REVIEW ARTICLE

Impact of School-Based Interventions for Building School Belonging in Adolescence: a Systematic Review

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Abstract

A student's sense of school belonging is critical to school success, yet internationally, a large proportion of secondary students do not feel that they belong to their school. However, little is understood about how schools can address this issue, nor what evidence-based interventions are available to increase belonging among secondary school students. The aim of this study is to identify and critically review the evidence on school-based interventions that increase a sense of school belonging in adolescents. Seven electronic databases and the Cochrane Central Register of Controlled Trials were searched from 1999 to February 2021 using 'school belonging' and 'intervention' amongst the key search terms. A total of 22 controlled trials were identified with 14 studies reporting effective school-based interventions for enhancing a sense of adolescent school belonging. Successful interventions targeted students' strengths and promoted positive interactions between students and between school staff and students. Overall, this review found a paucity of interventions that intentionally aimed to develop adolescent school belonging. Inconsistencies in terminology use and definitions describing school belonging were identified even when similar measurement tools were utilised. Findings of this review have important practice implications and provide information to support schools to select evidence-based interventions to improve students' sense of school belonging.

Keywords Adolescence · Interventions · School belonging · Social and emotional learning · Systematic review

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Introduction

In most educational contexts, and especially secondary schools, a student's sense of school belonging is associated with successful school experiences (Korpershoek et al., 2020). The long- and short-term benefits associated with a students' positive sense of school belonging include improved psychosocial health and adult functioning (O'Connor, 2010; Steiner et al., 2019; Wyman et al., 2019), greater psychological wellbeing (Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018a; Arslan et al., 2020) and reduced instances of school violence, truancy, substance use, mental illness, and bullying (Demanet & Van Houtte, 2012; Lonczak et al., 2002; Shochet et al., 2007; Van Ryzin et al., 2009; Wike & Fraser, 2009). Of concern, approximately one in three students do not feel a sense of belonging to their school (The Organisation for Economic Co-operation and Development [OECD], 2019). A lack of belonging to school by nearly a third of all students is a major educational challenge that has been an international concern for over a decade. Despite the documented benefits associated with school belonging, little is understood about what interventions are available for building a sense of belonging (Korpershoek et al., 2020). The aim of this review is to identify and critically review studies that have evaluated interventions designed to increase students' sense of school belonging in secondary schools.

A students' sense of belonging to their school is described as feeling safe, supported, accepted, and respected by peers and teachers (Goodenow & Grady, 1993). Terms including school engagement, school bonding, school connectedness, and school membership have also been used to refer to the construct (Allen & Bowles, 2012; O'Brien & Bowles, 2013). Although the terminology around school belonging varies, there is relatively greater consistency in how the construct has been operationalised and measured (Libbey, 2004; Parr et al., 2020). Of note, there is wide agreement that all students have a fundamental need to belong and schools can offer a common and predictable avenue of belonging for most students (Baumeister & Leary, 1995; Maslow, 1959). From a developmental perspective, a strong sense of belonging is important for adolescent development and influences social identity, interpersonal relationships, emotional regulation and ultimately, successful transitions into adulthood (Allen, 2020; Allen et al., 2021; O'Connor, 2010).

A useful framework to examine school belonging is through Fredricks et al.'s (2004) behavioural, cognitive, and emotional domains. Although initially applied to school engagement, both school engagement and belonging have a large degree of overlap in how they are conceptualised and accordingly, these terms have been used interchangeably in previous literature (Fischl et al., 2017; Furlong et al., 2003; O'Brennan & Furlong, 2010). Conversely, the term *disengagement* is often used to describe not belonging to school (Willms, 2000). Furlong et al. (2014) describe various belonging terms (e.g., bonding, connectedness) within the context of engagement research and note a splintering in school engagement-related research, with parallel agendas by researchers: one which focuses on academic outcomes such as motivation and participation, the other focuses primarily on sense of connection and relationships, not only with other people, but with the school institution itself. There are clear parallels in how the Fredericks three-pronged model relates to school belonging as defined and operationalised with the studies in scope to this review which have been also observed in previous applications of Frederick's research (see Furlong et al., 2014 for a review). Behaviourally, school belonging involves students' active participation in school, both socially and academically. It involves conduct by students that is conducive to successful school outcomes, and in this way, it signifies the absence of vandalism, truancy and bullying

(Fredricks et al., 2004). Secondly, the emotional domain of school belonging relates to a student's feelings about school, their emotional reactions to school and towards schoolwork, and co-regulation of emotions as well as positive relationships with peers, teachers and other school staff. Lastly, the cognitive domain of belonging relates to the positive or negative thoughts students may hold toward their school. This particular framework has been selected for this study because it is widely accepted that emotional, behavioural, and cognitive engagement are interrelated, that there are multiple indicators for each type, and that these indicators partly overlap with constructs such as motivation to learn, self-efficacy, and attitudes towards school (e.g., Appleton et al., 2006; Fredricks et al., 2004). It also provides a useful lens through which to design and evaluate potential interventions.

Existing Systematic Reviews

To date, there have been no systematic reviews that have specifically focused on examining interventions that increase students' sense of school belonging in secondary school students. Through a systematic review of 365 studies, Greenwood and Kelly (2019) examined the views of secondary school staff on how they might develop a sense of school belonging for students (Greenwood & Kelly, 2019). They found that school staff thought that school belonging operates through bio-psycho-socio-ecological influences, a finding that reinforces the argument that school belonging is a multisystemic and multifactorial construct involving the emotional, cognitive, and behavioural domains described previously (Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018a). Conceptualizing school belonging in this manner underscores that at an intervention level, increasing a sense of belonging in students needs to incorporate comprehensive strategies addressing multiple ecological contexts (e.g., whole school approaches).

Chapman et al. (2013a) conducted a systematic review, including 14 articles which discussed seven different school-based interventions that increased school belonging and reduced students' risk-taking behaviour. They found that all school belonging interventions were conducted over 1–3 years, with elementary school children. Four of the seven interventions evaluated using randomized controlled trials were reported to contribute towards improved outcomes including increased school belonging, improved emotional regulation, and decreased substance use and risk-taking behaviours.

Although several decades of research have shown a positive sense of school belonging to be highly beneficial for students (Abdollahi et al., 2020; Goodenow & Grady, 1993; Lonczak et al., 2002), there is a disparity between understanding the importance of school belonging in a research context and knowing how it can be developed and fostered in schools. As a result, it has been unclear as to what interventions are available to schools for increasing students' sense of school belonging (Korpershoek et al., 2020). The aim of this systematic review is to identify and critically review studies that have evaluated school-based interventions in secondary school settings and have identified positive outcomes for student school belonging. This review also aims to build on previous research by identifying the key components of effective interventions, including intervention content, frequency, duration, and target participants. The results generated from this review can assist school administrators and policy makers make well informed decisions about school belonging interventions and highlight opportunities for future research.

Methodology

The protocol for this review followed PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) guidelines (Moher et al., 2015).

Measuring School Belonging

The term school belonging has been used interchangeably with other terms in literature (e.g., school connectedness, school bonding, school membership, school value, school engagement) which has been widely noted in the literature (Allen & Kern, 2019; Allen, Vella-Brodrick, & Waters, 2017b, 2018c). To account for the various terms used to describe school belonging, this study focused on the measures employed in the identified papers, rather than the terminology used. In order to be selected for inclusion in this systematic review, papers must have incorporated psychometrics that aligned to the definition of school belonging offered by Goodenow and Grady (1993) in their seminal paper. This definition describes school belonging as the extent to which students feel appreciated, respected, supported, and involved in their school social environment. In addition, since school-based intervention programs for school belonging will likely use measures specific to their goals/needs, a large number of instruments and scales will be used to measure the construct. Therefore, to overcome this potential issue we limited our review to studies that specifically used psychometric measures that were either previously reported or validated for the assessment of students' sense of school belonging

Selection Criteria

The systematic review included peer-reviewed articles that reported on students with a mean age between 12 and 18 years, examined school-based interventions of any duration, used an instrument with psychometric properties which addressed at least one of the three domains of school belonging described by Fredricks et al. (2004) (behavioural; cognitive; emotional) and concepts of school belonging described by Goodenow and Grady, published between 1999 and February 2021 and were evaluated using a randomized or quasi-experimental controlled trial. Excluded studies were those that reported on primary or elementary school students or younger, were not based in a school setting, did not measure school belonging in a manner consistent with Goodenow and Grady's (1993) definition used in this review, did not describe an intervention that aimed to promote students' school belonging, did not have a control or comparison group, did not report at least on one domain of school belonging as an outcome, were published prior to 1999 (to ensure the recency of interventions reviewed and to reflect the rapid growth in research in the field over recent years) and were non-randomized, epidemiological or observational studies.

Search Strategy

Electronic databases searched included PubMed, SCOPUS, CINAHL, Embase, PsycINFO, ERIC, EPPI Centre Database of Education Research, and Cochrane Central Register of Controlled Trials. In addition, the citations and references from the eligible studies as well as references from previous reviews were manually searched. Because the focus was on peer-reviewed studies, grey literature such as conferences and thesis were excluded. Authors were contacted for more information on the interventions such as clarification of the instrument used for measuring school belonging and data on school belonging scores where the construct was a

Table 1 PubMed search strategy*

No.	Search term combinations
#1	Students [Mesh] OR adolescent [Mesh] OR adolescence
#2	"middle level" OR Middle-level OR "middle school" OR Secondary OR "Secondary education" OR "high school" OR " Secondary school" OR "Education"[Mesh] OR School OR Classroom
#3	#1 AND #2
#4	Intervention* OR Strateg* OR Program* OR "Restorative practice*"
#5	"school-based intervention*" OR "social-psychological intervention*" OR "educational intervention" OR "Educational intervention*" OR "School community"
#6	#4 OR #5
#7	"sense of belonging at school" OR "school belonging" OR "school identification" OR "school bonding" OR "school membership" OR "student connection" OR belonging OR engagement OR bond OR bonding OR affiliation OR connect* OR attachment OR membership OR "School climate" OR "School involvement" OR "School acceptance" OR relatedness OR "School value"
#8	#3 AND #6 AND #7
#9	Empath* OR "empathic mindset" OR mindset OR mind-set OR "value-affirmation" OR "extracurricular activit*" OR behavior* OR behaviour* OR emotion* OR cognit* OR educational outcome* OR cognit* OR achieve* OR perform* OR motivat* OR "social-emotional" OR "social-emotional learning" OR "positive behavior support" OR "Academic motivation*" OR "Academic achievement*" OR "Academic outcome*" OR "Academic performance*" OR "Academic engagement" OR "Academic success"
#10	#8 AND #9
#11	Review OR "meta-analysis" OR "systematic review"
#12	#10 NOT #11

*Adapted for the other 6 databases

Filter: Publication year 1999 to February 2021, adolescent 13-18 years, Randomized Controlled Trial

subscale of school climate and a separate score was not reported. The main search terms were based on a combination of keywords such as *school belonging, school,* and *intervention* (see Table 1 for full list of key search words and search strategy).

Study Selection and Data Abstraction

Database search results were exported into Endnote X9 reference management software before removing duplicates and downloading the articles for screening. Two authors independently screened the titles and abstracts of potential articles according to the eligibility criteria and resolved any disagreement through discussions until consensus was reached. One author

Table 2 National Health and Medical Research Council (NHMRC), 2009 body of evidence matrix (adapted from: https://www.nhmrc.gov.au/sites/default/files/images/NHMRC%20Levels%20and%20Grades%20(2009).pdf)

Component	Excellent	Good	Satisfactory	Poor
Evidence-base	One or more level I studies with a low risk of bias or several level II studies with a low risk of bias	One or two level II studies or a systematic review/several level III studies	One or two level III studies with a low risk of bias, or level I or II studies with a moderate risk of bias	Level IV studies, or levels I-III studies with a high risk of bias
Consistency	All studies consistent	Most studies consistent	Some inconsistency	Evidence is inconsistent
Clinical impact	Very large	Substantial	Moderate	Slight

screened according to full-text eligibility and a second author verified inclusions. Data extracted from identified studies included: first author and publication year, country, study design, sample characteristics (age, gender, number of participants), intervention characteristics (intervention name and aim, description of content, duration, follow-up), setting and delivery format including the facilitator, and main evaluation results. Meta-analysis incorporating a statistical weighted arithmetic mean was not possible due to the heterogeneity of the studies and the different types of numerical outcome data that were reported. Given the reported variability of methodologies used in the identified studies, the National Health and Medical Research Council (National Health and Medical Research Council [NHMRC], 2009) (see Table 2) criteria for establishing the strength of evidence was used to assess the quality of eligible studies.

Results

The PRISMA flow chart of the study protocol is presented in Fig. 1. A total of 2885 articles were screened after removal of duplicates according to eligibility criteria which yielded 22
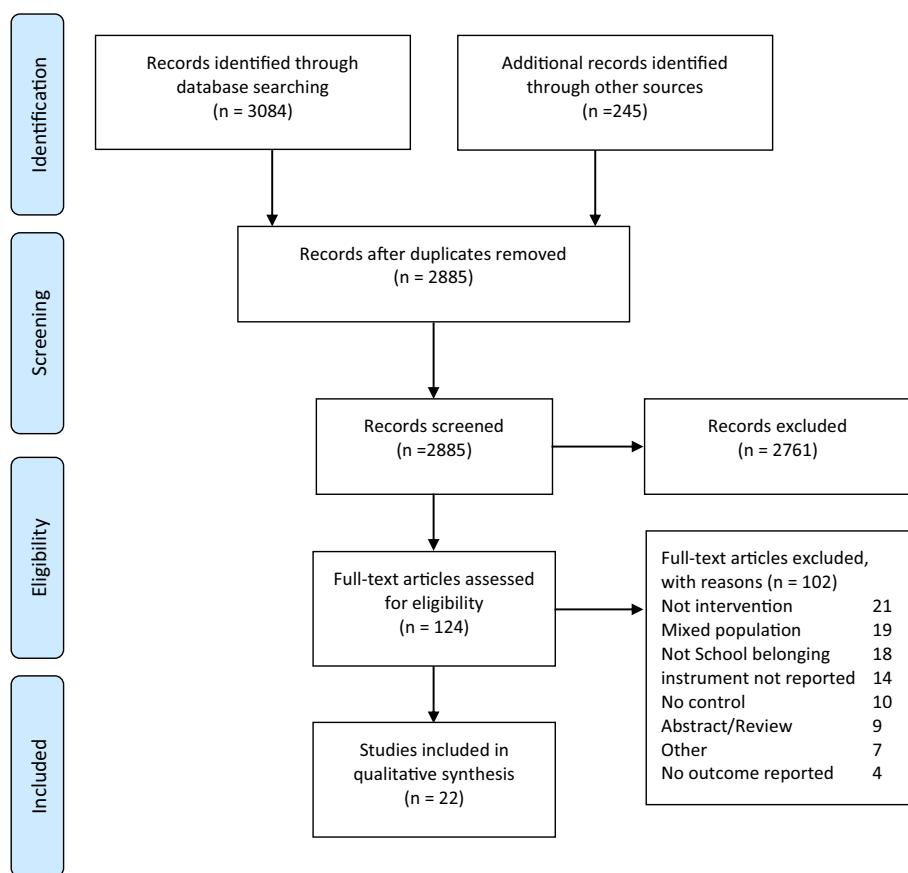

Fig. 1. PRISMA flow diagram of the study

final eligible articles. Out of the 124 full-text articles screened for eligibility, 21 were excluded due to a lack of intervention, 19 focused on a different population of students (not exclusively secondary school), 18 did not use psychometrics aligned to the definition of school belonging used for this study, and 44 were excluded for other reasons. Of the final 22 studies selected for inclusion, fourteen studies were randomized controlled trials with strength of evidence at level II while the remaining eight articles were quasi-experimental with level III-1 evidence (NHMRC, 2009).

Characteristics of Studies

The majority of the studies (n=14) were conducted in the United States, three were in Australia and one study each in Israel, Nigeria, Spain, Uganda, and Canada (Table 3). In 22 of the studies, females comprised 42% to 62% of the participants. One study included all female participants (Mann et al., 2015). Studies included participants from 1 to 22 schools (participants drawn from a total 159 schools), involving 36 to 3649 adolescents, with an overall total of 13834 students participating across all studies. Five studies were based on specific populations, including students experiencing or needing high levels of mental health support (Midgett & Doumas, 2019), students at risk of academic failure (Holt et al., 2008; Kuperminc et al., 2019b), students with disabilities (Espelage, 2016) and students with hearing impairment (Asogwa et al., 2020), with the remaining studies conducted on general student populations. Of the 22 studies, 19 involved a primary focus on building school belonging. In addition to school belonging, interventions targeted subjective well-being (n=4 studies), bullying (n=3 studies), and mentoring (n=3 studies).

Evaluation Methodologies

Of the final 22 studies selected for inclusion, 14 studies were randomized controlled trials with strength of evidence at level II while the remaining eight articles were quasi-experimental with level III-1 evidence (NHMRC, 2009). The 21 unique interventions identified employed 13 different assessment measures, six of which used the Psychological Sense of School Membership (PSSM) scale, three the School Connectedness Scale (SCS), two the School Engagement Survey, and one each used scales from the National Adolescent Health Study, Resilience Youth Development Module Scale, School Belonging Scale, School Success Profile of School Engagement, PSI Student Survey Subscale of Bonding, School Connectedness Questionnaire, Sense of School Membership Scale, School Bonding Scale, School Climate Sense of School Belonging Scale, and the Hemingway Measure of Adolescent Connectedness.

General Features of the Interventions

A total of 19 interventions identified in the review were delivered in person and 3 were delivered in online settings. Out of the 19 interventions delivered using face to face delivery only, one was delivered fully in 2 days while four were delivered once a week, one was delivered twice a week, one delivered three times a week and one intervention delivered once fortnightly. 18 interventions were delivered to groups, three were delivered to individuals, and one was a combination of group and individual sessions. Six studies reported a follow-up intervention which was delivered post intervention, with a timeframe ranging from 3 months to 1 year.

Table 3 Characteristics of identified studies

First author (Year) Country	Study design	Sample characteristics3 (Female%)	Intervention characteristics	
			Intervention name	Intervention Aim
Acosta et al., 2019 USA	RCT	Grade 6, 7 41% 12 years old 2771 students (49%) 13 middle schools (7 intervention & 6 control groups)	Restorative Practices Intervention (RPI)	To evaluate positive impact of the intervention on school connectedness & school environment through 11 restorative practices
Asogwa et al. (2020) Nigeria	RCT	One school Total: 46 students with hearing impairment I: 20 (44%) 12.8 years old C: 26 (56%) 13.2 years old	Video-guided educational intervention package (VGEIP)	To determine the effect of a video-guided educational intervention on school engagement of students with impaired hearing
Burnette et al. (2018) USA	RCT	222 girls (age not reported) I: 115 students C: 107 students 4 rural low-income high school	Project Growing Minds (PGM)	To evaluate effectiveness of a brief, web-based intervention on developing growth mindsets to see if it triggers motivation and a sense of school belonging
Chapman et al., 2013b Australia	RCT	5 Schools Grade 8 13.6 years (50%) Total 299	Skills for Preventing Injury in Youth (SPIY)	Pilot evaluation of the SPIY connectedness + curriculum program on connectedness to school & risk-taking behaviour
Cross et al., 2015 Australia	RCT	I: 19 schools C: 16 schools Grade 10 14-15 years 225 students (53%)	Cyber Friendly Schools Project (CFSP)	To increase sense of belonging in targeted student cyber leaders to help prevent cyberbullying
Espelage, 2016 USA	RCT	12 schools 53% African American Grades 6 to 8 11-12 years old	Second Step–Student Success Through Prevention (SS-SSTP)	To evaluate intervention effectiveness on increasing prosocial behaviors that could serve as protective factors against bullying

Table 3 (continued)

First author (Year) Country	Study design	Sample characteristics3 (Female%)	Intervention name	Intervention Aim
Ferrer-Cascales et al., 2019 Spain	RCT	Total: 123 students with disabilities I: 47 (38%) C: 76 (46%) 22 Schools (50%) 13.1 years I: 10 schools, 987 students C: 12 schools, 1070 students	*Tutoría Entre Iguales* (TEI) program a Spanish peer-tutoring initiative	To assess effect of TEI program in promoting a positive school climate by integration of a culture of zero tolerance
Frank et al., 2017 USA	RCT	One middle school Grade 6 and 9 Total: 159 students (47%)	Transformative Life Skills (TLS) program	To assess effectiveness of a yoga & mindfulness program on adolescent emotional distress & prosocial behaviour
Garcia et al., 2011 USA	RCT	2 high schools Grades 9 and 10 13-16 years Total: 41 students	Project Wings Girls' Group	To examine outcomes of Project Wings Girls' Group to improve mental health & school connectedness of Latina adolescents
Holt et al. (2008) USA	RCT	Public high school Grade 9 'at risk' of academic failure students 47% Latino 38% African American N=36 (42%)	Achievement Mentoring Intervention (AMP)	To investigate whether adult mentoring intervention improves adolescents' school engagement
Jenkinson et al., 2018 Australia	QE	2 secondary schools Grade 7 (12-13 years) I: 170 C: 143	Girls! Lead! Achieve! Mentor! Activate! (GLAMA) Boys! Lead! Activate! Succeed Together! (BLAST)	To examine impact of a transition program on school connectedness & physical activity self-efficacy (PASE)
Johnson et al., 2008 USA	QE	1 school, 2 classrooms 100 students (50%)	Peer Group Connection program	To improve bonding to school and reduce negative behaviors through peers and adult mentoring
Kuperminc et al., 2019a USA	QE	Hispanic/Latino (61.6%) grade 9 students	Project Arrive (PA)	

Table 3 (continued)

First author (Year) Country	Study design	Sample characteristics3 (Female%)	Intervention name	Intervention Aim
		12.8-15.9 years (median 14 years) I: 114 students (48%) from 4 High schools C: 71 students (49%) from 2 high schools		To examine PA effect on promotive factors such as school belonging that increase resilience of academically vulnerable adolescents
Lewis et al., 2006 USA	RCT	One black public middle school Grade 8 Mean age 13.3 years (47%) I: 31 students C: 26 students	Project EXCEL	To evaluate effect of an emancipatory education course on psychological & behavioural well-being of African American adolescents specifically on students' communal views, individualism, school connectedness, motivation to achieve, and social change activities
Mann et al., 2015 USA	QE	2 public schools 54.6% White & 29.4% Hispanic 12-14 years Total 48 students (100%)	REAL Girls intervention (based on Project Challenge)	To promote resilience, school connectedness & effective coping skills in multiple risk school girls
Mcloughlin, 2009 USA	QE	17 Schools grade 712 years old (NR) Total: 198 students	Positive peer groups (PPG) program	To increase bonding to school, establish a psychological sense of school membership & enhance development of social skills and competence
McMullen & McMullen, 2018 Uganda	QE	4 middle schools Mean age 14-15 years (44%-56%) I: 92 C: 78	Living Well program	To determine effectiveness of a life skills-focused & manualized intervention in improving self-efficacy & promoting a sense of connectedness
Midgett & Doumas, 2019 USA	RCT	I: 22 students C: 20 students Total 42 students (62%) 15-18 years Students requiring high levels of mental health support	STAC	To evaluate the effectiveness of STAC, a brief bullying bystander intervention on depressive symptoms of adolescents & its association with sense of school belonging

Table 3 (continued)

First author (Year) Country	Study design	Sample characteristics3 (Female%)	Intervention characteristics	
			Intervention name	Intervention Aim
Orthner et al., 2013 USA	RCT	One high school Age and gender information not reported 14 Middle schools 3649 (48%) Asians/ Caucasians 47% African American, Hispanic 53%	career-relevant instruction (CRI) and CareerStart	To assess effects of CareerStart & Career-Relevant Instruction on school engagement of middle school students
Portwood et al., 2005 USA	QE [4]	5 middle schools Total 208 students (52%) 35% middle & high school students	YouthFriends	To establish the effect of mentoring interventions in school children on substance use as well attitudes toward others, school academic performance and school connectedness
Shoshani et al., 2016 Israel	RCT	6 schools Grades 7 to 9 I: 1262 students C:1255 students (50%)	Maytiv	To examine effects of Maytiv intervention on student's subjective well-being, GPA, school attendance & engagement longitudinally
Wright et al. (2007) Canada	QE [4]	4 schools Grade 9 Mean age: 14 years I: 146 (LRY), 111 (HRY) C:51 (LRY) 60 (HRG) Total 400 students (50%)	SSDP	To determine effects of preventive interventions for antisocial behaviour in adolescents by promoting conditions conducive to the development of strong bonds to school

First author (Year) Country	Intervention characteristics		Main Findings	Level of Evidence1
	Intervention content	Setting and delivery format (Duration)		

Table 3 (continued)

First author (Year) Country	Intervention characteristics		Main Findings	Level of Evidence1
	Intervention content	Setting and delivery format (Duration)		
Acosta et al., 2019 USA	RPI is focused on relationship building, social and emotional skills (peer & school systems) Three core components: 1) continuous positive teacher-student relationships (2) builds on skills of students coached by teachers on 7 out of 11 essential practices (3) students translate skills into practice as they become proficient in the 7 essential practices	Group classroom setting Supervised by teachers Delivery is online (2 years, no follow-up)	Supportive school environment created higher school connectedness (but Intervention itself did not create a whole-school change)	II
Asogwa et al. (2020) Nigeria	The video-guided educational intervention involved a 13-minutes captioned video clip of hearing-impaired individuals by a 30 min group discussion. Video clip focused on different aspects of school engagement as related to hearing impairment, relationship with others, as well as strategies to improve school engagement.	Group classroom setting Group discussion moderated by one of researchers (12 weeks, 3 months follow-up)	Intervention was effective in improving school engagement of special needs adolescent students compared to control group.	II
Burnette et al. (2018) USA	PGM focus is on emotional and academic skills. Three core interactive modules related to success in high school: intelligence, person and self-regulation mindsets.	Individual setting Delivery is web-based platform (45minutes, follow-up 4 months)	Although intervention group had stronger mindset, but no effect was observed on school belonging	II

Table 3 (continued)

First author (Year) Country	Intervention characteristics		Main Findings	Level of Evidence
	Intervention content	Setting and delivery format (Duration)		
Chapman et al., 2013b Australia	4 parts: 1. Research on growth mindsets; 2. Growth mindset mantra, 3. Role-model, and 4. 'saying is believing' exercise. SPIY Curriculum component: targets risk-taking behaviours (e.g. risky transport & substance use). Primary aim is to increase safer behaviours. SPIY Connectedness component: support individual behaviour changes as targeted by the SPIY curriculum	8 weekly, 50-min lessons based around presentation of a risk-taking injury scenario, delivered by health teachers (6 months) manualized program of presentations & interactive discussions	Although the intervention did not impact school connectedness scores, however intervention group reported lower violence risks than control group.	II
Cross et al., 2015 Australia	4-6 students/school acted as cyber leaders who were trained to develop leadership strategies to implement minimum 3 whole school CFSP activities (e.g. cyberbullying education prevention training) per year.	School Group, online delivery Supervised by teachers (3 years no follow-up)	CFSP training intervention contributed positively to sense of belonging and competence of cyber leaders	II
Espelage, 2016 USA	Intervention covers social emotional targets (e.g. bully prevention, empathy communication skills)	Setting classroom groups face-face 15 lessons delivered by teachers in grade 6 and 13 lessons Grade 7,8 50 min sessions/lesson (3 months no follow-up)	Increase in self-reported school belongingness compared to control (but non-statistically significant)	II
Ferrer-Cascales et al., 2019 Spain	Intervention involved: 1) Cohesion activities (2 session/quarter) 2) Tutorial activities of per-tutoring. (once a month) 3) Specific activities to develop a specific skill (9x one-hour sessions throughout the year)	Setting one-one lessons delivered by student tutors (trained for 3 sessions) and monitored by trained teachers (for 30 hours) (3 months)	Significant improvement in school climate subscale of sense of belonging in intervention compared to control group	II

Table 3 (continued)

First author (Year) Country	Intervention characteristics	Setting and delivery format (Duration)	Main Findings	Level of Evidence1
	Intervention content			
Frank et al., 2017 USA	universal classroom-based program total of 4 units, delivered as 12 sessions of 30 minutes each 3–4 times a week	Group classroom setting, delivered by experienced yoga instructors (3 months)	Intervention group showed significant increases in school engagement with reductions in school detention and absences	II
Garcia et al., 2011 USA	16 sessions x 3 hours each A booster session at 3-month post–intervention Program included relaxation exercises and skills building to positively manage stress including identifying social supports.	Group classroom setting, delivered by study-hired bilingual staff with prior experience mental health and cofacilitated by bilingual Latina school staff member (1 year with 3 & 9 months follow-ups)	Intervention group demonstrated increased school connectedness but it was not statistically significant	II
Holt et al. (2008) USA	The mentors were teachers and school counselors: 1. once a week talked to the student's teachers about a positive thing student did that week 2. meet with student for about 20 min to problem-solve how to keep the positive behaviour & complete assignments 3. practice a relevant behaviour with the mentee, such as doing homework together 4. Check school attendance & discuss report cards	Individual format 5 month (with a 6 month follow up)	Intervention group exhibited significantly higher level of school belonging than control post-intervention but no significant difference at follow-up	II
Jenkinson et al., 2018 Australia	Stealth approach: specific activities used in the program were challenge sessions of 48 minutes followed by 20 minutes activities.	Teams of 4-6 year 7 students led by their peer leaders (year 10). (8 weeks) Delivery mode physical activity by teachers	School connectedness decreased in Students from control & intervention Longer time may be required to elicit positive school connectedness changes.	III

Table 3 (continued)

First author (Year) Country	Intervention characteristics		Main Findings	Level of Evidence1
	Intervention content	Setting and delivery format (Duration)		
Johnson et al., 2008 USA	universal program included team building, anger management, conflicts in relationships, and communication skills.	Delivered by peer-leaders 16 modules over one year (12-16 students) Peer leaders were trained by teacher advisors (1 year)	No significant time-by-group interaction for school bonding	III
Kuperminc et al., 2019a USA	Project Arrive (PA) based on relationship building and academic & emotional skills development	Setting is group delivery by school staff or community partners	Significant effects in intervention	III-1
	The design of intervention materials allowed for autonomy encouraging a positive sense of school connectedness and academic development.	format face to face classroom setting	group for external resources such as school belonging compared to control group	
	Common activities in group sessions were ice breakers (100%), academic check-ins (98%), games (98%) closing reflections (98%), and field trips (93%).	(50min per session, 1 year, no follow-up)		
Lewis et al., 2006 USA	1. Based on cohesion-building, leadership & social change for students (educational component). 2. Involved engaging in traditional African practices (empowerment component) students received daily positive affirmations to enhance school connectedness	Delivered by teacher in consultation with psychologist. Setting is group delivery format 3x week (one semester, 4 months (no follow-up)	Intervention group more positive change in school connectedness over time compared to control	II
Mann et al., 2015 USA	It combines 12 core strategies of Project Challenge intervention directed to influence intrapersonal characteristic of academic self-efficacy, interpersonal characteristic of school connectedness, and identity	Delivered by teachers in groups over 2 full school days with a 2-hour booster treatment (10 days, follow-up at 3 months)	Moderately larger increase in scores for school connectedness, self-efficacy and identity post-intervention and follow-up	III-1

Table 3 (continued)

First author (Year) Country	Intervention characteristics Intervention content	Setting and delivery format (Duration)	Main Findings	Level of Evidence1
Mcloughlin, 2009 USA	Students plan an evaluate the impact of a project with positive influence of peers on projects that improve school such as designing signage for their school	Setting is group Delivery by psychologists & educators (25 weeks)	Intervention had a statistically significant impact on student's bonding to school	III-2
McMullen & McMullen, 2018 Uganda	Promotes mental health and resilience, communication Skills, 24 lessons plans 6 lessons of 45-60 min on: 1) Living Well with Ourselves and Others; 2) Living Well with Worry and Stress; 3) Living Well with Life's Issues; and 4) Living Well in the Future	Group setting delivery by teachers in consultation with researchers (12 months)	Overall connectedness improved significantly (which included connectedness to peers, religion, self in past and present as well as to school) however intervention did not specifically increase school connectedness	III-2
Midgett & Doumas, 2019 USA	Based on development of emotional skills & conflict resolution. Students were trained on four STAC anti-bullying strategies: "distraction, turning it over, accompanying peers & coaching compassion."	Setting is group Delivery by counseling graduate students Mode: face to face (90 min training, 15 min meeting, 4 weeks, no follow-up)	STAC intervention is effective in reducing depression symptoms in high school students through a sense of school belonging	II
Orthner et al., 2013 USA	Teachers in core middle school courses apply CRI by showing career examples from industries that operate in the location of schools.	Delivered face-to-face (3 years) by teachers	Intervention group were significantly more likely to value their education than in control group as measured by school valuing. Students exposed to higher CRI reported significantly greater levels of school engagement and valuing	II
Portwood et al., 2005 USA	School-based mentoring	Individuals or groups of students alone or with an adult met with a volunteered mentor (not specified) at least one hour per week (>8 months)	Children in the intervention program developed a sense of school membership.	III

Table 3 (continued)

First author (Year) Country	Intervention characteristics		Main Findings	Level of Evidence1
	Intervention content	Setting and delivery format (Duration)		
Shoshani et al., 2016 Israel	Positive Psychology-based intervention aims to increase students' sense of engagement & overall psychological well-being Maytiv has 8 components that are translated into practice through stories, discussions, and activities	Delivery by teachers in consultation with clinical psychologists, school counselors ad research team Setting classroom groups Mode: face-face (2 hour sessions 2x weekly for 15 weeks and 1 year follow up)	Increase in school engagement (emotional and cognitive engagement and GPA scores)	II
Wright et al. (2007) Canada	Includes three interventions: 1.Cooperative learning, 2. Classroom management 3. Peer tutoring, mentoring, and mediation	Delivered by teachers & counselors Setting classroom group (3 months)	Intervention group: Increase in student sense of belonging in low-risk youth No significant change in high-risk youth	III

Abbreviations. *C*: Control; *EXCEL*: Ensuring Excellence through Communalism, African Education, & Leadership; *I*: Intervention; *HRY*: High-risk youth; *LRY*: low-risk youth; *QE*: Quasiexperimental; *RCT*: Randomized controlled trial; *SSDP*: Secondary Schools Demonstration Project; *STAC*: "stealing the show," "turning it over," "accompanying others," and "coaching compassion"

[1] According to NHMRC level of evidence 2009

[2] Mentors were teachers, student support professionals, administrators or community volunteers

[3] Only participants completing the intervention were included

[4] A two-group comparison before-and-after design

As summarised in Table 3, 12 studies involved school wide approaches to improving the quality of social interactions (whole school), six studies were curriculum-based, involving session content delivered by teachers, one study involved mentoring, and three studies involved improving social interactions but it was unclear if this was via a whole school or curriculum approach. The three domains of school belonging used for the review, namely, *behavioural* (involvement in academic, social or extracurricular activities), *cognitive* (willingness and motivation), and *emotional* (positive and negative feelings regarding teachers, peers, and the school) belonging (Fredricks et al., 2004), were targeted by the interventions to varying degrees. All three domains were investigated in nine studies; behavioural and emotional belonging was investigated in 11 studies; emotional and cognitive domains were investigated in one study; and behavioural and cognitive domains were investigated in one study. The content of the interventions was highly heterogenous. Some of the more commonly described content areas included the promotion of peer-support or interaction (13 studies), increasing school-support (9 studies), increasing self-efficacy (8 studies), enhancing social skills (6 studies), building empathy (4 studies), developing problem-solving skills (4 studies), building emotional regulation/stress coping skills (3 studies), a focus on mindfulness, awareness, gratitude, and/or meditation (3 studies), and strengthening resilience (2 studies) (Table 4).

Thirteen studies reported effect sizes (Cohen's *d*) ranging from 0.13 to 0.85 while 14 studies reported statistically significant interventions ($p<0.05$). As well as increased school belonging, the findings indicated improved mental health, increased prosocial skills, and less risk-taking behavior among the adolescents postintervention (Table 4).

A series of Chi-Square Independence Tests were conducted using Microsoft Excel. Each test compared one categorical attribute with the presence of a significant p-value (<0.05) in the papers included in this study. Variables tested include Group vs Individual delivery (Group, Individual, Mixed), In-Person vs Online delivery (In-Person, Online), Duration (<1 year, 1-2 years, >2 years), Behavioural Domain (Y, N), Cognitive Domain (Y, N), Emotional Domain (Y, N), Peer-Support Intervention (Y, N), School-Support Intervention (Y, N), and Self-Efficacy Intervention (Y, N). The other types of interventions were rare enough in the sample that they were not tested. Results of this test are included in Table 5. No significant relationships were found between any categorical attributes of interventions and whether the intervention was significant or not.

Discussion

This study aimed to identify and critically review interventions that have been found to improve students' sense of school belonging in secondary schools. Although this review identified that the weight of evidence was generally strong (as defined by multiple high-quality studies utilizing randomized controlled trials, satisfactory consistency across studies and moderate to substantial clinical impact), only 22 experimental design studies in total have been conducted on interventions to improve school belonging in secondary school students. More research is needed to evaluate the short- and long-term gains for students (and whole school communities) associated with school belonging interventions, as well as the sustainability of interventions. Based on the evidence reviewed here, interventions focusing on cognitive, behavioural or emotional domains of belonging, and targeting whole school or curriculum areas were effective in improving students' sense of belonging.

Table 4 Summary of the intervention characteristics

Intervention and implementation fidelity %	Intervention definition used main focus	Focus of strategy and Approach	Domains of School belonging Student outcome	Main themes explored	Theoretical framework used
Achievement Mentoring Intervention (AMP) [b]	School engagement/ school belonging Mentoring	Whole school	Behavioural Cognitive engagement	1.self-efficacy 2. positive accomplishment	BMRP based on social cognitive theory (Bandura, 1986)
GLAMA & BLAST NR	School connectedness Peer-Mentoring	Social interaction	Behavioural Emotional Cognitive engagement	1.teamwork 2. cognitive strategies 3. peer-support 4.school-support 5. Social self-efficacy 6. PASE	Bandura's Social Cognitive Theory (SCT) (Bandura, 1986)
Peer Group Connection program 82% [c] 13/15	School bonding or school attachment Mentoring	Whole school Social interaction	Behavioural Emotional Cognitive engagement	1.resist negative influences 2. set realistic goals 3. anger management	Social learning theory (Bandura, 1977) Developmental tasks concept (Erickson, 1963) Social development model (Catalano et al., 1996)
Project Arrive (PA)	School belonging Mentoring	Social interaction Whole school	Behavioural Emotional engagement	1.self-efficacy 2. self-awareness 3.empathy 4.problem-solving 5.peer-support 6.school-support 7.home-support 8. resilience	Resilience Youth Development Module (RYDM; Hanson & Kim, 2007)
Ensuring Excellence Communalism, African Education, & Leadership (EXCEL)	School connectedness communalism (cohesion-building)	Social interaction Curriculum-based	Behavioural Emotional engagement	1.motivation 2.social skills 3. communalism	Model by Triandis et al. (1998)
REAL Girls intervention	School connectedness Developing Resilience	Social interaction Whole school	Behavioural Emotional engagement	1.resilience 2. academic self-efficacy	Lazarus's transactional model of stress & coping (Lazarus & Folkman, 1984) Project Challenge (Mann, 2013)

Table 4 (continued)

Intervention and implementation fidelity %	Intervention definition used main focus	Focus of strategy and Approach	Domains of School belonging Student outcome	Main themes explored	Theoretical framework used
Positive Peer Group (PPG)	Bonding to school	Social interaction Curriculum-based	Behavioural Cognitive Emotional engagement	1.problem solving 2.peer support 3. self-confidence 4. work ethics 5. anger management	Theory developed by Wonderly based on Motivation, Behaviour & Emotional Health (1991)
Living Well program	School connectedness Mental health promotion	Social interaction Curriculum-based	Behavioural Cognitive Emotional engagement	1. self-efficacy 2. prosocial skills 3. peer- support 4. school support	Not reported
STAC intervention	School belonging Positive Psychology (bullying)	Social interaction Whole school	Behavioural Emotional engagement	Bullying Victimization	Bully-Proofing CARES strategies (Garrity et al., 1997)
CareerStart Career-Relevant Instruction	student engagement Psychosocial	Teachers	Behavioural Emotional engagement	Career	Possible-selves theory (Markus & Nurius, 1986)
YouthFriends	School Connectedness sense of school membership	Mentoring	Behavioural Emotional Cognitive engagement	Mentoring	None reported
Maytiv intervention	School engagement Positive Psychology	Curriculum-based Whole school	Emotional Cognitive engagement	1.empathy 2.gratitude 3.mindfulness 4.hope 5. school-support 6.peer-support 7. character strengths	PERMA model (Seligman, 2011)
Secondary Schools Demonstration Project (SSDP)	Sense of school belonging School attachment	Social interaction (Anti-social behaviour)	Emotional Behavioural Cognitive	1. conduct disorder 2.cooperative learning	Social development model (Hawkins & Weis, 1985).

Table 4 (continued)

Intervention and implementation fidelity %	Intervention definition used main focus	Focus of strategy and Approach	Domains of School belonging Student outcome	Main themes explored	Theoretical framework used
				3. peer-support 4.school-support 5.home-support 6. self-efficacy.	

Intervention and implementation fidelity %	Assessment tools used to measure school belonging	Duration of intervention	Effect size [a]	Study, first Author (Year)
Achievement Mentoring Intervention (AMP) [b]	Psychological Sense of School Membership 12 items	5 months	0.75*[1]	Holt et al. (2008)
GLAMA & BLAST NR	School connectedness Questionnaire 4-point scale (Bond et al., 2007)	8 weeks	NR	Jenkinson et al., 2018
Peer Group Connection program 82% [c] 13/15	Modified Psychological Sense of School Membership Scale	12 months	NR	Johnson et al., 2008
Project Arrive (PA)	Resilience Youth Development Module: 5 School belonging scales	12 months	0.64*[1]	Kuperminc et al. (2019a)
Ensuring Excellence Communalism, African Education, & Leadership (EXCEL)	Psychological Sense of School Membership 18 items	4 months	0.85*[1]	Lewis et al. (2006)
REAL Girls intervention	School Connectedness Scale 5 items	2 days +2 hr booster after 10 days	0.46	Mann et al. (2015)
Positive Peer Group (PPG)	PSI student Survey subscale Bonding to school 4 items	Core program 20 weeks, plus 5 weeks for organising the research	0.023*[1]	Mcloughlin (2009)
Living Well program		12 months	NR	

Table 4 (continued)

Intervention and implementation fidelity %	Assessment tools used to measure school belonging	Duration of intervention	Effect size [a]	Study, first Author (Year)
	Hemingway Measure of Adolescent Connectedness Version 5.5 6-items			McMullen and McMullen (2018)
STAC intervention	Psychological Sense of School Membership 18 items	4 weeks	0.28*	Midgett and Doumas (2019)
CareerStart Career-Relevant Instruction	School valuing[a] School Success Profile School Engagement (SSPES [a])	3 Years	NR*	Orthner et al. (2013)
YouthFriends	Sense of school membership	8 months	NR*	Portwood et al., 2005
Maytiv intervention	School engagement survey: -behavioural 7 items -cognitive 22 items -emotional 22 items	4 months	0.24-0.71*	Shoshani et al., 2016
Secondary Schools Demonstration Project (SSDP)	SCM: Effective School Battery (Student Survey) subscale, 7 items: Sense of School belonging	12 months	Low-risk youth: 0.31* High-risk youth: 0.01	Wright et al. (2007)

Abbreviations:

BLAST: Boys! Lead! Activate! Succeed Together!*GLAMA*: Girls! Lead! Achieve! Mentor! Activate!*SAI*: Student Attitudinal Inventory for Outcome Evaluation of Adolescent Drug Use Prevention Programs (Kim, 1981)*SCM*: School Climate Measure*PASE*: physical activity self-efficacy

* Denotes significance set at * $p < 0.05$ for intervention group compared to control group or [1] change over time

[a] Cohen d

[b] Minority adolescents

Table 5 Summary of Chi-Sq Independent Tests

Significant P-Value (Y/N) vs …	Chi-Sq Test P-Value	Dependent or Independent
Group vs Individual	1.0000	Independent
Online vs In-Person	1.0000	Independent
Behavioural Domain (Y/N)	1.0000	Independent
Emotional Domain (Y/N)	1.0000	Independent
Cognitive Domain (Y/N)	1.0000	Independent
Duration (<1 year vs 1-2 years vs >2years)	1.0000	Independent
Peer-Support (Y/N)	1.0000	Independent
School-Support (Y/N)	1.0000	Independent
Self-Efficacy (Y/N)	1.0000	Independent

Successful interventions targeting school belonging identified by this review focused on building students' strengths and promoting positive interactions between students and between school staff and students. Among the interventions not specifically targeting school belonging (such as those aiming to reduce bullying; n = 3), interventions were found to generate improved competence to prevent cyber bullying (Cross et al., 2015), increased student sense of belonging (Cross et al., 2015; Espelage, 2016), and reduced student depression levels (Midgett & Doumas, 2019).

Of the interventions identified in this review, nine focused on the behavioural, emotional, and cognitive domains of school belonging, while the remainder focused on either the behavioural and emotional domains, the emotional and cognitive domains, or the behavioural and cognitive domains. Prior research has specified that a bio-psycho-social-ecological model is needed to enhance school belonging for students (Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018a). However, results of this review found that even interventions targeting only two of these aspects of belonging (i.e. behavioural and emotional or behavioural and cognitive) appear to be effective in enhancing students' sense of school belonging.

All but one intervention targeted behavioural domains of belonging among students. There is strong evidence in the literature for the effectiveness of the behavioural modules when incorporated into belonging interventions (e.g., social skills training, problem-solving, and goal planning) in reducing psychological distress of adolescents (Martin & Oliver, 2019). These intervention components aim to improve students' relationships with their peers (either through behaving more pro-socially or by reducing bullying among peers) and to improve the mental health of children (Pearce et al., 2011). Further, interventions focusing on students' emotional regulation and co-regulation with peers and teachers have also been demonstrated to be effective in improving the psychological wellbeing and social connectedness of students in primary and secondary schools (Blaustein & Kinniburgh, 2019).

Research has also identified that vulnerable children who are at risk of poor school connectedness are those who experience impaired regulation of their emotions, poor attachment and limited co-regulation of emotions with teachers and peers, and impulsive and dysregulated behaviour at school (Berger, 2019). Our review of school belonging interventions for students requiring mental health support, students with disabilities and students at risk of academic failure (n = 5) revealed positive implications for these student groups in terms of increasing their levels of school belonging after the intervention (Asogwa et al., 2020; Espelage, 2016; Holt et al., 2008; Kuperminc et al., 2019a; Midgett & Doumas, 2019). However, the limited number of studies with students representing these groups means that additional research is required to show the sustained benefits of school belonging interventions

for students who typically experience the lowest levels of school belonging, emotional control, and school attachments. It is clearly evident from this review that emotional regulation, engagement and control are important for interventions promoting relationships and connectedness in schools, with all but one intervention including an emotional component to increase students' sense of school belonging.

Finally, school-based interventions targeting the cognitive domain of school belonging have a very strong evidence-base in the psychological literature, and from the interventions reviewed, fostering students' adaptive cognitions was effective in improving belonging. Self-reflection and identifying character strengths and motivations were important elements of effective cognitive interventions. In addition, cognitive-based interventions for students that focus on more adaptive thoughts and motives that drive feelings and actions have been shown to reduce children's psychological distress (Oud et al., 2019). Unfortunately, from this review, it is not possible to separate the unique contribution of strategies targeting the cognitive, emotional or behavioural domains of belonging. However, the incorporation of all or most of these domains of belonging into effective interventions provides additional support for the use of these multiple strategies within belonging interventions.

Limitations and Future Research

The limitations of this review highlight the limitations within the school belonging literature more generally. Specifically, the literature on school belonging uses inconsistent language and definitions of school belonging which, in the context of this review, resulted in a large number of studies that may have been removed despite being related in some way to school belonging (e.g., social belonging). In addition, the majority of interventions reviewed targeted elements of behaviour regulation, emotional control and/or cognitive restructuring to reduce behaviours that prevent students from feeling connected to their peers and school (i.e., bullying), rather than designing and testing interventions specifically aimed at enhancing students' sense of school belonging. Future research in the school belonging area would benefit from intervention evaluations that compare the emotional, behavioural and cognitive components of these interventions, and which compare interventions based on whether they provide one off support or ongoing support and mentoring for students. This review found only a limited number of high-quality evaluations that included a control group and therefore conclusions about the design and delivery of effective interventions to improve students' school belonging are tentative.

Many of the papers included in this study were heterogenous in nature. It was not possible to specifically pinpoint which types of interventions seemed to work better than others. Because such a small sample of intervention experiments was identified, and the selection of interventions tested was heterogenous, few conclusions could be drawn about the effectiveness of any given class or style of intervention. Interventions ranged from group to individual delivery, in-person to online settings, two days through three years of deployment, addressed a different mix of the domains from Fredricks et al. (2004) model, and focused on a variety of pedagogical techniques. There were no observed correlations between any of the categorical attributes and a significant p-value. Future studies would benefit by testing specific intervention attributes for their ability to improve school belonging. Furthermore, it should be noted that many of the identified studies measured a variety of related outcome variables that may have included school belonging as a component, but did not report the effect separately from other outcomes (e.g., measured school climate, which includes school belonging as one of the outcomes, but no effect for *just* school belonging was reported). It is also not possible to

comment on the sustainability of the identified interventions. Although many of the interventions were implemented over a series of several months or years, it is unknown what kind of impact a longer-term implementation might have on school belonging, or whether a school or classroom could continue to follow these kinds of activities for a long period of time.

Conclusion

This study systematically reviewed the results of published interventions that aimed to improve students' sense of belonging in secondary schools. Although many of the identified studies found a positive effect on student school belonging, not all study designs specifically targeted student's sense of belonging. This is despite well-established evidence that has found that school belonging is an important factor in successful school outcomes (Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018a). Additionally, a majority of schools now view both school belonging/well-being and academic achievement as key priorities (Allen, Kern, et al., 2017a; Allen, Kern, Vella-Brodrick, & Waters, 2018b). The study has practical implications for school staff seeking to identify interventions that increase school belonging. It is recommended that future research adopts well validated, multifactorial measures of school belonging, incorporates control groups into evaluations, and that the components of whole school interventions for school belonging are implemented in a rigorous manner with adequate follow-up. Such research will help facilitate empirically supported conclusions about the utility of whole school intervention strategies and demonstrate how specific intervention strategies are linked with improved school belonging.

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