body of evidence was somewhat inconclusive due to contradictory findings between studies. Table 7 summarises the studies that found, and those that investigated but did not find, evidence of demographic effects on school climate or mental health. The table demonstrates both the inconsistency of the findings (in terms of whether a particular demographic variable affects school climate or mental health) and the inconsistency of the research attention that has been paid to the roles of the various demographic variables, with gender and age/level of schooling being more commonly investigated than sexual orientation, socio-economic status or urban/rural home location. We note that, even within the groups of studies that reported demographic effects on either school climate or mental health,

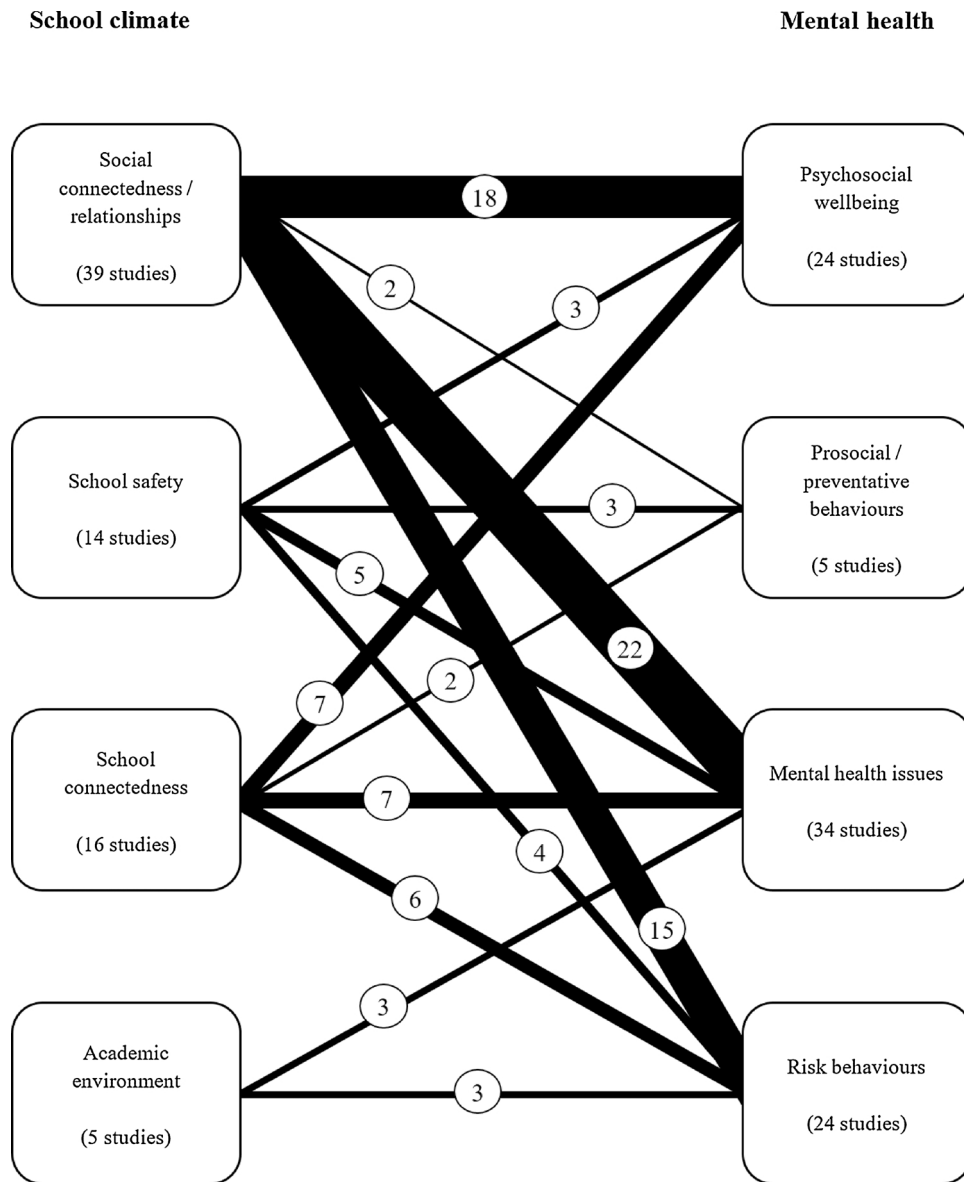


Fig. 7. Relationships found between sub-constructs of school climate and mental health in 48 reviewed studies.

the nature and direction of the effects was not consistent. As such, the influence of demographic factors on adolescents’ perceptions of the school climate and their mental health demands further investigation.

As well as the indications that *individual aspects* of school climate or mental health may have been influenced by demographic factors, there was also some evidence that these factors affected the *relationships between* the school climate and adolescent mental health.

- Students’ gender affected relationships between school climate and mental health in the studies by Gerard and Buehler (2004); Lester et al. (2013); Nijs et al. (2014); Ormerod et al. (2008); Pisani et al. (2012); Pittman and Richmond (2007); Plenty et al. (2014); Shang et al. (2014); Suldo, McMahan, Chappel, and Loker (2012) and Walsh et al. (2010). In contrast, Loukas et al. (2006) found that gender did not mediate such relationships.
- Age or level of schooling was found to affect the relationships between school climate and mental health in the studies by Lester and Cross (2015), Nijs et al. (2014), Noble, Sornberger, Toste, Heath, and McLouth (2011), Pisani et al. (2012; although only to a small extent), and Shang et al. (2014); however, age did not have a similar influence in the study by Gerard and Buehler (2004).
- Finally, adolescents’ ethnicity affected the relationships between school climate and mental health in the studies by Gerard and Buehler (2004) and Pittman and Richmond (2007).

Table 7Studies examining the effects of gender,^a ethnicity, and age/level of schooling on aspects of school climate or adolescent mental health.

Demographic variable	Studies showing effects of demographic variable on aspects of school climate or mental health	Studies investigating but not finding effects of demographic variable on aspects of school climate or mental health
Gender	Barrett, Ausbrooks, and Martinez-Cosio, (2008) Dessel, Kulick, Wernick, and Sullivan (2017) Eisman et al. (2015) Gerard and Buehler (2004), Idsoe (2016) Kasen et al. (2009) Langille, Asbridge, Kisely, and Rasic (2012) Lester, Waters, and Cross (2013) Mijanovich and Weitzman (2010) Murnaghan, Morrison, Laurence, and Bell (2014) Ormerod, Collinworth, and Perry (2008) Phuong, Huong, Tien, Chi, and Dunne (2013) Pisani et al. (2012) Pittman and Richmond (2007) Pitts (2012) Plenty et al. (2014) Turner, Reynolds, Lee, Subasic, and Bromhead (2014)	Askell-Williams et al. (2013) Cornwell (2003) Lampard, Maclehorse, Eisenberg, Neumark-Sztainer, and Davison (2014) Nalls et al. (2009) Nijs et al. (2014) Toomey et al. (2011) McMahon et al. (2008)
Ethnicity	Eisman et al. (2015) Gerard and Buehler (2004) LaRusso, Romer, and Selman (2008) Mijanovich and Weitzman (2010) Moore et al. (2012) Pisani et al. (2012) Toomey et al. (2011) Walsh, Harel-Fisch, and Fogel-Grinvald (2010)	Cornwell (2003) Dessel et al. (2017) Lampard et al. (2014) McMahon et al. (2008) Nijs et al. (2014) Ormerod et al. (2008) Pittman and Richmond (2007) Shin, D'Antonio, Son, Kim, and Park (2011) Way and Robinson (2003)
Age/level of schooling	Anderson and Graham (2016) Gerard and Buehler (2004) Kasen et al. (2009) LaRusso et al. (2008) Lester and Cross (2015) Lester et al. (2013) McMahon et al. (2008) Mijanovich and Weitzman (2010) Moore et al. (2012) Shang, Li, Li, Wang, and Siegrist (2014) Turner et al. (2014)	Cornwell (2003) Eisman et al. (2015) Idsoe (2016) Nalls et al. (2009) Nijs et al. (2014) Ormerod et al. (2008)
Sexual orientation	Dessel et al. (2017) Langille et al. (2012)	
Socio-economic status	Kasen et al. (2009) Moore et al. (2012) Murnaghan et al. (2014) Shang et al. (2014)	Lampard et al. (2014) Pittman and Richmond (2007)
Urban/rural home location	LaRusso et al. (2008) Mijanovich and Weitzman (2010) Phuong et al. (2013)	

^a For simplicity, the term 'gender' is used here and elsewhere to represent variables relating to participants' biological sex and/or preferred gender identity.

5. Discussion

This systematic review has brought together 48 articles, published between 2000 and 2017 in a diverse range of journals and fields of research, in order to provide an overview of the current state of research related to the relationships between school climate and adolescent mental health. In doing so, this review makes a valuable contribution to research across the fields of education, psychology, and health promotion and responds to calls made in previous reviews of research in related areas (see Section 2.3).

The findings of our review provide strong evidence of the importance of the school climate in influencing adolescents' mental health, supporting the ecological and health-promotion perspectives that were reviewed in Section 2.2. As such, attending to the psychosocial school climate is a manageable way in which schools can promote student mental health while drawing on the existing knowledge and skills of teachers. This is particularly significant given that past research has shown that, although teachers acknowledged that schools should seek to enhance students' mental health, teachers felt ill-equipped to do so (Reinke et al., 2011). Whereas teachers may not necessarily have the specialist knowledge and skills needed for the types of interventions that target students who are struggling with poor mental health, it is well within the reach of schools and teachers to work, proactively and intentionally, to enhance aspects of the school climate (see, for example, Centers for Disease Control and Prevention, 2009; Cohen,

2013; Read, Aldridge, Ala'i, Fraser, & Fozdar, 2015; Rhodes, Camic, Milburn, & Lowe, 2009).

An important contribution of this review relates to our examination of how school climate and adolescent mental health were conceptualised in the 48 reviewed studies. Across these studies, we identified four sub-constructs of school climate and four of adolescent mental health. By identifying these sub-constructs and examining the extent and quality of the associated research, our review provides detailed information about the current state of the research base and identifies particular areas that have been relatively under-researched. It was noteworthy, however, that we excluded a number of studies that had used insufficiently specific conceptualisations of school climate (as outlined in Section 3.1). This highlights a weakness in a portion of the existing research base; in Section 6 we discuss this finding further in terms of implications for future research.

The specific sub-constructs that were identified in our study are largely consistent with those identified elsewhere in the literature. In terms of school climate, the four sub-constructs identified in our study (social connectedness/relationships; school safety; school connectedness; and the academic environment) generally aligned with sub-constructs reported by Cohen et al. (2009), Kutsyuruba et al. (2015), Thapa et al. (2013) and Wang and Degol (2016). It is noteworthy, however, that whereas we separated social connectedness/relationships from school connectedness, Cohen et al. (2009), Thapa et al. (2013) and Wang and Degol (2016) all treated these two aspects of school climate as a single construct (termed 'relationships' by Cohen et al. (2009) and Thapa et al. (2013), and 'community' by Wang and Degol (2016)). These authors all identified the dimensionality of school climate *a priori* as a way of organising their reviews; in contrast, our taxonomy of sub-constructs of school climate emerged from inductive analysis of the constructs involved in the 32 reviewed studies. As such, our finding, that school connectedness functions (according to the reviewed studies) in a different way from other aspects of social connectedness and relationships, is an important contribution of this study. Future research and reviews should, likewise, examine these constructs separately rather than treating them as a single domain.

In terms of mental health, our inductive analysis of the aspects examined in the 48 reviewed studies resulted in the identification of four sub-constructs: psychosocial wellbeing; preventative/prosocial behaviours; mental health issues; and risk behaviours. Similar lists of sub-constructs for mental health could not be located for the purpose of comparison; however, the sub-constructs identified in our study capture both positive (or healthy) and negative (unhealthy) aspects of adolescents' affective states (hedonic) and behaviours (eudaimonic), as shown in Fig. 8. As such, the set of four sub-constructs identified in this study reflects broad trends in the field of mental health since the middle of the twentieth century (Huppert, 2005; Keyes, 2005; Lehtinen et al., 2005; Nielsen et al., 2017; Rogge, 2011).

6. Directions for future research

Our review highlights a number of important directions for future research. These are outlined in this section.

First, given the origins of the reviewed literature (reported in Section 4.1.1), more research is needed that originates from non-Western countries and from the Southern Hemisphere. It is well-documented that the existing literatures related to both school climate and mental health (separately) are heavily Western-dominated (Herman, 2011; Kutsyuruba et al., 2015); however, Henrich et al. (2010, p. 61) have highlighted the dangers associated with research that is biased towards participants from "Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies". Among the articles included in our review, two studies (Pisani et al., 2012; Toomey, Ryan, Diaz, & Russell, 2011) suggested that ethnicity affected the relationships between school climate and adolescents' mental health and a further eight articles (listed in Table 7) suggested that ethnicity influenced adolescents' reports of the school climate and/or their mental health. Broadening the ethnic and geographical representativeness of the research base is, therefore, an important next step.

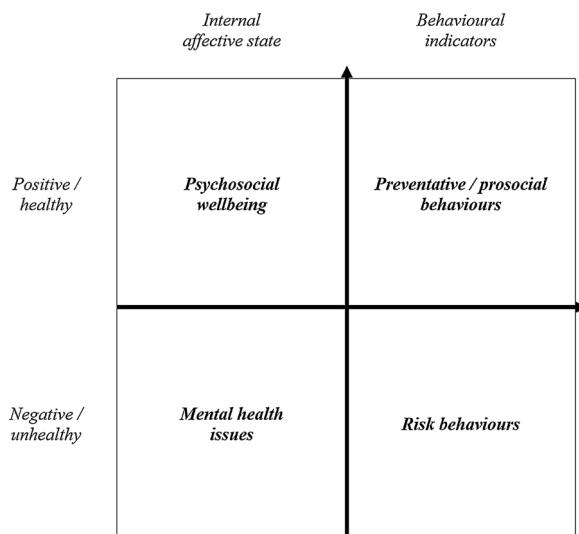


Fig. 8. Four sub-constructs of mental health identified in the present study.

Second, the field would benefit from further diversity in the research methods and designs used to examine relationships between school climate and adolescent mental health and wellbeing. As shown in Table 5, the existing literature is weighted towards quantitative methods and associational designs. More qualitative and mixed-methods studies would promote in-depth understanding of how and why the school climate affects adolescent mental health (Diener, 1994; Rogge, 2011), and more experimental and longitudinal studies would provide stronger evidence for causal claims that it is school climate that influences adolescent mental health (and not the other way around).

Third, given the imbalance in the quantity of research that has examined the various combinations of school climate and mental health constructs (as shown in Fig. 7), future research needs to more deliberately ‘fill out’ the picture. More studies are needed that investigate under-researched combinations of constructs such as the impact of the affective academic environment on aspects of adolescent mental health.

Fourth, additional research is needed that uses more complex models to examine the relationships depicted in Fig. 7. For example, given the findings reviewed in Section 4.2, further research is needed to examine the role of mediating variables (rather than examining simple bivariate associations).

Fifth, further research is needed to clarify the influences of demographic factors such as students’ gender, ethnicity, age, level of schooling, socio-economic background, sexual orientation, and home location (either urban or rural). The scope of our review meant that we could not report in detail the various findings of the 48 reviewed articles in relation to the influence of demographic factors. However, the reviewed articles presented inconsistent findings as to the influence of demographic factors on adolescents’ experiences of the school climate, adolescents’ mental health, and the relationships between these constructs. Further research is, therefore, required.

Sixth, during the selection process for this study (summarised in Fig. 2), we rejected a number of articles that used only an aggregate ‘school climate’ variable that superficially combined a number of elements of school climate that have been demonstrated, in previous literature, to be distinct constructs (Wang & Degol, 2016). Studies that involve such conceptualisations of school climate are restricted in their ability to contribute robust and informative findings to future research and practice: Both scholars and practitioners need to understand which specific aspects of the school climate affect student mental health and wellbeing in particular ways. As such, we recommend that future research use finer-grained conceptualisations and measures to examine school climate, such as the six-construct model captured by the What’s Happening In This School? questionnaire (Aldridge & Ala’i, 2013).

Finally, across the studies reviewed we noted a general absence of explicit theoretical frameworks for the study of school climate or mental health. A range of theoretical frameworks and perspectives can inform research in these areas, including: affiliation theory (Anderson, Tomlinson, Robinson, & Brown, 2011; Hill, 1987; Osterman, 2000); attachment theory (Allen & Land, 1999; Atwood, 1999; Bowlby, 1982; Kennedy & Kennedy, 2004); empowerment perspectives (Fitzsimons & Fuller, 2002; Mohajer & Earnest, 2009; Perkins & Zimmerman, 1995; Wallerstein & Bernstein, 1988); health-promotion perspectives (Barry, 2007; Mittelmarm et al., 2005; Tones, 2005; World Health Organization, 1986); primary socialisation theory (Higgins, Ricketts, Marcum, & Mahoney, 2010; Oetting, Donnermeyer, & Deffenbacher, 1998); risk and resilience theory (Benard, 1991, 1997; Martin et al., 2015; Masten, 2001; Masten, Herbers, Cutuli, & Lafavor, 2008; O’Dougherty Wright, Masten, & Narayan, 2013; Rutter, 2006; Sanders, Munford, & Liebenberg, 2016; Schoon & Bynner, 2003); social cognitive theory (Bandura, 2001; Fan, Williams, & Corkin, 2011); social control (or bonding) theory (Hirschi, 1969; Stewart, 2003); and socio-ecological models (Bronfenbrenner, 1979, 1994; Zubrick & Kovess-Masfety, 2005). We, therefore, call on authors of future research to make the theoretical foundations of their work more explicit, thus enhancing the robustness of the research base.

7. Limitations

Although our study followed the PRISMA guidelines for systematic literature reviews, we acknowledge several limitations. First, since the key constructs for our study are poorly defined in the existing literature (as discussed in Section 2.1), there is potential for a degree of incongruence between the constructs that were reportedly measured in a particular study and the actual items or measures that were used. Articles with a severe lack of conceptual clarity were not included in the review (see Section 3.1), and we examined the reviewed articles carefully and coded the sub-constructs according to the information provided. Ultimately, however, we were limited by the varying levels of detail and precision in the published articles.

Second, our inclusion criteria meant that other, potentially-relevant literature may not have been considered. This could include both ‘grey’ (unpublished or non-peer-reviewed) literature and literature that examined specific sub-constructs relevant to our study without linking these to the broader themes of school climate and mental health. Because we did not have an exhaustive *a priori* list of relevant sub-constructs, it was not possible for us to systematically search for articles drawing on combinations of those sub-constructs. However, we acknowledge that (as in any systematic review) our inclusion criteria may have led to the exclusion of relevant literature.

Third, our decision to conduct a comprehensive review of research involving any methodology or design, and the range of sub-constructs reflected in the research base, meant that we were unable to use the statistical techniques necessary for a meta-analysis. Meta-analyses are a robust and valuable tool for examining quantitative, experimental evidence related to particular relationships or interventions, and we look forward to meta-analyses being conducted in this field in future, once a greater number of experimental studies have been conducted.

Finally, it should be reiterated that we deliberately focused on psychosocial aspects of the school climate. Although school climate has, in some cases, been considered to incorporate additional constructs such as the physical environment or the quality of teaching and learning (Cohen, 2006; Loukas, 2007; Wang & Degol, 2016), we chose to limit this review to consideration of the psychosocial school climate. This approach is supported elsewhere in the existing literature (Aldridge & Ala’i, 2013; Aldridge et al., 2016; Brookover et al., 1978; Riekie, Aldridge, & Afari, 2017).

8. Conclusion

Promoting adolescent mental health and wellbeing is a global priority, as outlined in Section 1. This systematic review of the existing literature, related to the relationships between aspects of the psychosocial school climate and aspects of adolescents' mental health, has confirmed the role that schools play in this endeavour in terms of the influence of the school climate on students' mental health. School practitioners, therefore, should seek to enhance their school climates, drawing on existing literature (Aldridge & Ala'i, 2013; Cohen, 2006, 2013; Read et al., 2015; Rhodes et al., 2009). In particular, practitioners should seek to improve: the social connectedness and relationships within their schools (Carroll, Bower, & Muspratt, 2017; Mind Matters, n.d.; Pianta, Hamre, & Allen, 2012; Sanders et al., 2016); students' perceptions of school safety (Astor, Benbenishty, & Estrada, 2009; Gottfredson & Gottfredson, 2001; Noble et al., 2011); students' level of school connectedness (Benard & Slade, 2009; Centers for Disease Control and Prevention, 2009; McNeely, Nonnemaker, & Blum, 2002); and the school-level academic environment (Backman et al., 2012; Cohen, 2006).

Despite confirming the importance of school climate for adolescent mental health and wellbeing, our review has highlighted that there are a number of areas in which the existing research base needs to be strengthened. Attending to the research directions outlined in Section 6 would facilitate further advances in our understanding of the ways in which aspects of the psychosocial school climate affect adolescent mental health and wellbeing.

Declaration of interest

The authors declare that they have no conflict of interest in relation to this article.

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Appendix A. Details of the context, participants, research approach, and quality assessment scores for the 48 articles included in the review

Study	Context		Student participants		Number of schools	Research approach		Quality assessment ^a	
	Country	Field	Sample size	Gender		Methods	Design	MMAT score	Criteria not met
Aldridge et al. (2016)	Australia	Education	2122	M, F	6	Quantitative	Associational	100%	
Anderson and Graham (2016)	Australia	Education	9268	M, F	49	Mixed methods	Associational	83%	1.6, 4.3
Askell-Williams, Cefai, and Fabri (2013)	Malta	Education, psychology	281	M, F	7	Quantitative	Associational	100%	
Barrett et al. (2008)	USA	Education, psychology	182	M, F	19	Quantitative	Associational	67%	4.3
Blasco (2004)	Mexico	Education	–	M, F	1	Qualitative	Associational	50%	1.4, 1.5, 1.6
Bond et al., (2004)	Australia	Health	2678	M, F	26	Quantitative	Experimental, longitudinal	100%	
Brietzke and Perreira (2017)	USA	Psychology	12	M, F	9	Qualitative	Associational	83%	1.6
Chen and Wei (2011)	Taiwan	Psychology	1376	M, F	16	Quantitative	Associational	100%	
Cornwell (2003)	USA	Psychology	11,835	M, F	–	Quantitative	Associational, longitudinal	100%	
Dessel, Kulick, Wernick, and Sullivan (2017)	USA	Psychology	953	M, F	5	Quantitative	Associational	100%	
Eisman et al. (2015)	USA	Psychology	850	M, F	4	Quantitative	Associational, longitudinal	100%	
Flaspohler, Elfstrom, Vanderzee, and Sink (2009)	USA	Education, psychology	4331	M, F	9	Quantitative	Associational	100%	
Gerard and Buehler (2004)	USA	Other	5070	M, F	–	Quantitative	Associational, longitudinal	100%	

Idsoe (2016)	Norway	Psychology	1161	M, F	80	Quantitative	Associational	100%	
Kasen et al. (2009)	USA	Psychology	592	M, F	–	Quantitative	Associational	67%	4.3
Kidger et al. (2015)	England	Psychology	4036	M, F	–	Quantitative	Longitudinal	100%	
Kubiszewski et al. (2015)	France	Other	1422	M, F	5	Quantitative	Associational	100%	
Lampard et al. (2014)	USA	Education, psychology	2793	M, F	20	Quantitative	Associational	100%	
Langille et al. (2012)	Canada	Psychology	1597	M, F	3	Quantitative	Associational	100%	
LaRusso et al. (2008)	USA	Education, psychology	476	M, F	–	Quantitative	Associational	67%	4.3
Lester and Cross (2015)	Australia	Psychology	1810	M, F	11	Quantitative	Associational, longitudinal	100%	
Lester et al. (2013)	Australia	Education, psychology	3462	M, F	11	Quantitative	Associational, longitudinal	100%	
Loukas et al. (2006)	USA	Psychology	489	M, F	3	Quantitative	Associational	100%	
McMahon et al. (2008)	USA	Education, psychology	136	M, F	29	Quantitative	Associational	67%	4.3
Mijanovich and Weitzman (2010)	USA	Health	Approx. 5000	M, F	–	Quantitative	Associational, longitudinal	100%	
Moore, Huebner, and Hills (2012)	USA	Psychology	855	M, F	1	Quantitative	Associational	100%	
Murnaghan et al. (2014)	Canada	Education, health	10,632	M, F	242	Quantitative	Associational	100%	
Nalls et al. (2009)	USA	Psychology	148	M, F	–	Quantitative	Associational	100%	
Nijs et al. (2014)	The Netherlands	Health	11,130	Both	45	Quantitative	Associational	67%	4.2
Noble et al. (2011)	USA	Education	1276	M, F	31	Quantitative	Experimental	33%	4.2, 4.3
Ormerod et al. (2008)	USA	Psychology	578	M, F	7	Quantitative	Associational	67%	4.3
Phuong et al. (2013)	Vietnam	Health	972	M, F	2	Quantitative	Associational	100%	
Pisani et al. (2012)	USA	Education, psychology	2737	M, F	12	Quantitative	Associational	100%	
Pittman and Richmond (2007)	USA	Education	266	M, F	–	Quantitative	Associational	100%	
Pitts (2012)	USA	Sociology	6504	M, F	–	Quantitative	Associational	100%	
Plenty et al. (2014)	Sweden	Psychology	3685	M, F	–	Quantitative	Associational	100%	
Reid, Peterson, Hughey, and Garcia-Reid (2006)	USA	Health	586	M, F	1	Quantitative	Associational	67%	4.1
Riekie et al. (2017)	Australia	Education	618	M, F	15	Quantitative	Associational	100%	
Sarkova et al. (2014)	Slovakia	Education	3694	M, F	–	Quantitative	Associational	100%	
Shackleton et al. (2016)	England	Health	6667	M, F	40	Quantitative	Associational	67%	4.2
Shang et al. (2014)	China	Psychology	1004	M, F	4	Quantitative	Associational	100%	
Shin et al. (2011)	USA	Psychology	295	M, F	73	Quantitative	Associational	100%	
Singh and Steyn (2014)	South Africa	Sociology	40	M, F	5	Qualitative	Associational	83%	1.6
Suldo et al. (2012)	USA	Education, psychology	415	Both	3	Quantitative	Associational	67%	4.3
Toomey et al. (2011)	USA	Psychology	245	M, F	–	Quantitative	Associational	67%	4.3
Turner et al. (2014)	Australia	Education, psychology	492	M, F	4	Quantitative	Associational, longitudinal	67%	4.3
Walsh et al. (2010)	Israel	Education, health	3933	M, F	122	Quantitative	Associational	100%	
Way and Robinson (2003)	USA	Psychology	100	M, F	1	Quantitative	Associational, longitudinal	100%	

A dash in the table indicates that the relevant information was not specified.

^a See Table 4.

Appendix B. Extent and quality of the evidence supporting the links between sub-constructs of school climate and mental health

Linked sub-constructs		Evidence supporting link			
School climate	Mental health	Study	MMAT score		
Social connectedness/relationships	Psychosocial wellbeing	Aldridge et al. (2016)	100%		
		Anderson and Graham (2016)	83%		
		Askill-Williams et al. (2013)	100%		
		Blasco (2004)	50%		
		Brietzke and Perreira (2017)	83%		
		Dessel et al. (2017)	100%		
		Flaspohler et al. (2009)	100%		
		Idsoe (2016)	100%		
		Kubiszewski et al. (2015)	100%		
		Lampard et al. (2014)	100%		
		Lester and Cross (2015)	100%		
		McMahon et al. (2008)	67%		
		Moore et al. (2012)	100%		
		Sarkova et al. (2014)	100%		
		Singh and Steyn (2014)	83%		
		Suldo et al. (2012)	67%		
		Way and Robinson (2003)	100%		
		Social connectedness/relationships	Prosocial/preventative behaviours	Aldridge et al. (2016)	100%
				Riekie et al. (2017)	100%
		Social connectedness/relationships	Mental health issues	Askill-Williams et al. (2013)	100%
Bond et al. (2004)	100%				
Brietzke and Perreira (2017)	83%				
Chen and Wei (2011)	100%				
Cornwell (2003)	100%				
Gerard and Buehler (2004)	100%				
Idsoe (2016)	100%				
Kasen et al. (2009)	67%				
Kubiszewski et al. (2015)	100%				
Lampard et al. (2014)	100%				
LaRusso et al. (2008)	67%				
McMahon et al. (2008)	67%				
Mijanovich and Weitzman (2010)	100%				
Pittman and Richmond (2007)	100%				
Plenty et al. (2014)	100%				
Sarkova et al. (2014)	100%				
Shin et al. (2011)	100%				
Singh and Steyn (2014)	83%				
Turner et al. (2014)	67%				
Walsh et al. (2010)	100%				
Way and Robinson (2003)	100%				
Social connectedness/relationships	Risk behaviours	Bond et al. (2004)	100%		
		Gerard and Buehler (2004)	100%		
		Kubiszewski et al. (2015)	100%		
		Lampard et al. (2014)	100%		
		Langille et al. (2012)	100%		
		LaRusso et al. (2008)	67%		
		Noble et al. (2011)	33%		
		Phuong et al. (2013)	100%		
		Plenty et al. (2014)	100%		
		Reid et al. (2006)	67%		
		Shackleton et al. (2016)	67%		
		Singh and Steyn (2014)	83%		
		Suldo et al. (2012)	67%		

		Walsh et al. (2010)	100%
School safety	Psychosocial wellbeing	Aldridge et al. (2016)	100%
		Lester and Cross (2015)	100%
		Ormerod et al. (2008)	67%
School safety	Prosocial/preventative behaviours	Aldridge et al. (2016)	100%
		Pisani et al. (2012)	100%
		Riekie et al. (2017)	100%
School safety	Mental health issues	Kidger et al. (2015)	100%
		Mijanovich and Weitzman (2010)	100%
		Nijs et al. (2014)	67%
		Ormerod et al. (2008)	67%
		Suldo et al. (2012)	67%
School safety	Risk behaviours	Kidger et al. (2015)	100%
		Noble et al. (2011)	33%
		Pisani et al. (2012)	100%
		Reid et al. (2006)	67%
School connectedness	Psychosocial wellbeing	Aldridge et al. (2016)	100%
		Barrett et al. (2008)	67%
		Lester and Cross (2015)	100%
		McMahon et al. (2008)	67%
		Murnaghan et al. (2014)	100%
		Pittman and Richmond (2007)	100%
		Riekie et al. (2017)	100%
		Toomey et al. (2011)	67%
School connectedness	Prosocial/preventative behaviours	Aldridge et al. (2016)	100%
		Riekie et al. (2017)	100%
School connectedness	Mental health issues	Barrett et al. (2008)	67%
		Kidger et al. (2015)	100%
		Lester et al. (2013)	100%
		Loukas et al. (2006)	100%
		McMahon et al. (2008)	67%
		Pittman and Richmond (2007)	100%
		Pitts (2012)	100%
		Shin et al. (2011)	100%
School connectedness	Risk behaviours	Toomey et al. (2011)	67%
		Barrett et al. (2008)	67%
		Kidger et al. (2015)	100%
		Loukas et al. (2006)	100%
		Phuong et al. (2013)	100%
		Pittman and Richmond (2007)	100%
		Reid et al. (2006)	67%
Academic environment	Psychosocial wellbeing	Toomey et al. (2011)	67%
		(no studies)	
		(no studies)	
Academic environment	Prosocial/preventative behaviours	(no studies)	
Academic environment	Mental health issues	Kasen et al. (2009)	67%
		Pitts (2012)	100%
Academic environment	Risk behaviours	Plenty et al. (2014)	100%
		Pitts (2012)	100%
		Plenty et al. (2014)	100%
		Shang et al. (2014)	100%

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