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Systematic and evaluative review of school climate instruments for students, teachers, and parents

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Abstract

This study involved a systematic and evaluative review of school climate measures to catalog main domains and subdomains and rate parameters of instrument presentation and psychometric quality. Four databases were used (Web of Science, Scopus, ERIC, and PsycINFO) and 37 instruments (studies) met inclusion criteria (instrument measured school climate; psychometric properties of the instrument were provided; every instrument included in the review has its original version published; the article was in English or Spanish; the article was a peer-reviewed publication). Information was synthesized according to instrument presentation and psychometric quality. The expansion of literature search routes was designed to mitigate publication bias. Analysis revealed four main domains among extant school climate measures: relationships (social relationships, school connectedness, leadership, and culture), environment (school facilities, physical comfort, and cleanliness), safety/discipline (school safety, fairness of rules, bullying and aggression, disciplinary harshness, and general drug use), and academic (academic outcomes, equality of opportunity, engagement, and cohesiveness/competitiveness). This domain/subdomain

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architecture could serve as a touchstone for conceptualizing school climate and developing and refining future assessment devices for this construct. The domain/subdomain architecture could also help guide school reform efforts. Limitations included possible publication bias and an exclusive focus on questionnaires and not other methods to assess school climate.

KEYWORDS
assessment, school climate, systematic review

1 | INTRODUCTION

An important focus of educational policy and practice in recent years has involved enhancing school climate in various academic environments. School climate is a multidimensional construct of the "quality and character of school life" that reflects "norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures" in educational institutions (Thapa & Cohen, 2017, pp. 303–304). School climate has a wide array of conceptualizations with central themes of individual-group relationships and physical surroundings, with broad domains such as safety, teaching and learning, relationships, and environmental/structural (Cohen et al., 2009; Van Houtte, 2005). As such, the measurement of school climate has been marked by considerable variability and breadth as well as a wide scope of informant targets that include students, teachers, and parents (Ramsey et al., 2016).

Core dimensions of school climate often surround *safety* (clear rules and norms; relational aggression; respect for others; supportive environments) (Capp et al., 2020; Goldstein et al., 2008); *school connectedness* (commitment to social and academic goals; involvement in social and academic activities; student affective attachment to the school community) (García-Moya et al., 2019); *school facilities* (availability of resources and supplies; condition of the physical setting) (Gislason, 2010); *social relationships* (parent involvement; respect for diversity; supportive relationships with peers and teachers) (Bradshaw et al., 2014; Gage et al., 2014); and *teaching and learning practices* (quality of instruction; social emotional learning; support for academic achievement (Gage et al., 2016). Other proposed school climate dimensions include community, equity, institutional/academic environment, leadership, safety, and shared beliefs, among others (Rudasill et al., 2018; Uline et al., 2010). School climate dimensions often vary and overlap in scope (Thapa et al., 2013).

School climate has been an important focus of educational policy and practice because of its positive linkage to multiple domains of functioning for children and adolescents. School climate is associated with improvements in academic, mental health, and behavioral domains such as achievement, bullying and violence, depression and suicidality, disciplinary referrals, psychosocial wellbeing, quality of life, self-esteem, school dropout, and substance use (J. M. Aldridge & McChesney, 2018; Cornell & Huang, 2016; Maxwell et al., 2017; Zullig et al., 2018). School climate quality has also been found to be closely related to school attendance across several studies (Brookmeyer et al., 2006; Hendron & Kearney, 2016; Ingul et al., 2012; Van Eck et al., 2017). School climate is a particularly salient factor for diverse student groups with respect to school attendance (Pizmony-Levy & Kosciw, 2016; Voight et al., 2015).

Mechanisms of action for these relationships have also been explored with respect to key school climate domains. *School safety*, for example, can encompass safe transportation to school, clear behavioral rules and

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expectations and consequences, and freedom from victimization, all of which enhance school attendance and engagement (Kingston et al., 2018). In addition, *school connectedness* acts as a protective factor against risky behavior and boosts student participation in campus-based activities (Martinez et al., 2016; Weatherson et al., 2018). The condition of *school facilities* also positively impacts attendance, learning, and beliefs about school (Mizunoya et al., 2018). Supportive *social relationships* include bonding with prosocial and significant others at school such as peers and teachers, which helps reduce mental health and other problems (e.g., Marraccini & Brier, 2017). *Teaching and learning practices* include effective classroom behavior management, innovative instruction, and academic support, among other processes, that enhance attendance and engagement (Mitchell & Bradshaw, 2013).

School climate has also been a key focus of educational policy and practice due to its increasing integration as a main concept in multitiered systems of support models to promote adaptive behavior and reduce maladaptive behavior (Bradshaw et al., 2014). School climate improvement is an essential aspect of Tier 1, preventative strategies that comprise Positive Behavior Intervention Supports, Response to Intervention, and integrated models (James et al., 2018; Kearney & Graczyk, 2020; Keesey & Mittelberg, 2019). In addition, school climate has been purportedly linked to multiple developmental contexts for children such as family, neighborhood, and community (M. T. Wang & Degol, 2016), thus potentially enhancing the protective effects of these intervention models. School climate impacts teacher satisfaction, retention, efficacy, and productivity as well (Berkowitz et al., 2017).

The assessment of school climate has become a burgeoning focus of study in recent years among researchers and stakeholders in education. Such assessment is crucial for understanding child and adolescent adjustment at school and for developing and evaluating school reform efforts (Ramelow et al., 2015). However, dozens of instruments have been presented in the literature with little consensus regarding factor structure, format, or dimensionality (Olsen et al., 2018). Indeed, substantial variability exists across school climate measures even with respect to primary domains and their labels (Shukla et al., 2019). In addition, many of these measures are restrictive and focus narrowly on few constructs and items related primarily to safety, Student–teacher relationships, and school connectedness (Berkowitz et al., 2017). Psychometric support for these measures can also be quite limited and is often based on limited sample sizes and age ranges (M. T. Wang & Degol, 2016). Sample size is recognized as a key parameter due to its impact on the precision of all statistical estimates and the generalizability of findings. Scale development in general and factor analysis are large sample size methods because sample affects precision and replicability of the results (Kyriazos, 2018). The factor pattern developed by a large-scale factor analysis is probably more stable than that based on a small sample size (DeVellis, 2017). Small sample size may arise some problems to estimation convergence failure, improper solutions, inaccurate parameter estimates or model fit statistics, among others (J. Wang & Wang, 2012). In addition, measures of school climate will be much more useful if they turn out to be applicable in a variety of school contexts, countries, and different age ranges. Measurements developed in one national cultural setting may not provide reliable measurements in others. Psychometric limitations can impact generalizability across diverse school settings and student populations. A systematic and evaluative review of extant measures would greatly assist efforts to choose one or more instruments that cover key domains of interest for a jurisdiction as well as those that are psychometrically sound.

The purpose of the present study was to provide a comprehensive systematic and evaluative review of school climate assessment (SCA) devices developed for a wide range of informants. Other reviews of school climate measures have been narrower in scope, focusing for example on one type of informant (e.g., Lewno-Dumdie et al., 2020), descriptive presentation of overall measures and not domains and their substructures (e.g., Lenz et al., 2020), restricted timeline (e.g., Grazia & Molinari, 2020), or older measures (e.g., Zullig et al., 2010). Although previous reviews have helped identify core features of school climate, including measures that are available to educational and other agencies, a thorough review of contemporary instruments that fully catalogs and rates major domains and subdomains of school climate with respect to instrument presentation and psychometric quality remains needed.

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The primary purpose of this systematic review was thus to address these limitations by focusing on parameters of instrument presentation and psychometric quality and to catalog main domains and subdomains of school climate. The secondary purpose of this review was to produce a catalog that would assist future measure development in this area, facilitate a common domain architecture across jurisdictions and agencies, identify core aspects of school climate for brief, standardized assessments and program evaluation purposes, and enhance quality and confidence of measures that could be designed for specific student groups.

2 | METHOD

2.1 | Study search and selection process

This systematic literature review followed the PRISMA process for transparency (Page et al., 2021) and was unregistered. The systematic search utilized 4 databases: Web of Science, Scopus, ERIC, and PsycINFO without time limit up to February, 2021. The search strategy for all databases included "school climate questionnaire" OR "school climate assessment" OR "school climate evaluation" OR "school climate survey" OR "school climate scale" OR "school climate inventory." In Web of Science and Scopus, the search was limited to fields of title, abstract, and keywords; in PsycINFO and ERIC, the search was limited to the abstract. The search was then expanded to gray literature via Google Scholar as well as school climate measures mentioned in bibliographies from retrieved articles. Expansion of literature search routes (i.e., multiple databases, bibliographies, and author contacts) was designed to mitigate publication bias. Searches were filtered by one author with respect to meeting inclusion or exclusion criteria; consultation as needed with other authors resulted in agreement in all cases. Original documents were reviewed if the abstract provided insufficient data to establish whether a study met inclusion criteria.

2.2 | Eligibility criteria

Basic filtering was applied via title and/or abstract to identify peer-reviewed studies citing psychometric properties of designed school climate measures. The following inclusion criteria were considered for study selection: (a) the instrument measured school climate (instruments that evaluate the quality and character of school life); (b) the psychometric properties of the instrument were provided (a set of statistical indices focused on evaluating the measurement quality of an instrument, at least validity, reliability or factor analysis); (c) every instrument included in the review has its original version published (instruments can be the original version or subsequent validations); (d) the article was in English or Spanish, as the authors could comprehend these languages; and (e) the article was a peer-reviewed publication (journal article) to include papers that passed expert review criteria. Publications in other languages, those that evaluated school climate with an instrument but without analyzing its psychometric properties, or those that were reviews of original instruments not published were outside the scope of this review.

2.3 | Extracting data and design

Descriptive data extracted from the publications are in Tables 1 and 2. Table 1 includes descriptive data regarding the characteristics of each instrument (author/s and country; name of the instrument; academic grade and/or group targeted [students, parents, teachers]; number of items; response format; name of the dimension/s that comprise the instrument; item examples). Table 2 presents data regarding the psychometric properties of the instruments (i.e., type of factor analysis, rotation, variance, selection of items, reliability, construct validity, and factorial invariance).

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TABLE 1 Questionnaires, inventories, and scales to assess school climate

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
Bear et al. (2015) USA	Delaware School Climate Survey-Home (DSCS-H)	*N* = 16,173 parents/ guardians	26	4-point Likert-type disagree a lot (1) agree a lot (4)	**(1)** Teacher–student relations **(2)** Student–student relations **(3)** Teacher–home communication **(4)** School safety **(5)** Clarity of expectations **(6)** Fairness of rules **(7)** Respect for diversity	**(1)** Teachers care about their students **(2)** Students are friendly with each other **(3)** Teachers listen to the concerns of parents **(4)** Students know they are safe in this school **(5)** Rules in this school are made clear to students **(6)** The school rules are fair **(7)** Teachers treat students of all races with respect
Bear et al. (2011) USA	Delaware School Climate Survey-Student (DSCS-S)	3rd–12th *N* = 11,780	23	4-point Likert-type strongly disagree (1) strongly agree (4)	**(1)** Teacher–student relations **(2)** Student–student relations **(3)** Fairness of rules **(4)** School safety **(5)** Liking of school general factor	**(1)** Teachers care about their students **(2)** Students really care about each other **(3)** School rules are fair. **(4)** Students feel safe in this school **(5)** I wish I went to another school General factor: I am proud of my school
Coelho et al. (2020) Portugal	Portuguese version of the Delaware School Climate Survey–Student (Portuguese DSCS-S)	4th–8th *N* = 895	21	4-point Likert-type strongly disagree (1) strongly agree (4)	**(1)** Teacher–student relations **(2)** Student–student relations **(3)** Fairness of rules **(4)** School safety **(5)** Liking of school general factor	
Bear et al. (2016) Brazil	Brazilian version of the Delaware School Climate	5th–9th *N* = 378	27	4-point Likert-type strongly disagree (1)	**(1)** Teacher–student relations **(2)** Student–student relations **(3)** School safety **(4)** Fairness and clarity of rules	**(1)** Teachers care about their students **(2)** Students are friendly with each other

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
	Survey–Student (Brazilian DSCS-S)			strongly agree (4)	**(5)** Student engagement school-wide **(6)** School wide bullying	**(3)** The school is safe **(4)** The school rules are fair **(5)** The majority of students pay attention in class **(6)** Students threaten and bully others in this school
Bear et al. (2014) USA	Delaware School Climate Survey Teacher/Staff (DSCS-T/S)	*N* = 5781 Teachers and support staff	24	4-point Likert-type strongly disagree (1) strongly agree (4)	**(1)** Teacher–student relations **(2)** Student–student relations **(3)** Teacher–home communications **(4)** School safety **(5)** Clarity of expectations **(6)** Fairness of rules **(7)** Support for diversity	**(1)** Teachers care about their students **(2)** Students treat each other with respect **(3)** Teachers listen to the concerns of parents **(4)** This school is safe **(5)** Students know how they are expected to act **(6)** The school rules are fair **(7)** Teachers treat students of all races with respect
White et al. (2014) USA	Georgia Brief School Climate Inventory (GaBSCI)	6th–8th *N* = 130,968	9	Combine: always (2) never (0). always (3) -no-it's dangerous (0). yes (1)—no (0).	Unidimensional	My school sets clear rules for behavior
Rifenbark et al. (2020) USA	GaBSCI	9th–12th *N* = 4009	9	Combine: always (2) -Never (0). always (3) -no-it's dangerous (0).	Unidimensional	My school sets clear rules for behavior

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
				yes (1)—no (0)		
Gage et al. (2016) USA	Meriden School Climate Survey–Student Version (MSCS-SV)	Elementary school, middle school, and high school *N* = 3504	38	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** Adult support at school **(2)** School safety **(3)** Respect for differences **(4)** Adult support at home **(5)** Academic support at home **(6)** Peer support **(7)** Aggression toward others	**(1)** The adults in my school treat students with respect **(2)** I feel sad in school **(3)** Students in my school respect differences in other students **(4)** In the future, I feel I will be successful in life **(5)** At home, I have time to do my homework **(6)** At my school, I have a friend who I can really trust **(7)** During the past few months, I have hit or pushed other students at school in anger
Konold et al. (2014) USA	Authoritative School Climate Survey (ASCS)	7th–8th *N* = 39,364	26	4-point Likert-type strongly disagree (1) strongly agree (4)	**(1)** Disciplinary structure **(2)** Support I. Respect for students II. Willingness to seek help **(3)** Prevalence of teasing and bullying **(4)** Engagement I. Affective II. Cognitive	**(1)** The school rules are fair **(2)** I. Most teachers and other adults at this school care about all students I. I am comfortable asking my teachers for help with my school work **(1)** There is a lot of teasing about sexual topics at this school **(2)** I like this school II. I usually finish my homework
F. L. Huang et al. (2015) USA	Authoritative School Climate Survey Teacher version (ASCS-T)	7th- and 8th-grade teachers	35	Combine 6-point Likert-type	**(1)** Structure **I.** Fairness **II.** Justness **(2)** Support	**(1)** Students here know the school rules for student conduct

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
				strongly disagree (1) strongly agree (6) 4-point Likert-type strongly disagree (1) strongly agree (4) frequency items no = 0 many times = 3	I. Student willingness to seek help II. Teacher respect for students (3) Engagement I. Affective II. Cognitive (4) Prevalence of teasing and bullying (5) Student aggression toward teachers	(2) Students know who to go to for help if they have been treated badly by another student (3) Students generally like this school. Students here often get teased about their clothing or physical appearance (4) A student stole or damaged my personal property (5) A student stole or damaged my personal property
F. L. Huang and Cornell (2016) USA	ASCS-T	High school teachers (9th–12th) *N* = 12,808	29	6-point Likert-type strongly disagree (1) strongly agree (6)	(1) Fairness (2) Justness (3) Students feel respected (4) Willingness to seek help (5) Prevalence of teasing and bullying (6) Engagement (affective) (7) Engagement (cognitive)	(1) Students know the school rules for student conduct (2) Students get suspended for minor things (3) Most teachers and other adults at this school care about all students (4) Teachers know when students are being picked on or being bullied (5) Students in this school are teased about their clothing or physical appearance (6) Students generally like this school (7) Students finish their homework at this school
Kearney, and Sanmartín, and Gonzálvez (2020)	School Climate and Academic Mindset Inventory (SCAMI)	4th–12th *N* = 105,379	50	Combine 5-point Likert-type	(1) Parent involvement and support (2) Academic mindset (3) Social emotional learning	(1) My parents feel welcome to come to my school (2) My intelligence is something that I can't change very much

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
USA				strongly disagree (1) completely true (6) 5-point Likert-type never (1) always (6) 4-point Likert-type very difficult (1) very easy (6) 4-point Likert-type strongly disagree (1) strongly agree (4)	**(4)** Safety **(5)** Physical safety **(6)** Bullying **(7)** Physical environment and resources **(8)** Respect for diversity **(9)** Perceptions of school performance	**(3)** Have all of your class materials with you? **(4)** This school is safe **(5)** Students at this school threaten to hurt other students **(6)** This school does a good job to prevent bullying **(7)** This school is clean **(8)** This school encourages an appreciation of student diversity and respect for each other **(9)** This school promotes academic success for all students
Sun and Royal (2017) USA	School Climate Assessment (SCA) scale	School principals	13	4-point Likert-type not at all (1) a lot (4)	Unidimensional	Teachers' low expectations of students
Anwar & Anis-ul-Haque (2014) Pakistan	School Climate Scale (SC Scale)	Primary school teachers $N = 243$ $M_{age} = 39.5$	40	–	**(1)** Support **(2)** Relationships **(3)** Obstacles to teaching	–
DeRosier and Newcity (2005) USA	School Climate Survey (SC Survey)	Elementary school, middle school, and high school $N = 223$	40	5-point Likert-type almost never (1) almost always (5)	**(1)** Interpersonal character traits **I.** Caring **II.** Civility **III.** Cooperation **IV.** Friendship **V.** Problem-Solving **VI.** Tolerance	**(1)** Interpersonal character traits **I.** Treat other students kindly **II.** Say things like "thank you" and "excuse me" **III.** Work well with others to solve a problem

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
					(2) Intrapersonal character traits **I.** Citizenship **II.** Courage **III.** Diligence **IV.** Honesty **V.** Responsibility **VI.** Self-control	**IV.** Do not pick on/beat up/bully others **V.** Talk/get help when have a problem **VI.** Include others who are different from them **(2)** Intrapersonal character traits **I.** Do not break school/classroom rules **II.** Try to help when a student is picked on **III.** Don't give up when a problem/schoolwork is hard **IV.** Do what teachers ask them to do **V.** Do not blame other for problems **VI.** Do not get loud or aggressive when mad
Quijada et al. (2020) Spain	School Climate Questionnaire for Secondary and High School Teachers (SCQ-SHST)	High school teachers *N* = 581 24–65 years	72	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** School management quality **(2)** Teacher–teacher relationships **(3)** Mastery-goal structure **(4)** Performance-goal structure **(5)** Teacher–student relationships **(6)** Student–student relationships **(7)** Parent involvement	**(1)** Those who run this school take seriously teacher demands **(2)** In my school, most of the teachers seek to understand each other **(3)** My school emphasizes that students really understand, not just memorize **(4)** In this school, students who get the highest marks are often publicly congratulated to encourage other students **(5)** My students trust me: they have no problem in telling me what they want

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
						(6) Students often cooperate with each other without any problem whenever necessary **(7)** Most families collaborate little with me: they expect teachers to be the only ones that educate their children
Nishimura et al. (2020) Japan	Japan School Climate Inventory (JaSC)	4th–9th *N* = 1399	32	5-point Likert-type fully disagree (0) fully agree (4)	Unidimensional	Students feel safe in this school
Beld et al. (2017) The Netherlands	Special Education Classroom Climate Inventory (SECCI)	12–25 years *N* = 325	22	3-point Likert-type I do not agree (1) I agree (3)	**(1)** Teacher support **(2)** Negative student interactions **(3)** Positive student affiliation **(4)** Unstructured classroom environment dimensions	**(1)** The teachers are listening to us **(2)** We call each other names in the classroom **(3)** I like to work together with my classmates **(4)** The classroom is never quiet
Marx and Byrnes (2012) USA	Multicultural School Climate Inventory (MSCI)	8th–9th *N* = 1511	22 and an open question	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** Linking school **(2)** Educator–student relationships **(3)** Cultural relevancy **(4)** School success	**(1)** I like my teachers **(2)** I feel that I can relate to my teachers **(3)** feel that my teachers know me well **(4)** I feel well prepared for school
Whitehouse et al. (2020) USA	SC Survey	3rd–8th *N* = 3075	52	4-point Likert-type strongly disagree strongly agree	**(1)** Teacher and school effectiveness **(2)** School safety and inclusion **(3)** Perceived value of learning experience **(4)** Principal effectiveness **(5)** Sense of belonging and care	–

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
Emam and Hendawy al-Mahdy (2020) Oman	Inclusive School Climate Scale (ISCS)	Teachers *N* = 287	18	5-point Likert-type rarely occurs (1) very frequently (5)	**(1)** Teacher prosocial motivation toward inclusive practices **(2)** Inclusive leadership **(3)** Academic excellence	**(1)** Teachers help and support each other in fulfilling the needs of children with SEN **(2)** The principal lets teachers know what is expected from them toward with SEN **(3)** School sets high academic standards for the learning outcomes of students with disabilities
Sudla et al. (2020) Thailand	SCS	Teachers *N* = 220	34	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** Safety **(2)** Academic **(3)** Community **(4)** Institutional environment	**(1)** In school, there are some colleagues who often create misunderstandings, which create work conflicts among my fellow teachers **(2)** I was given the opportunity to develop my own professional skills (e.g., academic training, studying in higher education, self-development seminars) **(3)** My colleagues and I work without any cultural or background discrimination of any kind (e.g., education background, religion, race, job position) **(4)** I work in a school that promotes and raise concerns with a clean and tidy environment
Zullig et al. (2010) USA	School Climate Measure (SCM)	6th–12th *N* = 2049	39	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** Positive student–teacher Relationships **(2)** School connectedness **(3)** Academic support **(4)** Order and discipline **(5)** School physical environment	**(1)** Teachers understand my problems **(2)** My schoolwork is exciting **(3)** I usually understand my homework assignments

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
					(6) School social environment **(7)** Perceived exclusion/privilege **(8)** Academic satisfaction	**(4)** Classroom rules are applied equally **(5)** The school grounds are kept clean **(6)** I am happy with kinds of students who go to my school **(7)** At my school, the same person always gets to help the teacher **(8)** I am happy about the number of tests I have
Zullig et al. (2015) USA	SCM	9th–12th *N* = 1643	42	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** Positive student–teacher relationships **(2)** Order and discipline **(3)** Positive student engagement **(4)** School physical environment **(5)** Academic support **(6)** Parental involvement **(7)** School connectedness **(8)** Perceived exclusion/privilege **(9)** School social environment **(10)** Academic satisfaction	**(1)** Teachers understand my problems **(2)** Classroom rules are applied equally **(3)** Females and males treated as equals at school **(4)** My school is neat and clean **(5)** I feel that I can do well in this school **(6)** My parents are involved in school activities **(7)** My schoolwork is exciting **(8)** At my school, the same person always gets to help the teacher **(9)** I am happy with the kinds of students who go to my school **(10)** I am happy about the number of tests I have
Fraser (1982) Australia	My Class Inventory-Short Form (MCI-SF)	7th *N* = 2305	25	(Yes/no) response format	**(1)** Cohesiveness **(2)** Friction **(3)** Difficulty **(4)** Satisfaction	

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
					(5) Competitiveness	
Sink and Spencer (2005) USA	MCI-SF	4th–6th *N* = 2835	18	(Yes/no) response format	**(1)** Cohesion **(2)** Competitiveness **(3)** Friction **(4)** Satisfaction	**(1)** Everybody is my friend **(2)** Some students always try to do better than others **(3)** Students in my class fight a lot **(4)** Students enjoy schoolwork
Lee et al. (2017) Australia	School Climate and School Identification Measure–Student (SCASIM-St)	7th–10th *N* = 7207	38	7-point Likert-type strongly disagree (1) strongly agree (7)	**(1)** School climate (second order) **I.** Student–student relationships **II.** Student-staff relationships **III.** Academic emphasis **IV.** Shared values and approach **(2)** School identification	**(1)** School climate (second order) **I.** Students care about each other **II.** Staff care about students **III.** Teachers challenge students to do better **IV.** Students and staff are working toward the same **(2)** Being a part of this school is important to me
Gálvez-Nieto et al. (2020) Chile	SCASIM-St	13–20 years *N* = 1456	38	5-point Likert-type totally disagree (1) totally agree (7)	**(1)** School climate (second order) **I.** Student–student relationships **II.** Student–staff relationships **III.** Academic emphasis **IV.** Shared values and approach **(2)** School identification	–
Escalante, Palacios, et al. (2020) Spain	Students' Perception of the School Climate (PACE)	12–18 years *N* = 480	42	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** Physical security **(2)** Rules **(3)** Student–teacher relationship **(4)** Relationship between equals **(5)** Group cohesion **(6)** Environmental-structural aspects **(7)** Motivational capacity of teachers **(8)** Evaluation	–

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
					(9) Perception of teacher expectations **(10)** Methodological resources	
Escalante, Goñi, et al. (2020) Spain	Students' Perception of the School Climate (PACE-33)	12–20 years *N* = 1180	33	5-point Likert-type totally disagree (1) totally agree (5)	**(1)** Physical safety **(2)** Rules **(3)** Student–teacher relationships **(4)** Peer relationships **(5)** Group cohesion **(6)** Environmental-structural aspects **(7)** Teachers' ability to motivate **(8)** Teachers' expectations **(9)** Methodological resources	**(1)** In this center, there are students who steal thing **(2)** The rules are clearly explained to the students **(3)** It is easy to talk to the teachers **(4)** I feel comfortable talking to my classmates about my problems **(5)** In this class, there is a good atmosphere and a good coexistence **(6)** My classroom is kept clean and orderly **(7)** Teachers make us want to learn **(8)** The teachers expect us to work hard **(9)** The material we work with in class is interesting to me
Bradshaw et al. (2014) USA	USDOE 3-factor model of school climate (Maryland's Safe and Supportive Schools Initiative (MDS3).	9th–12th *N* = 21824 (wave 1) *N* = 28104 (wave 2)	56	4-point Likert-type strongly disagree (1) strongly agree (4)	**(1)** Safety **I.** Bullying and aggression **II.** Physical safety **III.** General drug use **(2)** Environment **I.** Rules and consequences **II.** Physical comfort/cleanliness **III.** Support **IV.** Disorder **(3)** Engagement **I.** Teacher connect **II.** Student connect	**(1)** Safety **I.** Physical fighting between students **II.** I feel safe at this school **III.** Students' tobacco use (cigarettes, chew, and cigars) **(2)** Environment **I.** Students listen to the teachers **II.** The bathrooms in this school are clean **III.** Teachers at my school

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
					III. Academic engagement **IV.** School connect **V.** Culture of equity **VI.** Parent engagement	help students with their problems **IV.** Students disobey the rules **(3)** Engagement **I.** My teachers listen to me when I have something to say **II.** I feel like I belong **III.** My teachers believe that I can do well in school **IV.** Students and staff feel pride in this school **V.** Students of all races are treated the same **VI.** My parent(s) or guardian(s) feels welcome at this school
Lindstrom Johnson et al. (2019) USA	USDOE 3-factor model of school climate (Maryland's Safe and Supportive Schools Initiative (MDS3)	6th–8th *N* = 69,513	30	4-point Likert-type strongly disagree (1) strongly agree (4)	**(1)** Safety **(2)** Engagement **(3)** Environment	**(1)** I feel safe at this school **(2)** I enjoy learning at this school **(3)** Students listen to the teachers
Brand et al. (2003) USA	Inventory of School Climate-Student (ISC-S)	Year 1 (*N* = 4309 students) Year 2 (*N* = 12,291 students)	50	4-point Likert-type were used for the safety items Never (1) 6 or more times (4);	**(1)** Teacher support **(2)** Consistency and clarity of rules and expectations **(3)** Student Commitment/ achievement orientation **(4)** Negative peer interactions **(5)** Positive peer interactions	**(1)** Teachers go out of their way to help students **(2)** If some students are acting up in class the teacher will do something about it **(3)** Students work hard for good grades in classes

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
				the support for cultural pluralism items never (1) often (4)	**(6)** Disciplinary harshness **(7)** Student input in decision making **(8)** Instructional innovation/ relevance **(9)** Support for cultural pluralism **(10)** Safety problems	**(4)** Students in this school have trouble getting along with each other **(5)** Students get to know each other well in classes **(6)** The rules in this school are too strict **(7)** In our school, students are given the chance to help make decisions **(8)** New and different ways of teaching are tried in classes **(9)** Your teachers show that they think it is important for students of different races and cultures at your school **(10)** Been afraid that someone will hurt you or bother you at school?
Acun-Kapıkıran and Kapıkıran (2011) Turkey	ISC-S	6th–8th *N* = 707 (study 1) *N* = 317 (study 2)	50		**(1)** Student input in decision-making and instructional innovations **(2)** Safety problems **(3)** Achievement orientation **(4)** Teacher support **(5)** Negative peer interactions **(6)** Disciplinary harshness **(7)** Positive peer interactions **(8)** Support for cultural pluralism **(9)** Consistency and clarity of rules and expectations	

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TABLE 1 (Continued)

Author(s) - Country	Measure	Age	Items	Response format	Dimensions	Items' example
J. Aldridge and Ala'I (2013) Australia	What's Happening in This School? (WHITS) Questionnaire	8th–12th *N* = 4067	49	5-point Likert-type almost never (1) almost always (5)	**(1)** Teacher support **(2)** Peer connectedness **(3)** School connectedness **(4)** Affirming diversity **(5)** Rule clarity reporting and seeking help	**(1)** At this school, teachers take an interest in my background **(2)** At this school, I make friends with people from different backgrounds **(3)** At this school, I feel welcome **(4)** At this school, my cultural background is respected by students **(5)** At this school, the rules make it clear that certain behaviors are unacceptable I can report incidents without others finding out
Cocoradă and Clinciu (2009) Romania	Questionnaire for School Climate Connected to Assessment (QSCCA)	14–20 years *N* = 618	85	–	**(1)** Relational climate **(2)** Climate of equity climate of safety	–
Cemalcilar (2010) Turkey	Scale for Measuring Schools' Social Climate (SMSSC)	7th–8th *N* = 799	46	5-point Likert-type strongly disagree (1) strongly agree (5)	**(1)** Teacher–student relationships **(2)** Administrator–student relationship **(3)** Peer relationships **(4)** Violence in the school **(5)** Physical environment Availability of supporting resources	**(1)** Our teachers are tough **(2)** Our school principal is concerned about us **(3)** I feel close to my classmates **(4)** There are students who cut classes **(5)** I like our school building/campus Sports areas adequate

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TABLE 2 Psychometric properties of the school climate measures

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
DSCS-H Bear et al. (2015)	Confirmatory factor analyses	–	Cronbach's alpha ranged from 0.88 to 0.93	Bully/Target Scale (B/TS-M; Marsh et al., 2011) Academic achievement suspensions and expulsions	–	Across grade levels (i.e., elementary, middle, and high school), five racial-ethnic groups, and gender
DSCS-S Bear et al. (2011)	Confirmatory factor analyses	–	Cronbach's alpha **(1)** 0.88 **(2)** 0.81 **(3)** 0.70 **(4)** 0.83 **(5)** 0.83 Total scale 0.94	Academic achievement suspensions and expulsions	–	Across grade levels (i.e., elementary, middle, and high school), racial ethnic groups (i.e., Caucasian, African American, and Hispanic), and gender
DSCS-S Coelho et al. (2020)	Confirmatory factor analyses	–	Cronbach's alpha **(1)** 0.85 **(2)** 0.77 **(3)** 0.73 **(4)** 0.86 **(5)** 0.76 Total scale 0.92	–	–	–
DSCS-S Bear et al. (2016)	Confirmatory factor analyses	–	Cronbach's alpha **(1)** 0.80 **(2)** 0.77 **(3)** 0.83 **(4)** 0.74 **(5)** 0.76 **(6)** 0.79	Brazilian Delaware Student Engagement Scale (Brazilian DSES)	–	Across public and private school groups and across gender

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
			Total scale 0.86			
DSCS-T/S Bear et al. (2014)	Confirmatory factor analyses	–	Cronbach's alpha	Academic achievement suspensions and expulsions	–	Ac Across grade levels and teacher–staff positions)
GaBSCI White et al. (2014)	Exploratory and confirmatory factor analyses	Polychoric correlation matrix	**(1)** 0.86 **(2)** 0.90 **(3)** 0.92 **(4)** 0.89 **(5)** 0.90 **(6)** 0.83 Total scale 0.96 Cronbach's alpha **(1)** 0.71	Bullying behaviors	–	–
GaBSCI Rifenbark et al. (2020)	Confirmatory item factor analysis	Factor loading ranges from 0.814 to 1.119	Cronbach's alpha 0.87 (full sample) 0.88 (with disabilities) 0.87 (without disabilities)	–	–	Across participants with and without disabilities
MSCS-SV Gage et al. (2016)	Principal components and confirmatory factor analysis	Varimax Items with factor loading larger than 0.40 and did not cross-load on another factor above 0.35	Cronbach's alpha **(1)** 0.90 **(2)** 0.76 **(3)** 0.76 **(4)** 0.75 **(5)** 0.72 **(6)** 0.75 **(7)** 0.69 Total scale 0.91 McDonald's ω	–	–	–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
			Guttman's λ Revelle's β TR: from October to June ranged from 0.23 to 0.46			
ASCS Konold et al. (2014)	Exploratory and confirmatory factor analyses	Geomin	Cronbach's alpha and Spearman-Brown formula, respectively **(1)** 0.77–0.70 **(2)** I. 0.87–0.72 II. 69–0.61 **(3)** 0.79–0.88 **(4)** I. 0.85–0.66 II. 0.87–0.96	–	–	–
ASCS-T F. L. Huang et al. (2015)	Exploratory and confirmatory factor analyses	Oblique Geomin Items should not have high loadings on more than 1 factor	Cronbach's alpha and Spearman-Brown formula, respectively **(1)** I. 0.85–0.90 II. 0.63–0.53 **(2)** I. 0.78 II. 0.91 **(3)** I. 0.82–0.94 II. 0.83–0.94 **(4)** 0.82–0.79 **(5)** 0.58–0.85	–	–	–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
ASCS-T F. L. Huang and Cornell (2016)	Multilevel confirmatory factor analysis	–	Teacher level Cronbach's alpha **(1)** 0.83 **(2)** 0.65 **(3)** 0.91 **(4)** 0.81 **(5)** 0.89 **(6)** 0.74 **(7)** 0.81 School level Spearman-Brown reliability ranged from 0.70 (Justness) and 0.94 (Engagement) TR: 1–2 weeks ranged from 0.70 (justness) to 0.84 (affective engagement)	School engagement and prevalence of teasing and bullying	–	–
SCAMI Kearney, and Sanmartín, and Gonzálvez (2020)	Confirmatory factor analysis	**(1)** 0.35 **(2)** 0.37 **(3)** 0.35 **(4)** 0.50 **(5)** 0.50 **(6)** 0.45 **(7)** 0.41 **(8)** 0.45 **(9)** 0.42	Cronbach's alpha and Omega coefficients, respectively **(1)** 0.61–0.61 **(2)** 0.75–0.87 **(3)** 0.75–0.76 **(4)** 0.84–0.83 **(5)** 0.72–0.74 **(6)** 0.81–0.80 **(7)** 0.78–0.78 **(8)** 0.79–0.80 **(9)** 0.83–0.84	–	–	Across gender, age group and ethnic group
SCA	Parallel factor analysis	–	Cronbach's alpha	–	–	–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
Sun and Royal (2017)			0.88			
SC Scale Anwar & Anis-ul-Haque (2014)	Exploratory factor and principal component analyses	Oblique **(1)** 20.21% **(2)** 6.71% **(3)** 5.67% Total 32.2% Items with factor loading larger than 0.40	Cronbach's alpha **(1)** 0.73 **(2)** 0.70 **(3)** 0.57 Total 0.77	Maslach burnout inventory (MBI) (Maslach & Jackson, 1986). Personal accomplishment	Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1986). Emotional Exhaustion depersonalization	–
SC Survey DeRosier and Newcity (2005)	Exploratory factor analysis	–	Cronbach's alpha **(1)** Interpersonal character traits **I.** 0.63 **II.** 0.63 **III.** 0.55 **IV.** 0.69 **V.** 0.57 **VI.** 0.47 **(2)** Intrapersonal character traits **I.** 0.42 **II.** 0.52 **III.** 0.60 **IV.** 0.58 **V.** 0.57 **VI.** 0.51	School safety survey (SSS)	–	–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
SCQ-SHSTQuijada et al. (2020)	Parallel analysis and exploratory and confirmatory factor analyses	– All the items had factor loadings larger than 0.30.	Cronbach's alpha and composite reliability **(1)** 0.94–0.90 **(2)** 0.91–0.93 **(3)** 0.83–0.88 **(4)** 0.83–0.85 **(5)** 0.75–0.83 **(6)** 0.84–0.88 **(7)** 0.84–0.88	Teachers satisfaction scale (TSS)	–	–
JaSC Nishimura et al. (2020)	Exploratory and confirmatory factor analyses	Geomin	Cronbach's alpha 0.97	Pediatric Quality of Life Inventory 4.0 generic scale (PedsQL) (Kobayashi et al., 2010) Japan Ijime Scale (Osuka et al., 2019) Academic achievement and background characteristics	Strengths and Difficulties Questionnaire (SDQ) (Matsuishi et al., 2008)	Across sex and grade level
SECCI Beld et al. (2017)	Exploratory and confirmatory factor analyses	Oblique	Cronbach's alpha **(1)** 0.93 **(2)** 0.90 **(3)** 0.85 **(4)** 0.82	About me questionnaire: Academic competence and academic effort (Beld et al., 2017)	–	–
MSCI Marx and Byrnes (2012)	Principal components analysis	–	Cronbach's alpha **(1)** 0.86 **(2)** 0.91 **(3)** 0.83 **(4)** 0.81	–	–	–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
SCS Whitehouse et al. (2020)	Exploratory and confirmatory factor analyses	–	Cronbach's alpha 0.54	–	–	Across race and ethnicity
ISCS Emam and F. hendawy al-Mahdy (2020)	Exploratory and confirmatory factor analyses	Varimax Items with factor loading larger than 0.50	Cronbach's alpha **(1)** 0.90 **(2)** 0.90 **(3)** 0.94	–	–	–
SCS Sudla et al. (2020)	Confirmatory factor analysis	–	Cronbach's alpha and McDonald's omega coefficient **(1)** 0.68–0.66 **(2)** 0.91–0.91 **(3)** 0.87–0.87 **(4)** 0.90–0.91 Total 0.94–0.93	–	–	–
SCM Zullig et al. (2010)	Exploratory and confirmatory factor analyses	Varimax 45.7% Items with factor loading larger than 0.40	Cronbach's alpha **(1)** 0.91 **(2)** 0.81 **(3)** 0.80 **(4)** 0.83 **(5)** 0.87 **(6)** 0.82 **(7)** 0.73 **(8)** 0.70	–	–	–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
SCM Zullig et al. (2015)	Exploratory and confirmatory factor analyses	Varimax 63.3% Item factor loadings ranged from 0.47 to 0.95	Cronbach's alpha **(1)** 0.89 **(2)** 0.84 **(3)** 0.79 **(4)** 0.90 **(5)** 0.74 **(6)** 0.82 **(7)** 0.69 **(8)** 0.74 **(9)** 0.83 **(10)** 0.72	–	–	Across sex and ethnicity
MCI-SF Fraser (1982)	–	–	Cronbach's alpha **(1)** 0.67 **(2)** 0.71 **(3)** 0.65 **(4)** 0.78 **(5)** 0.71	–	–	–
MCI-SF Sink and Spencer (2005)	Confirmatory factor analyses	Oblimin 50.19%	Cronbach's alpha **(1)** 0.72 **(2)** 0.65 **(3)** 0.78 **(4)** 0.69	–	–	–
SCASIM-St Lee et al. (2017)	Exploratory and confirmatory factor analyses	–	Cronbach's alpha **(1)** School climate (second order) • Student–student relationships 0.96	A submeasure of "Chicago Public Schools' Student Connection Survey, American Institutes for Research," (2007), the subfactor of "Emotional Safety," a submeasure	–	Across student subgroups regarding gender, grade level, and non-English language

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
			• **Student–staff relationships 0.97** • **Academic emphasis 0.93** • **Shared values and approach 0.93** **(2)** School identification 0.94 TR: One-month test-retest data $r = 0.66$ for the SSdR, 0.72 for the SSfR, 0.69 for the AE, 0.60 for the SVA factor, and 0.75 for the school identification measure	of Teacher Academic Support in the Classroom Life Measure (Johnson et al., 1985). The School Connectedness submeasure of the Perceived School Experiences Scale (PSES) (Anderson-Butcher et al., 2012)		
SCASIM-St Gálvez-Nieto et al. (2020)	Confirmatory factor analyses	Items with factor loading larger than 0.55	Cronbach's alpha/McDonald's omega **(1)** School climate (second order) • Student–student relationships 0.84/0.84 • Student–staff relationships 0.92/0.92 • Academic emphasis 0.90/0.90 • Shared values and approach 0.86/0.87 **(2)** School identification 0.90/0.90	Authoritative School Climate Survey (ASCS)	–	–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
PACE Escalante, Palacios, et al. (2020)	Exploratory factor analyses	Oblique 51.51% Items with factor loading larger than 0.30	Cronbach's alpha **(1)** 0.83 **(2)** 0.81 **(3)** 0.87 **(4)** 0.67 **(5)** 0.87 **(6)** 0.80 **(7)** 0.73 **(8)** 0.76 **(9)** 0.79 **(10)** 0.86	–	–	Across sex, ethnicity, and grade level
PACE-33 Escalante, Goñi, et al. (2020)	Confirmatory factor analysis	Variance ranged from 40% to 79% Items with factor loading larger than 0.40	Cronbach's alpha/McDonald's omega **(1)** 0.85/0.85 **(2)** 0.85/0.85 **(3)** 0.86/0.84 **(4)** 0.87/0.87 **(5)** 0.86/0.86 **(6)** 0.71/0.72 **(7)** 0.92/0.92 **(8)** 0.85/0.85 **(9)** 0.88/0.88	–	–	Across sex
MDS3 Bradshaw et al. (2014)	Exploratory and confirmatory factor analyses	–	Cronbach's alpha **(1)** Safety **I.** 0.64 **II.** 0.63 **III.** 0.87 **(2)** Environment **I.** 0.73	–	–	Across sex, grade level, and ethnicity

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
			II. 0.79 **III.** 0.76 **IV.** 0.58 **(3)** Engagement **I.** 0.86 **II.** 0.87 **III.** 0.79 **IV.** 0.82 **V.** 0.83 **VI.** 0.74			
MDS3 Lindstrom Johnson et al. (2019)	Item response theory (IRT) analyses	–	Cronbach's alpha/McDonald's omega **(1)** 0.80/0.86 **(2)** 0.89/0.92 **(3)** 0.82/0.86	–	–	–
ISC–S Brand et al. (2003)	Exploratory and confirmatory factor analyses	Procrustes Items with factor loading larger than 0.35	Cronbach's alpha **(1)** 0.76 **(2)** 0.74 **(3)** 0.81 **(4)** 0.73 **(5)** 0.70 **(6)** 0.67 **(7)** 0.70 **(8)** 0.63 **(9)** 0.68 **(10)** 0.71 TR: 1- and 2-year test–retest intervals correlations between ISC–S ratings	Students' academic achievement, behavior problems, and socioemotional adjustment	Indexes of Behavioral Adjustment (e.g., delinquency, drug attitudes, cigarette smoking, drug use, alcohol use)	Across gender, race, grade level, and participation in the subsidized lunch program

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
			over 1 year ranged from 0.67 to 0.91 Over a 2-year interval, correlations between ISC–S ratings ranged from 0.25 to 0.87.			
ISC–S Acun-Kapıkıran and Kapıkıran (2011)	Exploratory and confirmatory factor analyses	Items with factor loading varied from 0.30 to 0.79	Cronbach's alpha **(1)** 0.82 **(2)** 080 **(3)** 0.76 **(4)** 0.74 **(5)** 0.76 **(6)** 0.73 **(7)** 0.56 **(8)** 0.58 **(9)** 0.48 Total scale 0.84	Selfesteem Life-satisfaction	Depression	–
WHITS J. Aldridge and Ala'I (2013)	Exploratory factor analysis	Oblique 64.05% Items with factor loading larger than 0.30	Cronbach's alpha **(1)** 0.89 **(2)** 0.93 **(3)** 0.90 **(4)** 0.89 **(5)** 0.91 **(6)** 0.91	–	–	–
QSCCA Cocoradă and Clinciu (2009)	Factorial analyses	Varimax **(1)** 47% **(2)** 31% **(3)** 22%	Cronbach's alpha 0.93	Inventory of evaluative styles (Cocoradă, 2004) Rosenberg questionnaire of		–

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TABLE 2 (Continued)

Instrument	Factorial analysis	Rotation, variance, and items' selection	Reliabilitytest–retest (TR)	Convergent validity	Divergent validity	Factorial invariance
		Items with factor loading larger than 0.30		selfesteem (1965), scales from Gough's CPI-432 (1996) (the scales responsibility, selfcontrol capacity, sociability, and dominance) and Spielberger's questionnaire of anxiety STAXI-2 (1999)		
SMSSC Cemalcilar (2010)	Exploratory factor analysis	Varimax **(1)** 40% **(2)** 45% **(3)** 59% **(4)** 56% **(5)** 45% 48%	Cronbach's alpha **(1)** 0.83 **(2)** 0.76 **(3)** 0.82 **(4)** 0.84 **(5)** 0.71 0.84	–	–	Across the two levels of schools' socioeconomic status

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TABLE 3 Appraisal criteria for instrument presentation and psychometric quality of school climate measures

Criterion	Rating
Instrument presentation	
1. Usability	(2) Provide all this information: number of items, response format, dimensions, and their respective items' example.
	(1) Provide some of this information: number of items, response format, dimensions, and their respective items' example.
	(0) Not describe this information: number of items, response format, dimensions, and their respective items' example.
2. Sample size	(2) Large sample size (n > 100/for each group) or very good representativeness of the population that was intended to be sampled.
	(1) Adequate sample size (n = 30–100/for each group) or good representativeness of the population that was intended to be sampled.
	(0) Small sample size (n < 30/for each group), weak representativeness of the population that was intended to be sampled or sample size or selection not described.
3. Age groups	(2) Instrument completed by 4 or more different grades.
	(1) Instrument completed between 3 or 2 different grades.
	(0) Instrument completed by only a group or this information is not mentioned.
4. Easy-to-answer questions	(2) Uniform response scale or readability tests and no negative formulations.
	(1) Two different response scales are used.
	(0) This information is not mentioned or more than two different response scale are used.
5. Number of major domains	(2) Three or more major domains.
	(1) Two major domains.
	(0) One major domain.
6. Theory	(2) Measure is based on a theoretical model or a scientifically based framework.
	(1) Measure is based scarcely on a scientifically based framework.
	(0) Measure is not based on any theoretical model or a scientifically based framework is not mentioned.
Psychometric quality	
7. Reliability	(2) Cronbach's alpha ≥ 0.70.
	(1) Cronbach's alpha 0.70–0.60.
	(0) Cronbach's alpha < 0.60.
8. Test–retest	(2) Test–retest >0.75.
	(1) Test–retest 0.75–0.60.
	(0) Test–retest <0.60 or not described.
9. Construct validity	(2) Analyze convergent and divergent validity.

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TABLE 3 (Continued)

Criterion	Rating
	(1) Analyze only convergent or divergent validity.
	(0) Not described.
10. Content validity	(2) The target population considers all items in the questionnaire to be relevant and considers the questionnaire to be complete.
	(1) The target population considers items in the questionnaire to be irrelevant or considers the questionnaire to be incomplete.
	(0) No target population involvement.
11. Structural validity	(2) Factor analysis (EFA and/or CFA) have been performed and factors explain at least 50% of the variance.
	(1) Factor analysis (EFA and/or CFA) have been performed and explained variance scores less than 50% or it is not mentioned.
	(0) Factor analysis or explained variance not mentioned.
12. Factorial invariance	(2) Factorial invariance across more than one group (e.g., age, gender, race).
	(1) Factorial invariance across one group (e.g., age, gender, race).
	(0) Not described.

2.4 | Instrument presentation and psychometric quality assessment

The caliber of the selected articles was evaluated based on revised appraisal criteria of school climate instruments proposed by Ramelow et al. (2015). Appraisal criteria for *instrument presentation* included age groups, easy-to-answer questions, number of major domains, theory, usability, and sample size. The age groups criterion was not assessed for parent and teacher instruments. Appraisal criteria for *psychometric quality* included reliability, test-retest, construct validity, content validity, structural validity, and factorial invariance. A country criterion was not included because only the original versions of the instruments were selected.

Each criterion was rated as positive (+) if results met specified author criteria; intermediate (−) if results partly met specified author criteria; and (x) if no information was reported for a criterion. To obtain numeric values, these ratings were coded: "+" = 2; "−" = 1; "x" = 0 (Table 3). Each included measure thus had a total score ranging from 0 to 24, with higher scores indicating better instrument presentation and psychometric quality (range for parent and teacher instruments: 0–22). This score should only be used as a guide.

3 | RESULTS

3.1 | Included/Excluded studies

A flow chart of the study search and selection process is in Figure 1. The initial (k = 677) and secondary gray (k = 10) literature searches generated 687 records that met initial inclusion criteria. Removal of duplicates lowered this number to 520 and removal of articles that did not meet selection criteria lowered this number further to 59. Of

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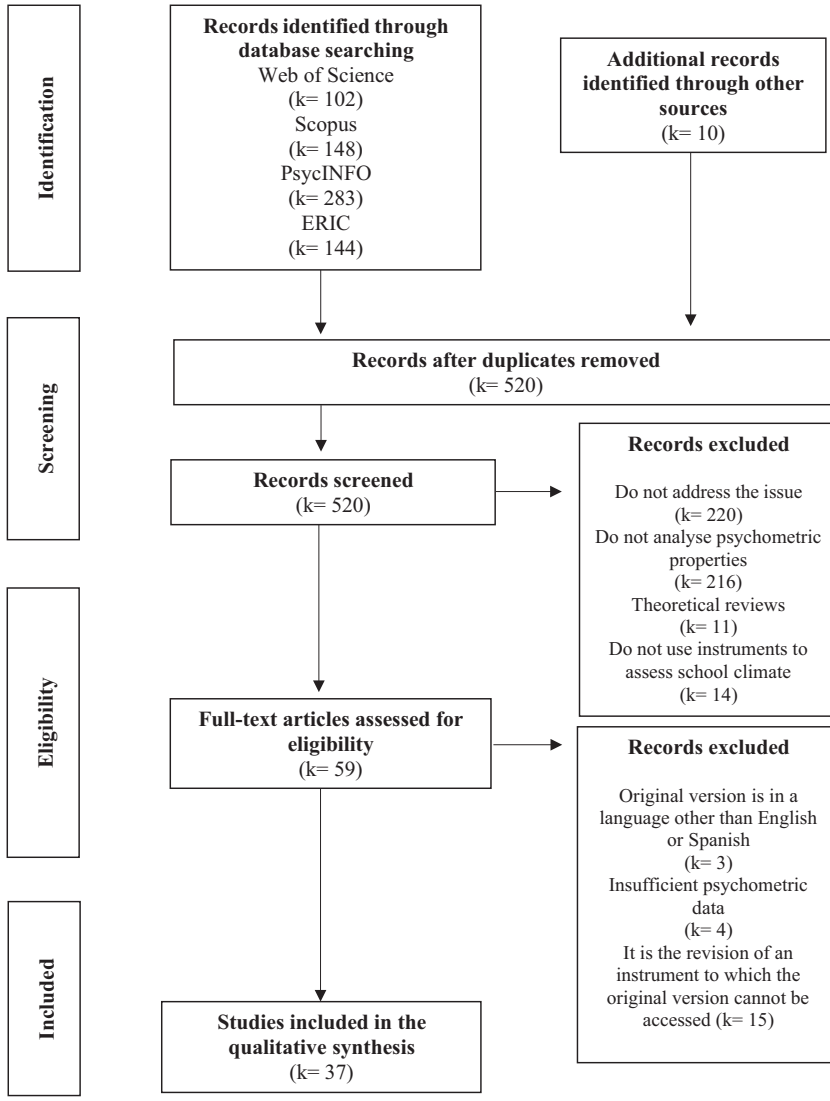

FIGURE 1 PRISMA flow diagram illustrating the process of selection of studies for inclusion in the systematic review

these, 22 were excluded for the following reasons: 15 analyzed psychometric properties of an instrument to which the original version cannot be accessed; 3 analyzed the psychometric properties of an instrument to which the original version is in a language other than English or Spanish; 4 not reported sufficient psychometric data to be included. This left 37 articles to be included in the qualitative synthesis because only original versions of the instruments were selected.

3.2 | School climate measures

Descriptive characteristics of the 37 selected school climate measures are in Table 1. Of these, 30 were published since 2011. Of the 37 studies, 10 are subsequent validations that have been done in other samples. All were self-

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report measures with fixed closed questions except the Multicultural School Climate Inventory (MSCI, Marx & Byrnes, 2012) with 22 items and an open question. Most instruments were validated with samples from the US (k = 30; 81.1%); others included investigations in Australia (k = 3; 8.1%), Spain (k = 3; 8.1%), Turkey (k = 2; 5.4%) and other countries (each k = 1; Brazil, Chile, Japan, Netherlands, Oman, Pakistan, Portugal, Romania, and Thailand).

Selected school climate measures were developed primarily for students (k = 28; 75.7%) but also teachers (k = 8; 21.6%) and parents (k = 1; 2.7%). Instruments included participants from elementary to high school, teachers, school principals, and parents or guardians. Most instruments (k = 30; 81.1%) utilized a Likert-type response format. However, the Georgia Brief School Climate Inventory (GaBSCI, Rifenbark et al., 2020; White et al., 2014) combined a Likert-type response format with a dichotomous (yes or no) rating system, the Authoritative School Climate Survey Teacher version (ASCS-T, F. L. Huang et al., 2015) combined a Likert-type response format with frequency items (*No* = 0; *Many times* = 3), and the My Class Inventory-Short Form (MCI-SF, Fraser, 1982; Sink & Spencer, 2005) reported only a dichotomous (yes or no) rating system. The number of items ranged from 9 to 85.

A summary of the psychometric properties of the selected school climate measures is in Table 2. Most studies provided data on internal consistency and applied factor analysis. The index used most to assess internal consistency was Cronbach's alpha (range: 0.42–0.97) and the most common factor analytic strategy was a combination of exploratory and confirmatory factor analysis (EFA; CFA). Of the 27 instruments, 15 (40.5%) analyzed convergent and/or divergent validity and 15 verified its factorial invariance.

A description of the domains evaluated by the school climate measures according to Cohen's et al. model (2009) is in Table 4. The four domains of this model (safety, teaching and learning, relationships, and environment) are represented among different measures but only three instruments included all four domains (School Climate and Academic Mindset Inventory [SCAMI], Kearney et al., 2020; School Climate Measure [SCM], Zullig et al., 2010, 2015; School Climate Scale [SCS], Sudla et al., 2020). The most common domains were safety and relationships; Teaching and learning was the next most common domain and environment was the least common domain. Three instruments contained a one-dimensional structure (Georgia Brief School Climate Inventory [GaBSCI], Rifenbark et al., 2020; White et al., 2014; SCA scale, Sun & Royal, 2017; Japan School Climate Inventory [JaSC], Nishimura et al., 2020); the mean number of domains per instrument was 4.1. A leadership category was present most often in teacher-based measures. Common domains and subdomain structures for the 37 measures are in Figure 2.

3.3 | Instrument presentation and psychometric quality

The synthesis of results per questionnaire and their accompanying level of quality evidence based on instrument presentation and psychometric quality is in Table 5. With respect to *instrument presentation*, 12 student instruments, five teacher instruments, and the parent instrument met the highest score for all items. With respect to *psychometric properties*, no instrument met the highest score for all items. Only two studies obtained the highest score for the test–retest criterion, the SC Scale (Anwar & Anis-ul-Haque, 2014) and the ASCS-T (F. L. Huang & Cornell, 2016), a statistical index that was not analyzed in most studies. Structural validity was tested primarily via factor analysis (EFA and/or CFA) and variance scores ranged from 22 to 79 although in most cases is not mentioned. Only six instruments met the highest score for this criterion of which two were original versions (What's Happening in This School? [WHITS; J. Aldridge & Ala'I, 2013] and Students' Perception of the School Climate [PACE; Escalante, Palacios, et al., 2020]) and the rest were revised versions (My Class Inventory-Short Form [MCI-SF, Sink & Spencer, 2005]; School Climate and School Identification Measure-Student [SCASIM-St, Gálvez-Nieto et al., 2020]; Students' Perception of the School Climate [PACE-33, Escalante, Goñi, et al., 2020]; and Inventory of School Climate-Student [ISC-S, Acun- Kapıkıran & Kapıkıran, 2011]).

With respect to *both* instrument presentation and psychometric quality, the most highly rated *student* instruments were the Delaware School Climate Survey-Student (DSCS-S, Bear et al., 2011) and its later Brazilian version (Bear et al., 2016), the SCASIM-St (Lee et al., 2017), and the WHITS (J. Aldridge & Ala'I, 2013). The most

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TABLE 4 Dimensions of school climate according to Cohen's et al. (2009) model

Instruments		Safety		Teaching and learning				Relationships				
		Physical	Social-emotional	Quality of instruction	Social, emotional, and ethical learning	Professional development	Leadership	Respect for diversity	School community and collaboration	Morale and "connectedness"	Environ-mental Structural	*Others*
Students	DSCS-S	•	•					•	•			
	Bear et al. (2011)											
	DSCS-S	•	•					•	•			
	Coelho et al. (2020)											
	DSCS-S	•	•					•	•			
	Bear et al. (2016)											
	WHITS	•	•					•		•		
	J. Aldridge and Ala'I (2013)											
	QSCCA	•	•	•				•				
	Cocoradă and Clinciu (2009)											
	SMSSC Cemalcilar (2010)	•	•					•			•	
	GaBSCI							•				Unidimen-sional
	White et al. (2014)											
	GaBSCI							•				Unidimen-sional
	Rifenbarck et al. (2020)											
	MSCS-SV	•	•	•				•				
	Gage et al. (2016)											
	ASCS	•	•	•				•	•			

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TABLE 4 (Continued)

Instruments	Safety		Teaching and learning				Relationships				
	Physical	Social-emotional	Quality of instruction	Social, emotional, and ethical learning	Professional development	Leadership	Respect for diversity	School community and collaboration	Morale and "connectedness"	Environ-mental Structural	*Others*
Konold et al. (2014)											
SCAMI	•	•	•	•			•	•		•	
Kearney, and Sanmartín, and González (2020)											
SC Survey	•	•					•				
DeRosier and Newcity (2005)											
JaSC											Unidimen-sional
Nishimura et al. (2020)											
SECCI							•			•	
Beld et al. (2017)											
MSCI			•				•		•		
Marx and Byrnes (2012)											
SCS	•	•	•			•	•		•		
Whitehouse et al. (2020)											
SCM	•	•	•				•		•	•	
Zullig et al. (2010)											
SCM	•	•	•				•		•	•	

(Continues)

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TABLE 4 (Continued)

Instruments	Safety		Teaching and learning				Relationships				
	Physical	Social-emotional	Quality of instruction	Social, emotional, and ethical learning	Professional development	Leadership	Respect for diversity	School community and collaboration	Morale and "connectedness"	Environ-mental Structural	*Others*
Zullig et al. (2015)											
MCI-SF	•	•	•				•				
Fraser (1982)											
MCI-SF	•	•	•				•				
Sink and Spencer (2005)											
SCASIM-St				•			•		•		
Lee et al. (2017)											
SCASIM-St				•			•		•		
Gálvez-Nieto et al. (2020)											
PACE	•	•					•			•	
Escalante, Palacios, et al. (2020)											
PACE-33	•	•					•			•	
Escalante, Goñi, et al. (2020)											
MDS3	•	•					•	•	•	•	
Bradshaw et al. (2014)											
MDS3	•	•					•	•	•	•	

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TABLE 4 (Continued)

Instruments		Safety		Teaching and learning				Relationships				
		Physical	Social-emotional	Quality of instruction	Social, emotional, and ethical learning	Professional development	Leadership	Respect for diversity	School community and collaboration	Morale and "connectedness"	Environ-mental Structural	*Others*
	Lindstrom Johnson et al. (2019)											
	ISC–S	•	•	•				•		•		
	Brand et al. (2003)											
	ISC–S	•	•	•				•		•		
	Acun- Kapıkıran and Kapıkıran (2011)											
Teachers	DSCS-T/S	•	•					•	•			
	Bear et al. (2014)											
	ASCS-T	•	•	•				•	•			
	F. L. Huang et al. (2015)											
	ASCS-T	•	•	•				•	•			
	F. L. Huang and Cornell (2016)											
	SCA					•		•	•		•	Unidimen-sional
	Sun and Royal (2017)											
	SC Scale			•			•				•	
	Anwar & Anis-ul-Haque (2014)											
	ISCS			•			•					

(Continues)

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TABLE 4 (Continued)

Instruments		Safety		Teaching and learning				Relationships				
		Physical	Social-emotional	Quality of instruction	Social, emotional, and ethical learning	Professional development	Leadership	Respect for diversity	School community and collaboration	Morale and "connectedness"	Environ-mental Structural	*Others*
	Emam and F. hendawy al-Mahdy (2020)											
	SCQ-SHST			•			•	•	•			
	Quijada et al. (2020)											
	SCS	•	•	•				•			•	
	Sudla et al. (2020)											
Parents	DSCS-H	•	•					•	•			
	Bear et al. (2015)											
Total		26	26	18	3	1	4	34	13	11	12	

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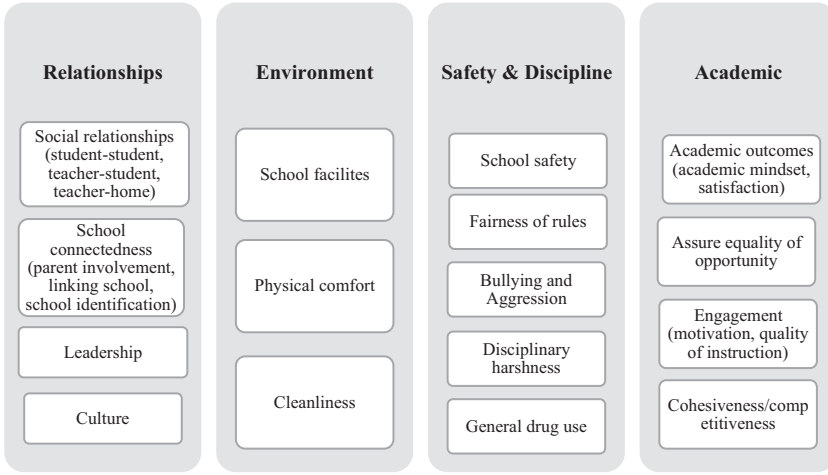

FIGURE 2 School climate domains and subdomains

highly rated teacher instruments were the ASCS-T (Huang & Cornell, 2016), which is a later psychometric review of the ASCS-T (F. L. Huang et al., 2015) whose original version scored 9 of 22 whereas the revised version scored 16 of 22, the Delaware School Climate Survey Teacher/Staff (DSCS-T/S, Bear et al., 2014) and the School Climate Questionnaire for Secondary and High School Teachers (SCQ-SHST, Quijada et al., 2020), scoring both also 16 of 22. The quality of only one *parent* instrument was evaluated, the Delaware School Climate Survey-Home (DSCS-H, Bear et al., 2015), scoring 18 of 22.

4 | DISCUSSION

School climate is indeed a multidimensional construct but little consensus has emerged as to what dimensions should comprise the construct. The present systematic review revealed that four main domains are generally represented among extant school climate measures: relationships, environment, safety/discipline, and academic (Cohen et al., 2009). Each main domain also contains key subdomains, and this architecture could serve as a touchstone for conceptualizing school climate and refining assessment devices for this construct. The domain/subdomain architecture could also serve to guide school reform efforts across jurisdictions to enhance comparability, fidelity, research endeavors, and outcome measurements.

A first main domain, *relationships*, was marked by subdomains that included social relationships, school connectedness, leadership, and culture. *Social relationships* involved those most central to student well-being, including student relationships with peers and teachers and parent–teacher relationships. Social relationships with respect to school, including parent involvement, form a key cornerstone of belongingness, which in turn boosts school achievement (Ahmadi et al., 2020). Social relationships and sense of belonging may be particularly important for diverse, immigrant, and nonbinary students (Budge et al., 2020; Jiang & Liang, 2021). Key mechanisms in this regard include reduced loneliness and depressive and other symptoms, enhanced social support and skills, and improved life satisfaction and academic competence (Arslan, 2021). These collective constructs also fit well with contemporary systems views of school climate that emphasize affective and cognitive perceptions regarding social interactions and relationships among students, teachers, administrators, and school staff within a school (Rudasill et al., 2018).

School connectedness can overlap with social relationships but also includes student commitment and investment with respect to school performance (Monahan et al., 2010). As such, school connectedness relates

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TABLE 5 Overall quality score of school climate measures

		Formal presentation characteristics						Psychometric characteristics						
	Instrument	Usability	Sample size	Age groups	Number domains	Easy-to-answer questions	Theory	Reliability	Test–retest	Construct validity	Content validity	Structural validity	Factorial invariance	Sum
Students	WHITS	+	+	+	+	+	+	+	x	x	+	+	x	18
	J. Aldridge and Ala'I (2013)													
	QSCCA	−	+	+	+	x	+	+	x	−	+	−	x	15
	Cocoradă and Clinciu (2009)													
	SMSSC	+	+	−	+	+	+	+	x	x	x	−	+	16
	Cemalcilar (2010)													
	DSCS-S	+	+	+	+	+	+	+	x	−	+	−	+	20
	Bear et al. (2011)													
	Portuguese DSCS-S	−	+	+	+	+	+	+	x	x	x	−	x	14
	Coehlo et al. (2020)													
	Brazilian	+	+	+	+	+	+	+	x	−	−	−	+	19
	DSCS-S Bear et al. (2016)													
	GaBSCI	+	+	+	x	x	+	+	x	−	x	−	x	12

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TABLE 5 (Continued)

Instrument	Formal presentation characteristics						Psychometric characteristics						Sum
	Usability	Sample size	Age groups	Number domains	Easy-to-answer questions	Theory	Reliability	Test–retest	Construct validity	Content validity	Structural validity	Factorial invariance	
White et al. (2014)													
GaBSCI	+	+	+	x	x	+	+	x	x	x	–	+	13
Rifenbark et al. (2020)													
MSCS-SV	+	+	+	+	+	+	–	x	x	+	–	x	16
Gage et al. (2016)													
ASCS	+	+	+	+	+	+	–	x	x	x	–	x	14
Konold et al. (2014)													
SCAMI	+	+	+	+	x	+	–	x	x	x	–	+	14
Kearney, and Sanmartín, and González (2020)													
SC Survey	+	+	+	–	+	+	x	x	–	x	–	x	13
DeRosier and Newcity (2005)													
JaSC Nishimura et al. (2020)	+	+	+	x	+	+	+	x	+	x	–	+	17
SECCI	+	+	+	+	+	+	+	x	–	x	–	x	16

(Continues)

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TABLE 5 (Continued)

	Formal presentation characteristics						Psychometric characteristics						
Instrument	Usability	Sample size	Age groups	Number domains	Easy-to-answer questions	Theory	Reliability	Test–retest	Construct validity	Content validity	Structural validity	Factorial invariance	Sum
Beld et al. (2017)													
MSCI	+	+	−	+	+	+	+	x	x	x	−	x	14
Marx and Byrnes (2012)													
SCS	+	+	+	+	+	+	x	x	x	x	−	+	15
Whitehouse et al. (2020)													
SCM	+	+	+	+	+	+	+	x	x	+	−	x	17
Zullig et al. (2010)													
SCM	+	+	+	+	+	+	−	x	x	x	−	+	16
Zullig et al. (2015)													
MCI-SF	−	+	x	+	+	+	+	x	x	x	x	x	11
Fraser (1982)													
MCI-SF	+	+	−	+	+	+	−	x	x	x	+	x	14
Sink and Spencer (2005)													
SCASIM-St	+	+	+	+	+	+	+	−	−	x	−	+	19
Lee et al. (2017)													
SCASIM-St	−	+	+	+	+	+	+	x	−	x	+	x	16
Gálvez-Nieto et al. (2020)													

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TABLE 5 (Continued)

Instrument	Formal presentation characteristics						Psychometric characteristics						Sum
	Usability	Sample size	Age groups	Number domains	Easy-to-answer questions	Theory	Reliability	Test–retest	Construct validity	Content validity	Structural validity	Factorial invariance	
PACE Escalante, Palacios, et al. (2020)	–	+	+	+	+	+	–	x	x	x	+	+	16
PACE-33 Escalante, Goñi, et al. (2020)	+	+	+	+	+	+	+	x	x	x	+	–	17
MDS3 Bradshaw et al. (2014)	+	+	+	+	+	+	–	x	x	x	–	+	16
MDS3 Lindstrom Johnson et al. (2019)	+	+	–	+	+	+	+	x	x	x	x	x	13
ISC–S Brand et al. (2003)	+	+	x	+	–	+	–	–	+	x	–	+	16
ISC–S Acun-Kapıkıran and Kapıkıran (2011)	–	+	–	+	–	+	x	x	+	+	+	x	15

(Continues)

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TABLE 5 (Continued)

		Formal presentation characteristics						Psychometric characteristics						
	Instrument	Usability	Sample size	Age groups	Number domains	Easy-to-answer questions	Theory	Reliability	Test–retest	Construct validity	Content validity	Structural validity	Factorial invariance	Sum
Teachers	DSCS-T/S	+	+	—	+	+	+	+	x	–	x	–	+	16
	Bear et al. (2014)													
	ASCS-T	+	+	—	+	x	+	x	x	x	x	–	x	9
	F. L. Huang et al. (2015)													
	ASCS-T	+	+	—	+	+	+	+	+	-	x	–	x	16
	F. L. Huang and Cornell (2016)													
	SCA	+	x	—	x	+	–	+	x	x	x	–	x	8
	Sun and Royal (2017)													
	SC Scale	–	+	—	+	x	+	x	+	+	+	–	x	14
	Anwar & Anis-ul-Haque (2014)													
	ISCS	+	+	—	+	+	+	+	x	x	+	–	x	15
	Emam and F. hendawy al-Mahdy (2020)													
	SCQ-SHST	+	+	—	+	+	+	+	x	–	+	–	x	16

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TABLE 5 (Continued)

		Formal presentation characteristics						Psychometric characteristics						
	Instrument	Usability	Sample size	Age groups	Number domains	Easy-to-answer questions	Theory	Reliability	Test–retest	Construct validity	Content validity	Structural validity	Factorial invariance	Sum
	Quijada et al. (2020)													
	SCS	+	+	—	+	+	+	–	x	–	x	–	x	13
	Sudla et al. (2020)													
Parents	DSCS-H	+	+	—	+	+	+	+	x	–	+	–	+	18
	Bear et al. (2015)													

Note: Ratings were coded: "+" = 2; "–" = 1; "x" = 0. Abbreviations: ASCS, Authoritative School Climate Survey; ASCS-T, Authoritative School Climate Survey Teacher version; Brazilian DSCS-S, Brazilian version of the Delaware School Climate Survey–Student (Brazilian DSCS-S); DSCS-H, Delaware School Climate Survey-Home; DSCS-S, Delaware School Climate Survey-Student; DSCS-T/S, Delaware School Climate Survey Teacher/Staff; GaBSCI, Georgia Brief School Climate Inventory; ISCS, Inclusive School Climate Scale; ISC-S, Inventory of School Climate-Student; JaSC, Japan School Climate Inventory; MCI-SF, My Class Inventory-Short Form; MSCI, Multicultural School Climate Inventory; MSCS-SV, Meriden School Climate Survey–Student Version; PACE, Students' Perception of the School Climate; QSCCA, Questionnaire for School Climate Connected to Assessment; SC Scale, School Climate Scale; SC Survey, School Climate Survey; SCA, School Climate Assessment; SCAMI, School Climate and Academic Mindset Inventory; SCASIM-St, School Climate and School Identification Measure–Student; SCM, School Climate Measure; SCQ-SHST, School Climate Questionnaire for Secondary and High School Teachers; SECCI, Special Education Classroom Climate Inventory; SMSSC, Scale for Measuring Schools' Social Climate; WHITS, What's Happening in This School?

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closely to school achievement and serves as a buffer against mental health problems and friction with others (Lohmeier & Lee, 2011). Key mechanisms in

this regard may include less victimization and association with deviant peers as well as greater health promotion practices (Li et al., 2013; Rowe & Stewart, 2011). School connectedness is thus a key element of many school climate improvement programs, particularly for students of color and those with disabilities (Daly et al., 2010; Hebron, 2018).

Leadership and *culture* were the other subdomains of relationships. Transformative leadership and school climate have been linked because of the former's effect on organizational improvement, effectiveness, and overall culture (McCarley et al., 2016). In addition, shared leadership, or strong decision-making partnerships within a school, usually means increased commitment to systemic change, fidelity to implemented procedures, and consistency with respect to school climate initiatives (Hughes & Pickeral, 2013). *Culture* in this context can refer to various constructs such as respect for diversity, school values and customs, student and teacher perceptions of climate, and philosophies with respect to instruction, discipline, and other key elements of a school (Lindahl, 2011). Important mechanisms in this regard may include enhanced student well-being and satisfaction as well as teacher support and respect for students (Dernowska, 2017).

A second main domain, *environment*, was marked by subdomains that included school facilities, physical comfort, and cleanliness. School infrastructure and its condition relate closely to student physical activity and academic performance as well as occupant respiratory and other forms of health (Haug et al., 2010). This can include the thermal and lighting quality of the school environment, overall maintenance and safety of the physical facilities, and proximity to positive (e.g., trees, vegetation) or negative (e.g., noise, odors) ambient factors (Magzamen et al., 2017). School environment may also include educational infrastructure such as upkeep of technological and other resources for learning, school designs and layouts, classroom size, acoustical controls, and overall presentation (Kutsyuruba et al., 2015).

A third main domain, *safety/discipline*, was marked by subdomains that included school safety, bullying and aggression, fairness of rules, disciplinary harshness, and general drug use. *School safety* has been linked to overall climate and student academic performance and school attendance across many studies and often subsumes reduced *bullying and aggression* (e.g., Bacon & Kearney, 2020; Marraccini et al., 2020). *Fairness of rules* and *disciplinary harshness* refer to the general consistency of responses to student misbehavior and greatly impact student attitudes toward school (F. Huang & Anyon, 2020). Major school climate improvement initiatives thus focus in part on clear behavioral rules and expectations, fair and consistent policies and consequences for misbehavior, and reduced exclusionary discipline and racial disparities with respect to discipline (Heilbrun et al., 2018). In addition, positive climate is often a protective factor against *general drug use* within a school, though more so for middle than high school grades (Daily et al., 2020).

A fourth main domain, *academic*, was marked by subdomains that included academic outcomes, equality of opportunity, engagement, and cohesiveness/competitiveness. These subdomains intersect with one another in various ways. As mentioned, school climate is closely related to student academic outcomes and engagement. At a more granular level, these relationships may be partly explained by *equality of opportunity*, which refers to egalitarian practices with respect to student expression and participation in school endeavors and resources, as well as *cohesiveness/competitiveness*, which refers to mutual responsibility, communication, care, and problem-solving (or lack thereof) with respect to school endeavors and resources (Barksdale et al., 2021). Group cohesiveness at school may be particularly important for science-based activities as well as for developing broader conceptualizations and real-world solutions for complex issues (Koul, 2019).

Efforts to identify these key domains and subdomains across the reviewed instruments can assist future measure development and school climate research in several ways. First, these efforts may assist a more consensus-based approach across jurisdictions, educational agencies, and researchers toward the development of a common domain architecture to facilitate comparable and parallel endeavors to measure and improve school climate and related constructs (Kearney, 2021).

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Second, these efforts may assist in the identification of core features of school climate that most impact student attendance, academic performance, and behavior (Bottiani et al., 2020). This could lead to a brief and standardized assessment of school climate for multiple informants. Third, these efforts may assist in program evaluation as a key metric for outcome purposes (Charlton et al., 2021). Finally, these efforts can be used to facilitate psychometric quality and confidence in whatever future measures are chosen to assess school climate, especially for measures designed specifically for diverse student groups (Blitz et al., 2020). The present systematic review provided a wide-ranging and critical structure to catalog and evaluate extant measures for these purposes.

Acceptable internal consistency and test-retest reliability were obtained with values equal or higher to 0.70 (George & Mallery, 2003) for most of the reviewed measures except for a pair of instruments whose reliability did not reach 0.70 (DeRosier & Newcity, 2005; Whitehouse et al., 2020). Cronbach's alpha was the most popular measure of reliability reported but can be affected by number of items, number of response alternatives, and proportion of test variance (Domínguez-Lara & Merino-Soto, 2015; Watkins, 2017). Researchers are thus encouraged to apply practical alternatives such as coefficient omega that works with factorial loads, makes calculations more stable, and reflects the true level of reliability (Dunn et al., 2014; Peters, 2014; Trizano-Hermosilla & Alvarado, 2016). In addition, few studies examined the temporal stability of the instruments and, among those that did, intervals of a 1–2 weeks, a month or more were utilized.

With respect to factor analysis, most studies used EFA and CFA consecutively with the same sample, which can be problematic because CFA often validates the solution resulting from EFA in the same group (Pérez-Gil et al., 2000). Ten of the 37 studies are validations of original versions and in most studies (7 of 10) they apply directly CFA. Factorial analyses show that some of these studies replicate the hypothesized factor solution according to the original version (Gálvez-Nieto et al., 2020; Rifenbark et al., 2020), others also replicate the factorial structure but changing or reducing the number of items (Coelho et al., 2020; Lindstrom Johnson et al., 2019; Sink & Spencer, 2005). The rest of the reviews reveal a similar but different factorial structure according to the original version (Acun- Kapıkıran & Kapıkıran, 2011; Bear et al., 2016; Escalante, Palacios, et al., 2020; F. L. Huang & Cornell, 2016; Zullig et al., 2015). One of the purposes of some of these reviews is to offer shorter and simple instruments that avoid fatigue in their completion and are logistically simple to administer and score. Some of these studies reexamined the validity of the instruments in new samples more diverse, with different age ranges and from other countries. Further exploration of the scales' psychometric properties by subsequent comparative studies is recommended.

Only 15 of the 37 studies reviewed provided data on factor invariance to determine whether the instrument maintains psychometric properties between groups. Of those 15, four studies are validations of previously validated original versions. Three of these studies in their original versions did not include analyzes of invariance, so their subsequent validations expand the informative data on psychometric validity (Bear et al., 2016; Escalante, Palacios, et al., 2020; Rifenbark et al., 2020; Zullig et al., 2015). New studies are needed to examine factorial invariance of these instruments with samples from different ethnic groups, checking if the instrument is invariant for the different groups such as gender or age. In addition, most studies utilized orthogonal or oblique rotation. Advantages apply to both methods but researchers should consider the goal of analysis. According to Kieffer (1998), if the goal of the analysis is to generate results that best fit the data, then oblique rotation is a logical choice. Conversely, if replicability of the factor analytic results is the primary goal of the analysis, then an orthogonal rotation might be preferable because results from this rotation tend to be more parsimonious.

Limitations of the present study should be noted. First, the interrater reliability of the study screening and coding process was not calculated because not all articles were reviewed by all of the authors. The selection process may have been more precise with multiple initial reviewers. Second, no review was made of preprint servers. Third, although a wide range of publications were reviewed, publication bias remains a concern given potential preferences for significant over null findings and greater difficulty to publish qualitative research. Finally, other methods to assess school climate were not reviewed. Methods such as direct observation or focus group

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interviews, for example, may produce more nuanced domains and substructures than the ones identified here via questionnaires.

4.1 | Future directions

Many of the studies conducted to evaluate the measures reviewed here were cross-sectional in nature and future research on school climate instruments should emphasize more longitudinal analyses. School climate has been shown to be an important mediator and predictor with respect to key social and academic variables in middle and high school, including bullying, disengagement, attendance, and dropout (e.g., Acosta et al., 2019). In addition, school climate has been investigated along multiple trajectories in secondary grades; such trajectories often fluctuate across genders, racial groups, and class sizes, for example (Coelho et al., 2020). School climate has also been examined longitudinally with respect to changes in student mental health, academic performance, and ethnic-racial identity (Camacho et al., 2018; Daily et al., 2020; László et al., 2019). As such, examining school climate measures longitudinally in psychometric analyses would seem to be imperative, including analyses beginning earlier in elementary school grades.

Many of the instruments reviewed in the present study also tended to be fairly restrictive in scope and did not necessarily reflect the true multidimensional nature of school climate. Several researchers have commented on the need to examine multiple facets of school climate, especially those related to individual-group relationships and physical surroundings (Van Houtte, 2005). In addition, many variables linked to school climate are equally multifaceted and thus require multilevel analysis (Coelho et al., 2020). School climate also links to many different ecological systems in a student's life such as parent-teacher relationships, peer interactions that flow inside and outside of school, and safety concerns not only within a school building but also in ancillary areas such as routes to school, campuses, and playgrounds (Rudasill et al., 2018). A renewed focus as well on school-family-community partnerships to address complex problems such as school absenteeism also means that climate measures will need to be sophisticated, wide-ranging, and adaptable to multiple informants (Bryan & Henry, 2012).

Finally, future school climate measures will need to emphasize cost-effectiveness to be utilized by educational agencies with limited resources. This includes a simultaneous analysis of student contextual learning and other factors that can be integrated within a school climate measure. Bacon and Kearney (2020), for example, found that academic mindset and school climate items interacted to predict key outcomes such as absenteeism severity levels. Such analysis allows for a more in-depth investigation of nuanced reciprocal effects (e.g., failure to submit homework assignments vis-à-vis safety concerns) that permit more targeted use of intervention resources. Such in-depth investigation would also allow for microanalysis and comparison among specific schools, grades, student groups, and classrooms (Cipriano et al., 2019).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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