



# Classroom motivational climate in Ibero-American secondary and higher education: a systematic review

Clima motivacional de clase en la enseñanza media y superior iberoamericana: una revisión sistemática

Clima motivacional de sala de aula no ensino médio e superior ibero-americano: uma revisão sistemática

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**Abstract:** The classroom motivational climate (CMC) is a construct that allows studying the patterns of teaching performance in the classroom and their relationship with student motivation. Based on the importance of CMC for teaching and learning environments, a systematic review was conducted with the aim of synthesizing the evidence from Ibero-American studies in secondary and higher education during the period 1992-2023. The methodological guidelines defined in the PRISMA statement were used, which allowed the selection of 51 articles that met the eligibility criteria. The results reveal a prevalence of quantitative studies (90 %) in secondary education (65 %). Nine instruments were identified for the CMC study and the CMC-Q was found to be the most commonly used instrument. The Analysis of the studies indicates that there is a moderate common explained variance between the CMC and personal psychological variables of students and teachers, but low with respect to student academic performance. The reported findings are in the same direction as the evidence available in other regions worldwide. It is suggested to move towards a multidimensional understanding of CMC, triangulation of participants, techniques and methods, as well as additional studies that integrate CMC as a measure of effectiveness in educational interventions.

**Keywords:** classroom motivational climate; class climate; motivation; secondary education; university education

**Resumen:** El clima motivacional de clase (CMC) es un constructo que permite estudiar los patrones de actuación docente en el aula y su relación con la motivación del estudiantado. En base a la importancia que tiene el CMC para los entornos de enseñanza y aprendizaje se realizó una revisión sistemática con el objetivo de sintetizar la evidencia de estudios iberoamericanos en la educación media y superior durante el período 1992-2023. Se utilizaron las directrices metodológicas definidas en la declaración PRISMA, que permitieron seleccionar 51 artículos que cumplieron con los criterios de elegibilidad. Los resultados revelan una prevalencia de estudios cuantitativos (90 %), en la enseñanza media (65 %). Fueron identificados nueve instrumentos para el estudio del CMC y se encontró que el CMC-Q fue el instrumento más utilizado. El análisis de los estudios señala que existe una varianza explicada común moderada entre el CMC y variables psicológicas personales de estudiantes y docentes, pero baja respecto al rendimiento académico estudiantil. Los hallazgos reportados van en la misma dirección que la evidencia disponible en otras regiones a nivel mundial. Se sugiere avanzar hacia una comprensión multidimensional del CMC, la triangulación de participantes, técnicas y métodos, así como estudios adicionales que integren al CMC como medida de la eficacia en las intervenciones educativas.  
**Palabras clave:** clima motivacional de clase; clima de clase; motivación; educación secundaria; educación universitaria

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**Resumo:** O clima motivacional de sala de aula (CMC pela sua sigla em espanhol) é um construto que permite estudar os padrões de atuação docente em sala de aula e sua relação com a motivação dos alunos. Com base na importância do CMC para os ambientes de ensino e aprendizagem, foi realizada uma revisão sistemática com o objetivo de sintetizar as evidências dos estudos ibero-americanos no ensino médio e superior durante o período 1992-2023. Foram utilizadas as diretrizes metodológicas definidas na declaração PRISMA, o que permitiram selecionar 51 artigos que atenderam aos critérios de elegibilidade. Os resultados revelam uma prevalência de estudos quantitativos (90 %) no ensino médio (65 %). Nove instrumentos foram identificados para o estudo do CMC, sendo que o CMC-Q foi o instrumento mais utilizado. A análise dos estudos indica que existe uma variância explicada comum moderada entre o CMC e variáveis psicológicas pessoais de alunos e docentes, mas em relação ao desempenho acadêmico dos estudantes. As descobertas relatadas seguem a mesma direção das evidências disponíveis em outras regiões do mundo. Sugere-se avançar para uma compreensão multidimensional do CMC, a triangulação de participantes, técnicas e métodos, bem como estudos adicionais que integrem o CMC como medida de eficácia em intervenções educativas.

**Palavras-chave:** clima motivacional da sala de aula; clima de sala de aula; motivação; ensino médio; ensino superior

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There is a broad field of international research that has focused on studying classroom interactions and the multiple educational outcomes associated with them (Fraser, 2012). One of the most fruitful approaches to studying the role of context and its interactions has come from the concept of classroom climate (CC). CC comes from a theoretical derivation of the Gestalt concept of the psychological field. Kurt Lewin introduced the metaphor of social climate to study the effects of context on human action (Lewin et al., 1939). The specific construct of CC was introduced by Walberg and Anderson (1968) and refers to group members' positive or negative perceptions regarding the types of interaction that occur among them in the classroom context.

One of the lines of research on CC has focused on motivational aspects, where we can identify the classroom motivational climate (CMC). This construct addresses the influence that different classroom structures have on student motivation (Meece et al., 2006). Theoretically, according to Robinson (2023), the concept of CMC has been primarily developed based on contributions from two motivational perspectives: Achievement Goal Theory (AGT) (Ames, 1992; Urdan & Kaplan, 2020) and Self-Determination Theory (SDT) (Ryan & Deci, 2017, 2020). These theoretical developments do not represent opposing or disjunctive approaches but rather offer complementary contributions (Gutiérrez & Tomás, 2018).

AGT emphasizes the importance of the type of goals that people pursue in achievement situations. According to Ames (1992), specific classroom goal structures may foster particular motivational orientations in students. If the teacher emphasizes effort and skill development, this will lead students to adopt mastery goals; if, on the other hand, the focus is on competition, skill comparison, and normative assessment, performance goals will predominate. Through messages shared in class, teachers promote certain types of goals in students (Alonso-Tapia, 2016).

Ames (1992) supports and disseminates the system initially proposed by Epstein in 1988, known by its acronym TARGET, which allows the identification of critical instructional practices that are associated with the orientation of students towards mastery or performance goals (Meece et al., 2006). According to Ames (1992), goal structures in the classroom include (but are not limited to) proposed tasks (T), where variety and optimal challenge are essential, as well as teacher orientation through authority (A) and the degree to which teachers involve the student in decision-making, through the promotion of autonomy. Another aspect highlighted is recognition (R); the use of rewards has a negative effect on the motivational climate when they are perceived as controlling and not contingent on effort and progress toward achieving goals; public praise favors comparison and competition among peers in the classroom. Another relevant instructional aspect is promoting group work (G) in collaborative contexts. Assessment practices (E) include standards, criteria, methods, frequencies, and where students' perception of the meaning of their learning is relevant. Finally, time management (T) by the teacher is considered, as well as the adequate and flexible use of time under the demands of the tasks and the characteristics of the students. Recent authors have pointed out the importance of social relationships in the classroom, which should be characterized by positive affection and mutual respect, and therefore propose adding an (S) to the acronym (TARGETS) (Chazan et al., 2022).

SDT is one of the five traditions for understanding motivational processes from a sociocognitive perspective (Huertas, 2023) and constitutes a macro theory for addressing motivation, personality, and human well-being (Urhahne & Wijnia, 2023). SDT includes a set of sub-theories, among which the theory of basic psychological needs stands out for its applications in the educational field (Ryan & Deci, 2017, 2020). From this theoretical perspective, motivational processes are linked to the satisfaction of the basic psychological needs of competence, autonomy, and relatedness. The need for autonomy refers to the opportunities for choice control and decision-making involved in the development of activities. The need for relatedness corresponds to warmth, bonding, and care and is satisfied in the experience of connection and belonging with others. The need for competence is associated with efficacy and mastery, which is achieved when students can competently participate in activities and have opportunities to use and expand skills and knowledge (Vansteenkiste et al., 2020). Teacher behaviors and classroom structure can contribute to satisfying students' psychological needs in the classroom context (Reeve & Lee, 2014).

Although there is abundant international research on CMC, it is essential to highlight that there needs to be more representation of Ibero-American studies in Systematic Reviews (SR) and meta-analyses on this topic. Recent SRs with meta-analyses by Rolland (2012) and Bardach et al. (2020) have included studies from North America, Asia and Europe without reference to Ibero-American studies. Therefore, the present SR, in addition to systematizing, analyzing and presenting in an optimized way the empirical evidence on CMC from Ibero-American educational systems, aims to contribute to giving visibility to the academic production of this region, to engage in discussions with international evidence, and to advance the field of research.

In this direction, the purpose of this SR is to synthesize evidence on CMC in Ibero-American secondary and higher education in the period 1992-2023. To do so, the following specific objectives are proposed: a) to characterize the instruments for the study of CMC, b) to describe the relationships between CMC and other psychological variables, c) to identify the relationships between CMC and academic performance, and d) to explore the relationships between CMC and other dimensions of classroom climate.

## **Materials and method**

### **Design**

This SR was developed based on the guidelines established in the PRISMA (Preferred Reporting Items- for Systematic Reviews and Meta-Analyses) statement (Moher et al., 2009; Yepes-Núñez et al., 2021) and the methodological recommendations proposed by Alexander (2020).

### **Eligibility criteria for articles**

To develop the search strategy, the inclusion and exclusion criteria described in Table 1 were defined.

**Table 1**  
*Inclusion and exclusion criteria*

	<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
Construct	Motivational classroom climate	Other constructs (school climate)
Educational levels	Secondary and Higher Education	Primary education, work contexts, sports contexts and physical education
Period	1992 - 2023	1991 - earlier
Regional scope	Studies developed in Ibero-American countries	Other cultural contexts
Language	Spanish, Portuguese and English	Other languages
Type of publication	Articles published in peer-reviewed journals and indexed in databases (Redalyc, SciELO and/or Scopus)	Conference proceedings, books, book chapters, undergraduate and graduate theses, non - indexed articles
Type of study	Empirical articles	Theoretical articles

The delimitation of the period 1992-2023 recovers the academic production developed since the definition of the construct proposed by Ames (1992) up to the most recent evidence. It is important to note that this SR has excluded studies from sports and physical education contexts for two reasons. First, there have been recent systematic reviews or meta-analyses on motivational climate in physical education and sports contexts (González Valero et al., 2022; Harwood et al., 2015; Lacerda et al., 2021). Second, substantive differences in academic contexts regarding participants, dynamics, and activity structures exist.

It is also worth mentioning that three cross-cultural studies between Ibero-American countries or with other regions were identified. For these studies, only the results of the Ibero-American samples were considered. Finally, in the filtering process, a criterion of methodological quality indicators was applied, whereby three articles presented the following weaknesses: one study incompletely reported results, another did not specify the data analysis processes in detail, and another used a non-standardized assessment tool for the context in which the study was conducted reporting results significantly contradictory to the available evidence.

## **Procedure for searching and selecting articles**

### ***Phase 1. Database search***

The search strategy was carried out between July 24 and 31, 2023, in the full text and abstract fields in Spanish, English, and Portuguese. The databases and search engines used were EBSCO, Scopus, SciELO, Redalyc, and Google Scholar. By applying the inclusion above and exclusion criteria, the following search equation was defined: TX ("classroom motivational climate" OR "motivational class\* climate" OR "classroom goal structure") AND AB ("university" OR "college" OR "higher education" OR "secondary schools" OR "middle school" OR "high school") AND NOT AB ("sports" OR "physical education"). The searches were carried out using the EBSCO-Host engine from the Timbó Portal of the National Agency for Research and Innovation (ANII) of Uruguay and the Harzing PoP 8.9.4 software

(Harzing, 2007). At the same time, Zotero 6.0.27 software was used to manage the processing of the articles.

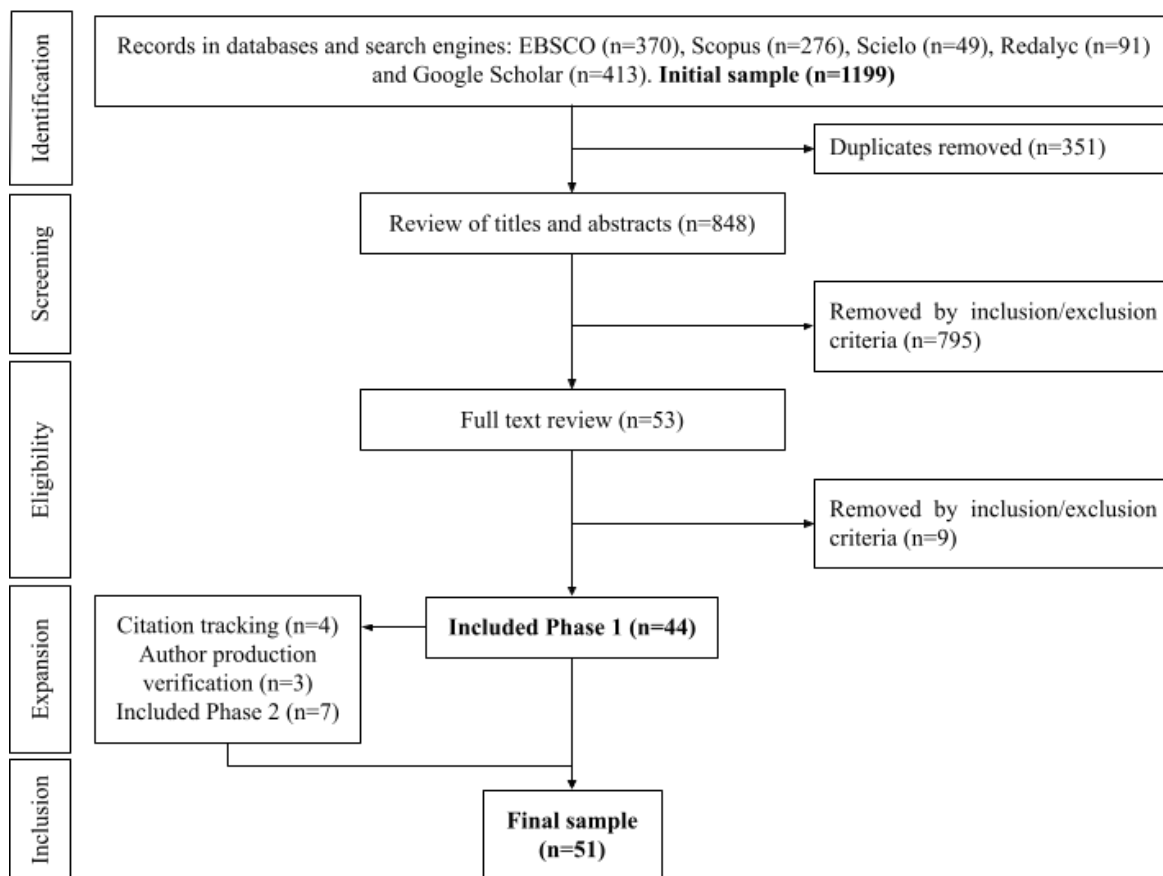
After the initial selection of articles was obtained, two screening processes were implemented. The first screening involved reading the articles' titles and abstracts, while the second screening was based on the full text. After completing this stage, 44 studies were included.

### Phase 2. Expanded Search

In accordance with Alexander's (2020) recommendations, an expanded manual search was implemented to explore possible findings not identified in Phase 1. On the one hand, the academic production of the authors in the articles selected in the first phase from the selected articles was verified via Google Scholar, ResearchGate, and their institutional web pages. On the other hand, references in the included articles were also tracked. Between both search strategies in this phase, seven studies were incorporated, which allowed a total of 51 studies to be included in the final sample. Figure 1 shows the flow chart of the article selection process.

**Figure 1**

Flowchart showing the study sample selection process



### Data extraction and synthesis

Once the article sample was refined, the next step was to code the studies based on descriptive variables (author/s, year, country of sample origin, educational level) and methodological variables (design, participants, instruments). Additionally, the results of each study were incorporated and linked to the objectives of the present SR, particularly the degree of association between the CMC with psychological variables, academic performance, and dimensions of the classroom climate where the common explained variance ( $R^2$ ) was specified for each case. To report this value, only the correlations reported by the authors of the studies were considered. A breakdown of the data mentioned for each study is presented in Appendix 1.

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## Results

### Descriptive analysis of the studies

A sustained increase in research output on the subject has been identified over the last three decades. Four studies correspond to the period 1992 - 2000, eight between 2001 and 2010, twenty-nine between 2011 and 2020, and ten between 2021 and 2023. In terms of research samples and contexts, Spain is the leading country where this topic has been investigated (37 %), with a growing development of studies in the following Latin American countries (in descending order): Argentina, Chile, Mexico, Colombia, Peru, Bolivia, Brazil, Dominican Republic and Venezuela. Likewise, eight cross-cultural studies were identified (between Ibero-American countries and countries in other regions). Concerning educational levels, a significant amount of research was focused on secondary education (65%) compared to university-level studies (33%) and one study on adult secondary education.

Regarding the research designs, there is a marked predominance of quantitative studies (90%), with three qualitative studies (Bono, 2012; de Oliveira & Catão, 2017; Huertas et al., 2020) and two mixed studies (Bardelli & Huertas, 2022; Paoloni, 2009). On the other hand, three studies with intervention strategies to improve CMC were identified (Huertas et al., 2020; Irureta Núñez, 1995a; López-Moya & Morán-Astorga, 2014). With respect to the characteristics of the samples, they were mostly incidental or by convenience with students (76%), with a minority of studies involving students and teachers or only teachers. In studies with quantitative designs, the sample size with students involved was between 33 and 5471 participants, and in samples with teachers, between 12 and 441 participants.

### Characteristics of instruments for the study of CMC

Nine self-report instruments for students were identified. Table 2 provides a systematic, categorized summary of the instruments' names, authors, year of publication, the theoretical model supporting the instrument, the number of factors, the number of items, reported reliability in various studies, and the frequency of use among the studies included.

**Table 2**  
*Measuring instruments for the study of CMC*

Instrument	Authors	Year	Associated theoretical model	Number of Factors	Number of items	Reliability reported in various studies	Frequency of use
CMC-Q	Alonso-Tapia & Fernandez Heredia	2008	AGT	1	32	.92 to .98	26
CMC1	Alonso & Garcia	1987	AGT	6	70	.71 to .94	7
MOC-S	Stornes & Bru	2011	SDT	4	15	.72 to .88	4
CGS-S	Midgley et al.	2000	AGT	3	18	.70 to .80	4
MCES	Granero-Gallegos & Carrasco-Poyatos	2020	SDT	2	7	.87 to .89	3
EMQ-Q	Alonso-Tapia & Lopez	1999	AGT	2	98	.70 to .90	3
EFFEC	Ames	1992	AGT	4	14	.94	1
CEMC 3x2	Elliot et al.	2011	AGT	6	18	.88 to .98 (subscales)	1
EEPCM	Nunez & Gonzalez-Pianda	1994	AGT	3	20	NS	1

*Note.* CMC1: Classroom Motivational Climate Questionnaire 1; EMQ-Q: Environment Motivational Quality Questionnaire; CMC-Q: Classroom Motivational Climate Questionnaire; EFEC: Classroom Structural Factors Scale; CEMC 3 x 2: Classroom Goal Structure Questionnaire; MCES: Motivational Climate in Education; CGS-S: Classroom Goal Structures Scale; EEPCM: Motivational Processes and Contexts Assessment Scale; MOC-S: Motivational Orientation and Climate Scale; NS: Not Specified; AGT: Achievement Goal Theory; SDT: Self-Determination Theory.

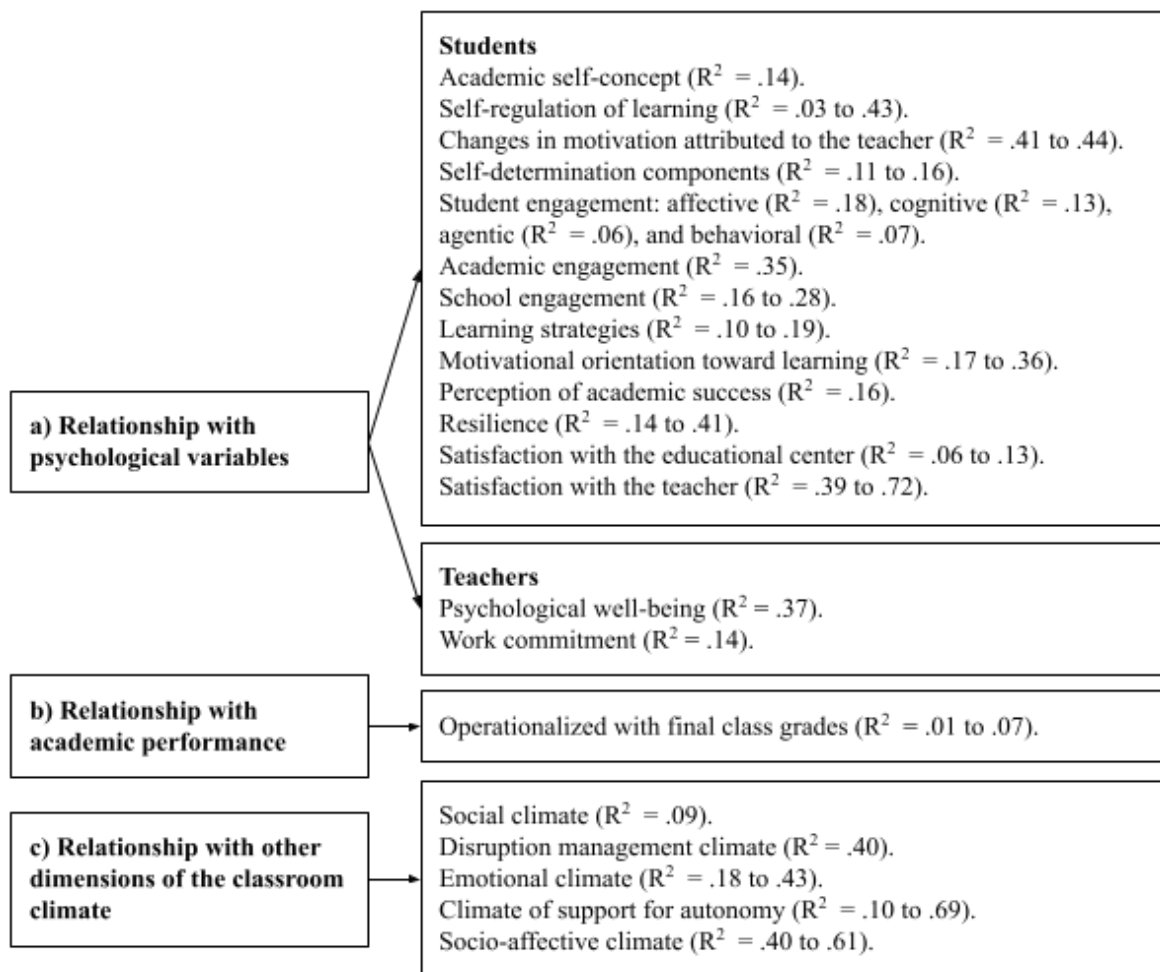
The identified instruments have a high reliability. The most widely used were the CMC-Q, the CMC1, the MOC-S, and the CGS-S. There is evidence of a predominance of the AGT as a theoretical framework that supports instrumental developments. The developed measures have a diverse factorial structure. The CMC-Q is composed of the sum of sixteen scales (novelty, prior knowledge, relating topics, encouragement to participation, learning messages, clarity in objectives, clarity in organization, support for autonomy, step-by-step action, frequent use of examples, adequate pace, regular feedback, assessment for learning, use of praise, equal treatment, affection, and emotional support) measured through pairs of items. The CMC1 proposes six factors that involve dimensions such as class pace, teacher treatment, class organization and clarity of objectives, teacher interest in student learning, group work, and cooperation between peers. Meanwhile, the MOC-S has four factors (performance orientation and performance climate, mastery orientation and mastery climate). In addition to instruments based on self-report measures for students, four studies were identified in the case of the CMC-Q that produced adapted versions for teachers. Finally, four studies were reported that used other instruments such as classroom observation, semi-structured interviews, and surveys.

## Relationships between CMC and psychological variables, academic performance and other dimensions of classroom climate

We propose categorizing the impact of CMC on other factors into three groups: a) CMC relationships with psychological variables of students and teachers, b) the relationships between CMC and student academic performance, and c) CMC relationships with other dimensions of classroom climate. Figure 2 provides a synthesis of the constructs and dimensions identified, as well as the shared explained variance ( $R^2$ ) with CMC.

**Figure 2**

*Shared explained variance ( $R^2$ ) of the CMC with psychological constructs, academic performance and other dimensions of the classroom climate*



## Discussion

The main objective of this SR was to synthesize updated evidence on CMC in Ibero-American secondary and higher education between 1992-2023. To achieve this objective, the methodological guidelines outlined in the PRISMA declaration were followed. After the selection process, the study sample was made up of 51 articles. The following specific objectives guided the analysis: a) to characterize the instruments used to study CMC, b) to describe the relationships between CMC and other psychological variables, c) to identify the relationships between CMC and academic performance, and d) to explore the relationships between CMC and other dimensions of classroom climate.

First, it is important to highlight several trends regarding the methodological designs, educational level, and participants in the studies. There is a high predominance of studies developed with a quantitative methodology (90 %) and in secondary education (65 %), findings that align with those reported by Alansari and Rubie-Davies (2020) on classroom climate. Regarding participants, although some studies have begun to include teachers and observers, most have focused exclusively on



the use of student self-report measures (75 %), which represents a limitation identified by several authors (Elliff & Huertas, 2015; Leal-Soto et al., 2016; Simón et al., 2013).

At the instrumental level, nine student self-report scales were identified for the study of the CMC, where the CMC-Q was the most used instrument (51 %). This instrument is the result of more than three decades of research led by Jesús Alonso-Tapia and Juan Antonio Huertas, along with a group of associated researchers at the Faculty of Psychology of the Autonomous University of Madrid (UAM). However, the CGS-S -a scale integrated into the PALS manual (Patterns of Adaptive Learning Scales; Midgley et al., 2000)- has been the most used instrument outside the Ibero-American context according to the meta-analytical reviews by Bardach et al. (2020) and Rolland (2012). It should be noted that in the theoretical models underlying the instrumental developments, a predominance of the AGT (Ames, 1992) over the SDT (Ryan & Deci, 2020) is evident. Both theories address different -but at the same time complementary- motivational aspects, which contribute to an understanding of the motivational processes and contexts situated in teaching and learning environments (Lens et al., 2008).

Regarding the relationships between CMC and various psychological variables, it is noteworthy that relationships with personal measures of different motivational components were moderate, while relationships with measures of teaching performance ranged from moderate to high. This outcome was expected, as CMC captures how different teaching behaviors are interpreted. These strong relationships help confirm the validity of the instruments. Additionally, it is logical to assume that other personal variables are influenced by contextual factors such as CMC, but only to a partial extent, which is the case when evaluating student characteristics. Among the psychological variables examined in student studies, motivational orientation toward learning and academic self-concept stand out. Regarding motivational orientation toward learning, studies in this SR reported a common explained variance with CMC between  $R^2 = .20$  and  $R^2 = .36$ , while in other regions, the variance was  $R^2 = .24$  (Bardach et al., 2020). For academic self-concept ( $R^2 = .14$ ) and academic success ( $R^2 = .16$ ), the results were similar to those for closely related constructs such as perceived personal competence ( $R^2 = .14$ ) (Rolland, 2012).

Regarding the relationships between the CMC and various psychological variables, it is worth highlighting that the relationships with personal measures of different motivational components were moderate, and moderate to high with measures of teaching performance. This result is to be expected as CMC assesses the interpretation of various teaching practices. In some way, these high relationships ensure the validity of the instruments. Likewise, it is logical to think that other personal variables are influenced by contextual variables such as the CMC, but only as a partial incidence; this will occur when evaluating student characteristics. Among the psychological variables addressed in studies with students, the motivational orientation towards learning and academic self-concept stand out. Regarding the motivational orientation toward learning, the studies in this SR reported a common explained variance with the CMC between  $R^2 = .20$  and  $R^2 = .36$ , while in other regions, it was  $R^2 = .24$  (Bardach et al., 2020). Regarding the perception of academic self-concept ( $R^2 = .14$ ) and academic success ( $R^2 = .16$ ), the results were similar with close constructs such as the perception of personal competence ( $R^2 = .14$ ) (Rolland, 2012).

Regarding the relationships between CMC and academic performance, a commonly explained variance of  $R^2 = .01$  to  $.07$  was identified, which is in the same direction as that reported by Rolland (2012) ( $R^2 = .03$  to  $.04$ ). These findings are reasonable given the multidimensional nature of the evaluation and grading used to obtain students' academic performance, a result consistent with that reported in the meta-analyses conducted by Dent & Koenka (2016) and Richardson et al. (2012), who point out low to moderate relationships between psychological variables and academic performance. It is essential to acknowledge the limitations of using academic performance as a criterion variable, as it is often operationalized through final course grades, which introduces measurement error due to the variety of grading criteria (attendance, participation, number of assignments, others) and the potential for teacher bias. In this regard, authors such as Abello et al. (2021) and Gutiérrez et al. (2019) emphasize the importance of assessing academic performance using learning tests or standardized assessments rather than course grades. Leal-Soto and Alonso-Tapia (2017) argue that the relationship between CMC and learning should be studied based on actual learning outcomes rather than merely on academic performance.

As expected, the strongest relationships are observed between CMC and other measures of perception of the context that develops in the classroom. It is essential to highlight that the most recently used instruments - such as the CMC-Q - have privileged academic-instructive aspects, with a lower

representation of socio-affective components in the teacher-student interactions and the teacher's role as a facilitator in peer interactions. These socio-affective components have a significant impact on student motivation and learning (Evans et al., 2009; Rolland, 2012). Although some studies were identified that integrated the emotional climate (Alonso-Tapia & Nieto, 2019), socio-affective climate (Bardelli et al., 2023), disruption management climate (Simón & Alonso-Tapia, 2016), coexistence climate (Alonso-Tapia & Nieto, 2019) and autonomy support climate (Granero-Gallegos et al., 2021), it is necessary to delve deeper into a multidimensional understanding of the motivational processes that integrate academic-instructive, socio-affective, disruption management and coexistence aspects that make up the classroom climate, as proposed in recent studies on the topic (Alonso-Tapia & Ruíz-Díaz, 2022a).

### Implications and directions for future research

Researchers, educators and policymakers in educational policies in the Ibero-American context could benefit from this work, as it provides a synthesis of updated quantitative and qualitative evidence on the perception of teacher performance patterns and their relationship with student motivation. The influence of CMC on psychological variables and academic performance highlights the need for developing teacher training and collaborative pedagogical counseling programs for change and improvement in components linked to CMC (Bardelli, 2017; Chiarino & Plachot, 2023; Ossa & Aedo, 2014). In this regard, contributions highlighted in evidence reviews, such as autonomy support (Lazowski & Hulleman, 2016), feedback (Black, 2015), and formative assessment for learning (Baird et al., 2014), should be considered. Additionally, it is essential to intervene in other CMC components such as emotional support, promoting participation, organizational clarity, and the use of novelty and examples in class (Bardelli & Huertas, 2022; Chiarino et al., 2024).

The synthesis of evidence presented suggests that future research could strengthen its methodological approaches by developing quasi-experimental designs, longitudinal studies, and incorporating randomized samples. It also emphasizes the importance of advancing the production of knowledge about CMC through qualitative or mixed methodologies that have yet to be represented in the field of study so far (Elliff & Huertas, 2015). Additionally, it is suggested that students go beyond the use of self-report measures and move towards a multi-informant and multi-method methodological convergence (Lawrenz et al., 2003). There is a need to develop further studies that integrate CMC as a measure of effectiveness in educational interventions (Anderman, 2020) while expanding the study of variables related to students, teachers, and educational institutions using complex multivariate analysis models. Variables to be incorporated in future studies of CMC include student psychological variables (self-efficacy, academic emotions, psychological well-being, procrastination, academic persistence), teacher psychological variables (personal and collective teacher self-efficacy), and other dimensions of classroom climate (peer support climate).

Finally, it is important to delve deeper into the analysis of CMC perceptions in technology-mediated teaching and learning environments (e.g., synchronous and hybrid formats), classes with different teacher-student ratios, and the differences across various stages of educational progress. Future reviews could also expand the types of academic sources by including master's and doctoral theses, books, and other gray literature, extend the temporal period (studies post-July 2023), and incorporate additional databases in the search strategy (e.g., PsycNet, ERIC, WOS).

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## Appendix 1

Table A1

Studies categorized according to descriptive and methodological variables and findings associated with the objectives of the SR

Author(s)	Year of publication	Country	Educational level	Methodological design	Sample	Instruments for CMC measurement	Common explained variance (R <sup>2</sup> ) linked to psychological variables, academic performance and/or relationship with other dimensions of CC
Irureta Nunez	1995	Spain	Secondary education	Quantitative	n = 684 students n = 12 teachers	CMC1	-
Irureta Nunez	1995	Venezuela	Secondary education	Quantitative	n = 1690 students	CMC1	-
Irureta Nunez	1997	Spain	Secondary education	Quantitative	n = 1760 students	CMC1	-
González Cabanach, et al.	1999	Spain	University	Quantitative	n = 609 students	EEPCM	-
Fernandez Liporace	2004	Argentina	Secondary education	Quantitative	n = 152 students	CMC1	-
Fernandez Liporace et al.	2004	Argentina	Secondary education	Quantitative	n = 751 students	CMC1	-
Alonso-Tapia & Pardo	2006	Spain	Secondary education	Quantitative	n = 630 students	EMQ-Q	Motivational orientation towards learning (R <sup>2</sup> = .38)
Fernandez Liporace et al.	2006	Argentina	Secondary education	Quantitative	n = 306 students	CMC1	-
Alonso-Tapia & Ruiz Diaz	2007	Spain	University	Quantitative	n = 1166 students	EMQ-Q	Motivational orientation (R <sup>2</sup> = .20)
Alonso-Tapia & Fernandez-Heredia	2008	Spain	Secondary education	Quantitative	n = 827 students	CMC-Q, CGS-S	Satisfaction with the teacher's job (R <sup>2</sup> = .62)
Alonso-Tapia & Fernandez-Heredia	2009	Mexico	Secondary education	Quantitative	n = 803 students	CMC-Q, CGS-S	Satisfaction with the teacher's job (R <sup>2</sup> = .60)



Author(s)	Year of publication	Country	Educational level	Methodological design	Sample	Instruments for CMC measurement	Common explained variance ( $R^2$ ) linked to psychological variables, academic performance and/or relationship with other dimensions of CC
Paoloni	2009	Argentina	University	Mixed	n = 33 students	Classroom Observation	-
Alonso-Tapia & Moral-Bosch	2010	Spain	Adult secondary education	Quantitative	n = 185 students	CMC-Q	Motivation to learn ( $R^2 = .36$ ) Satisfaction with the teacher's work ( $R^2 = .54$ ), Academic performance (final grades $R^2 = .07$ )
Calderon & Casu	2011	Chili	University	Quantitative	n = 275 students	EFFEC	-
Fernandez-Heredia	2011	Mexico	Secondary education	Quantitative	n = 420 students	CMC-Q, CGS-S	Satisfaction with the teacher's job ( $R^2 = .59$ ) Learning-oriented motivation ( $R^2 = .31$ )
Alonso-Tapia & Simon	2012	Spain	Secondary education	Quantitative	n = 485 students	CMC-Q	-
Bond	2012	Argentina	University	Qualitative	n = 13 teachers	Class Observation	-
Fernandez Jimenez & Alonso-Tapia	2012	Spain	University	Quantitative	n = 501 students	EMQ-Q	-
Alonso-Tapia et al.	2013	Spain	Secondary education	Quantitative	n = 471 students	CMC-Q	Changes in the perception of resilience attributed to the teacher ( $R^2 = .41$ ); Satisfaction with the teacher's job ( $R^2 = .60$ )
Simon et al.	2013	Spain	Secondary education	Quantitative	n = 827 students	CMC-Q	Satisfaction with the teacher's job ( $R^2 = .72$ ) Disruption management climate ( $R^2 = .40$ )

Author(s)	Year of publication	Country	Educational level	Methodological design	Sample	Instruments for CMC measurement	Common explained variance ( $R^2$ ) linked to psychological variables, academic performance and/or relationship with other dimensions of CC
Alonso-Tapia et al.	2014	Spain	Secondary education	Quantitative	n = 664 students	CMC-Q	Perception of change in self-regulation of learning attributed to the teacher's work ( $R^2 = .44$ ) Satisfaction with the teacher's job ( $R^2 = .62$ )
Leal-Soto et al.	2014	Chili	Secondary education	Quantitative	n = 1266 students, n=46 teachers	CMC-Q	Psychological well-being of teachers ( $R^2 = .37$ ) (CMC-Q teachers)
Lopez-Moya & Moran Astorga	2014	Spain	University	Quantitative	n = 91 students	-	-
Anaya & Leon	2015	Peru	University	Quantitative	n = 149 students	CMC1	-
Villasana & Alonso-Tapia	2015	Spain/ France	Secondary education	Quantitative	n = 749 students	CMC-Q	Satisfaction with the teacher's job ( $R^2 = .59$ )
Jimenez Rodriguez et al.	2015	Costa Rica / Spain	Secondary education	Quantitative	n = 1442 students	CMC-Q	Academic performance ( $R^2 = .01$ to $R^2 = .04$ depending on the course)
Leal-Soto et al.	2016	Chili	Secondary education	Quantitative	Study No. 1, n = 151; Study No. 2, n = 22. teachers	CMC-Q	-
Simon & Alonso-Tapia	2016	Spain	Secondary education	Quantitative	n = 827 students	CMC-Q	Decrease in disruptive behavior ( $R^2 = .40$ )
Thomas et al.	2016	Dominican Republic/ Angola	Secondary education	Quantitative	n = 1138 students (shows Dominican Republic)	MOC-S	Student Engagement (Dominican Republic) Cognitive Comp. ( $R^2 = .13$ ); Affective Comp. ( $R^2 = .18$ ); Agentic Comp. ( $R^2 = .06$ ); Behavioral Comp. ( $R^2 = .07$ ). Agentic Comp. ( $R^2 = .06$ ).

Author(s)	Year of publication	Country	Educational level	Methodological design	Sample	Instruments for CMC measurement	Common explained variance ( $R^2$ ) linked to psychological variables, academic performance and/or relationship with other dimensions of CC
Leal-Soto & Alonso-Tapia	2017	Spain/ Chile	Secondary education	Quantitative	Study No. 1, n = 793 / 711. Study No. 2, n = 2701; students	CMC-Q	Academic performance (course grade - $R^2 = .01$ ) Satisfaction with the teacher's job. Study 1 ( $R^2 = .53$ ). Study 2 ( $R^2 = .32$ ).
Matos et al.	2017	Peru	Secondary education	Quantitative	Study No. 1, n = 1505; Study No. 2, n = 298.	CGS-S	Motivation to learn ( $R^2 = .17$ ). Surface learning strategies ( $R^2 = .10$ ). Deep learning strategies ( $R^2 = .19$ )
de Oliveira & Catão	2017	Brazil	Secondary education	Qualitative	2 cases	Participant observation, semi-structured interviews	-
Gutierrez & Thomas	2018	Dominican Republic	University	Quantitative	n = 758 students	MOC-S	Basic psychological needs (autonomy - $R^2 = .11$ ; relationship - $R^2 = .11$ ; competence $R^2 = .12$ ). Satisfaction with the educational center ( $R^2 = .10$ ). Motivational orientation ( $R^2 = .28$ ). Academic performance ( $R^2 = .01$ ). Climate of support for autonomy ( $R^2 = .10$ ). Motivation for learning ( $R^2 = .28$ ).
Leal-Soto et al.	2018	Chili	Secondary education	Quantitative	n = 1266 students n = 46 teachers	CMC-Q	Work engagement ( $R^2 = .14$ )
Mendez-Gimenez et al.	2018	Spain	Secondary education	Quantitative	n = 2284 students	CEMC 3x2	-
Valenzuela et al.	2019	Chili	University	Quantitative	n = 306 students	Survey	-

Author(s)	Year of publication	Country	Educational level	Methodological design	Sample	Instruments for CMC measurement	Common explained variance ( $R^2$ ) linked to psychological variables, academic performance and/or relationship with other dimensions of CC
Alonso-Tapia & Nieto	2019	Spain	Secondary education	Quantitative	n = 749 students	CMC-Q	Emotional classroom climate ( $R^2 = .43$ ); Satisfaction with the teacher's work ( $R^2 = .39$ )
Gutierrez et al.	2019	Dominican Republic / Angola	Secondary education	Quantitative	n = 2032 shows Dominican Republic) students	MOC-S	Dominican Rep. School commitment ( $R^2 = .28$ ). Satisfaction with school ( $R^2 = .13$ ). Academic self-concept ( $R^2 = .14$ ). Perception of academic success ( $R^2 = .16$ ). Climate of support for autonomy ( $R^2 = .28$ )
Alonso-Tapia et al.	2020	Spain	Secondary education	Quantitative	n = 2223 students n = 95 teachers	CMC-Q	-
Granero-Gallegos & Carrasco-Poyatos	2020	Spain	University	Quantitative	Study No. 1, n = 181; study No. 2, n=354. students	MOC-S, MCES	-
Huertas et al.	2020	Argentina	Secondary education	Qualitative	n = 16 students n = 5 teachers	CMC-Q, Classroom Observation	-
Abello et al.	2021	Colombia	University	Quantitative	n = 624 students	CMC-Q	Changes in motivation attributed to the teacher ( $R^2 = .44$ ) Academic performance (final grades: $R^2 = .02$ )
Granero-Gallegos et al.	2021	Spain	University	Quantitative	n = 354 students	MCES	Climate of support for autonomy ( $R^2 = .69$ ) Satisfaction with academic competence ( $R^2 = .16$ )
Soto-Molina & Tapia-Huerta	2021	Mexico	University	Quantitative	n = 95 students	CMC-Q	-

Author(s)	Year of publication	Country	Educational level	Methodological design	Sample	Instruments for CMC measurement	Common explained variance ( $R^2$ ) linked to psychological variables, academic performance and/or relationship with other dimensions of CC
Alonso-Tapia & Ruiz Diaz	2022	Spain/ Costa Rica	Secondary education	Quantitative	n = 5471 students; n = 263 teachers	CMC-Q	-
Alonso-Tapia & Ruiz Diaz	2022	Spain/ Costa Rica	Secondary education	Quantitative	n = 5380 students n = 441 teachers	CMC-Q	Quality of teachers' mutual support ( $R^2 = .05$ ); quality of students' attitudes ( $R^2 = .04$ ); teachers' efficacy expectations for students ( $R^2 = .03$ )
Bardelli & Huertas	2022	Argentina	Secondary education	Mixed	n = 459 students	CMC-Q; semi-structured interviews	-
Abello et al.	2022	Colombia	University	Quantitative	n = 214 students	CMC-Q	Self-regulation of learning ( $R^2 = .03$ ); Attribution of changes to the teacher's work ( $R^2 = .41$ )
Lopez Garcia et al.	2022	Spain	University	Quantitative	n = 1410 students	M-CES	Support for autonomy ( $R^2 = .62$ ); Resilience ( $R^2 = .14$ ); Academic commitment ( $R^2 = .35$ )
Leal-Soto et al.	2023	Bolivia	Secondary education	Quantitative	n = 1022 students; n = 50 teachers	CMC-Q	-
Bardelli et al.	2023	Argentina	Secondary education	Quantitative	n = 459 students	CMC-Q	Motivational communication ( $R^2 = .61$ ); Closeness ( $R^2 = .54$ ); Conflict ( $R^2 = .40$ )

*Note.* CMC1: Classroom Motivational Climate Questionnaire 1; EMQ-Q: Environment Motivational Quality Questionnaire; CMC-Q: Classroom Motivational Climate Questionnaire; EFEC: Classroom Structural Factors Scale; CEMC 3 x 2: Classroom Goal Structure Questionnaire; MCES: Motivational Climate in Education; CGS-S: Classroom Goal Structures Scale; EEPCM: Motivational Processes and Contexts Assessment Scale; MOC-S: Motivational Orientation and Climate Scale.