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Multilevel latent class cluster analysis of school climate: individual, family and community factors☆

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A R T I C L E   I N F O

A B S T R A C T

Although school climate is related to a variety of positive student outcomes, few studies have explored the heterogeneity of school climate profiles. The purpose of this study was to identify and describe different school climate profiles by evaluating variables at the individual, family and community levels in Chilean students. The sample consisted of 2683 adolescent students 51.2% boys and 48.8% girls), aged between 12 and 20 years ($M = 15.78$, $SD = 1.35$) from 32 Chilean schools. Results obtained from a multilevel latent class cluster analysis show that the model with six clusters of students and two classes of schools is the most parsimonious model and with the best fit to the data. School climate profiles were built on the basis of four indicators: school climate ($Wald = 301.065$; $p < .001$), student–teacher relationships ($Wald = 226.687$; $p < .001$), positive attitude to authority ($Wald = 115.591$; $p < .001$) and positive attitude to norm transgression ($Wald = 3705.593$; $p < .001$). All of these are useful indicators for profile segmentation. Covariates associated with school climate profiles were identified: at the individual level, age ($p = .019$) and sex ($p < .001$); at the family level, family structure ($p < .001$); at the school level, type of school ($p = .002$); and at the community level, the perception of insecurity in the neighborhood ($p = .011$), social control ($p = .002$) and support ($p < .001$).

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Análisis de clases latentes multinivel del clima escolar: factores individuales, familiares y comunitarios

R E S U M E N

El clima escolar se relaciona con una variedad de resultados positivos en los/as estudiantes, sin embargo, escasos estudios exploran la heterogeneidad de perfiles de clima escolar. El objetivo de este estudio es identificar y describir perfiles de clima escolar evaluando variables individuales, familiares y comunitarias en estudiantes chilenos. La muestra está conformada por 2683 estudiantes (51.2% hombres y 48.8% mujeres), de edades comprendidas entre 12 y 20 años ($M = 15.78$, $DT = 1.35$), provenientes de 32 establecimientos educativos. Los resultados obtenidos a partir de una modelización de clases latentes multinivel evidencian que el modelo de seis clústeres de estudiantes y dos clases de establecimientos resulta ser el más parsimonioso y con mejor ajuste. Los perfiles de clima escolar se construyen sobre la base de cuatro indicadores; *clima del centro escolar* ($Wald = 301.065$, $p < .001$), *relaciones con el profesorado* ($Wald = 226.687$, $p < .001$), *actitud positiva hacia la autoridad* ($Wald = 115.591$, $p < .001$) y *actitud positiva hacia la transgresión* ($Wald = 3705.593$, $p < .001$). Todos ellos resultan ser indicadores útiles para la segmentación de los perfiles. Las covariables que se asocian significativamente con los perfiles identificados son: a nivel individual, la *edad* ($p = .019$) y *sexo* ($p < .001$); a nivel familiar, la estructura familiar ($p < .001$); y a nivel

comunitario, el tipo de establecimiento (*p* = .002), la percepción de *inseguridad en el barrio* (*p* = .011), *control social* (*p* = .002) y *apoyo* (*p* < .001).

Introduction

A series of studies has shown that students' perception of their school also influences their self-esteem and behavior (Vats, 2019); therefore, it has been recognized that a positive school climate is an opportunity to enhance learning experiences, positive behaviors, greater self-esteem, better adaptation, etc. (Daily, Mann, Kristjansson, Smith, & Zullig, 2019).

Despite there being no doubt as to the benefits of school climate (Steffgen, Recchia, & Viechtbauer, 2013), its definition has a wide range of conceptualizations (Alonso-Tapia & Nieto, 2019) and a lack of consistent theoretical approaches (Ramelow, Currie, & Felder-Puig, 2015). The studies with the greatest evidence and methodological robustness (Rudasill, Snyder, Levinson, & Adelson, 2018; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013) agree that school climate is a complex construct that must be measured from a multidimensional perspective. Wang and Degol (2016) suggest that there are four large categories that represent this multidimensionality: the academic, referring to the quality of the instruction and the teachers' professional development; the community, referring to interpersonal relations; the physical and emotional safety offered by the school, and a final aspect related to the structural characteristics of the school environment.

This is complemented by Rudasill et al. (2018), who indicate the importance of weighing individual, family and community factors in the school climate, which in turn forms part of various systems that affect the development of the topic.

Bioecological model applied to school climate: individual, proximal and distal factors

Bronfenbrenner's (2002) theory of ecological systems is one of the most frequently used models in the study of school climate. This theoretical perspective posits that individual behaviors are strongly explained from multiple contexts that affect harmonic adolescent development (Wang & Degol, 2016).

In the individual sphere, studies like that by Aldridge and McChesney (2018) confirm the association of school climate and students' mental health, while Reaves, McMahon, Duffy, and Ruiz (2018) — through a meta-analysis — report on the relation between climate and long-term behavioral problems. Other studies show that, for certain groups of schools, the composition by sex significantly affects school climate (Villalobos, Wyman, Schiele, & Godoy, 2016), and age is negatively associated with the perception of good treatment by the teachers (Muñoz, Lucero, Cornejo, Muñoz, & Araya, 2014).

Among the proximal factors, the family and the school stand out as the units closest to the individual in the ecological system (microsystem). In this sphere, family structure is a factor that differentiates young people's situations due to the number of adults with whom they live and who take care of them. Similarly, it occurs with the participation of mothers and fathers, and their cooperation with the school. Studies have shown that aspects like these affect school climate; for example, there is evidence that one-parent families provide, on average, less academic stimuli and direction to young people than families with a father and mother (O'Malley, Voight, Renshaw, & Eklund, 2015). With respect to the school, the levels of conflict or cooperation, academic expectations placed on the students and the measures of disciplinary structure are examples of factors that contribute to school climate, because in school they interact directly with the peer group, the family, the teachers and school support professionals (Bear et al., 2018).

Finally, with respect to the distal factors, the neighborhood stands out for its influence on the perception of the school climate. For example, the students who perceive their neighborhood positively demonstrate greater academic success and better behavioral results (White & Renk, 2012); however, a decrease in neighborhood safety is a significant risk factor for adolescent psycho-social development (Devenish, Hooley, & Mellor, 2017). In these cases, schools with suitable climates could insulate students from the negative effects of neighborhood violence, becoming a safe haven (Laurito, Lacoe, Schwartz, Sharkey, & Ellen, 2019).

Latent classes of school climate

Studies on latent classes of school climate are interesting because they make it possible to assume the hypothesis that it is possible to find multiple school climate perspectives even in the same school; however, the evidence available has not yet managed to clearly establish the empirical bonds between school climate and certain factors proposed by the ecological systems theory (Bronfenbrenner, 2002).

An example of this is the synthesis of the studies available shown in Table 1. As can be seen, three out of four studies identified (Shukla, Konold, & Cornell, 2016; Van Eck, Johnson, Bettencourt, & Johnson, 2017) were conducted on secondary databases, with instruments that present a scant theoretical foundation, and only one uses an instrument with psychometric evidence (Gage, Larson, Sugai, & Chafouleas, 2016); this last one, in addition, does not use dimensions like segmentation variables.

Yet the studies shown in Table 1 yield some interesting results. The study by Shukla et al. (2016) identifies four latent class clusters; those students who report higher levels of school climate have greater expectations and academic commitment as well as lower levels of bullying, victimization and intimidation. For her part, Sulak (2018), who uses schools as a unit of analysis (*n* = 2560, identifies five school climate profiles; the profiles of schools with deteriorated school climates are related to structural variables like school size >1000 and being located in high-crime areas. Studies like that of Van Eck et al. (2017) demonstrate the relation between the chronic absence of students and the climate of their schools, while Gage, Prykanowski, and Larson (2014) determine significant predictors for the reduction of intimidation in the classroom. It is worth noting that only the study by Shukla et al. (2016) considers family variables and no study includes variables related to the neighborhood where the students live.

This last one poses an as yet pending challenge from the ecological perspective; therefore, the present study aims to identify and describe school climate profiles, both at the individual level (students) and at the aggregate level (schools). Individual, family and community variables in Chilean students are assessed, and evidence is provided for the design of more specific interventions instead of unsuccessful global interventions.

Method

Participants

The population was comprised of 486,427 adolescent students in public, subsidized and private secondary schools belonging to five representative regions of the macrozones in Chile (Table 2).

Table 1
Main latent class studies that use the school climate construct.

Author (Year)	Analysis Unit	Segmentation variables	Sample size	Clusters (percentage)	Country
Shukla et al. (2016)	Students	Disciplinary structure, academic expectations, respect for students, willingness to seek help, affective engagement, cognitive engagement, prevalence of harassment and teasing, general victimization.	47,631	1.- Positive climate = 18.71%	USA
				2.- Medium climate-Low Bullying = 28.98% 3.- Medium climate-High Bullying = 31.30% 4.- Negative climate = 21.01%	
Sulak (2018)	Schools	How often student racial/ethnic tensions? How often student bullying occurs? How often student sexual harassment of students? How often student verbal abuse of teachers? How often widespread disorder in classrooms? How often student acts of disrespect for teachers-not verbal abuse? How often student gang activities?	2560	1.- High frequency = 6.48%	USA
				2.- Low respect = 14.61% 3.- Low frequency = 21.60% 4.- Extreme bullying = 16.25% 5.- Average schools = 41.05%	
Van Eck et al. (2017)	Students	Delinquent behavior at school, aggressive behavior at school, perceptions of safety, value placed on academics, school connect, teacher relationship, learning environment, physical environment, school resource, parent involve.	25,776	1.- Positive climate = 25%	USA
				2.- Moderate climate = 59% 3.- Negative climate = 17%	
Gage et al. (2016)	Students	The 47 items on the school climate instrument.	3797	1.- Primary = 74% 2.- Secondary = 22% 3.- Tertiary = 4%	England

Table 2
Characteristics of the sample.

Region	Population	Population %	Sample
Region of Antofagasta	32,475	6.68%	192
Region of Coquimbo	39,260	8.07%	83
Metropolitan Region	351,791	72.30%	1643
Region of La Araucanía	54,573	11.20%	695
Region of Magallanes and Chilean Antarctica	8328	1.70%	70
Total	486,427	100%	2683

Type of teaching	Population	Population %	Sample
Humanist-scientific	337,009	69.28%	1695
Technical-professional	149,418	30.72%	988
Total	486,427	100%	2683

Type of school	Population	Population %	Sample
Public	142,276	29.25%	801
Subsidized Private	268,913	55.28%	1523
Private	52,017	10.69%	257
Delegated administration corporation (Law 3166)	23,221	4.77%	102
Total	486,427	100%	2683

The participants were selected by stratified, multistage probability sampling, with 99.7% reliability, a 3% margin of error and a variance of p = q = .5. The stratification considered three relevant criteria: representative regions of the macrozones in Chile, type of teaching and type of school. The first stage of the methodological design was the random selection of schools; next, each was asked for an up-to-date list of the classes, then the students were randomly selected.

The final sample was comprised of 2683 students from 32 schools, both sexes 51.2% boys and 48.8% girls, ranging in age from 12 to 20 years (M = 15.78, SD = 1.35). The students' families live in urban (84.4%) and rural (15.6%) sectors.

Instruments

Four instruments were applied simultaneously. The first was a questionnaire for the sociodemographic characterization of the students, made up of closed-ended questions: age, sex, class, region, zone, type of school and family structure.

In addition, the Questionnaire for Evaluating School Social Climate (*Cuestionario para evaluar el clima social escolar,* CECSCE) was used, a self-report instrument created originally in Spain (Trianes, Blanca, De la Morena, Infante, & Raya, 2006). The *CECSCE* evaluates school social climate from the students' point of view using 14 items answered on a 5-point ordinal scale (1 = strongly disagree, 5 = strongly agree). The studies of reliability and validity in Chile (Gálvez-Nieto, Vera-Bachmann, & Trizano, 2015; Gálvez-Nieto, Salvo, Pérez-Luco, Hederich, & Trizano-Hermosilla, 2017) show that it has a suitable psychometric fit and two factors: *school social climate* (SSC), which refers to the relations between classmates, ability to assist and general feeling of well-being with the school; and *student–teacher relationships* (STR), which assesses academic demand, fairness and treatment of students. In this study, the factors on the CECSCE presented satisfactory indices of reliability:

SSC had a Cronbach's alpha of .793 (McDonald's Omega = .797) and a variance extracted index of .410, the factor STR had a Cronbach's alpha of .691 (McDonald's Omega = .698) and a variance extracted index of .440.

As a complementary measurement to assess attitudes to rules, the Attitudes to Institutional Authority in Adolescence Scale (AAI-A) was used. The AAI-A is a self-report scale that assesses adolescent attitudes to institutional authority (Cava, Estévez, Buelga, & Musitu, 2013). It is made up of nine items, and a five-point ordinal scale (1 = never, 5 = always) is used for the responses. The *AAI-A* contains two factors: *positive attitude to authority* (PAA), referring to the degree of respect for teachers and police officers; and *positive attitude to transgression* (PAT), defined as the student's positive attitude to the transgression of school rules and laws. The evidence of reliability and validity in Spain-Mexico (Cava et al., 2013), Chile (Gálvez-Nieto, Vera-Bachmann, Trizano, & García, 2015) and Colombia-Chile (Gálvez-Nieto, Salvo, Trizano, Hederich, & Polanco, 2018) show suitable psychometric fits in terms of factorial structure and reliability. In this study, the factors on the AAI-A present satisfactory reliability indices, PAA had a Cronbach's alpha of .714 (McDonald's Omega = .737) and a variance extracted index of .412, the factor PAT had a Cronbach's alpha of .777 (McDonald's Omega = .788) and a variance extracted index of .557.

Finally, the *Scale for the Assessment of Developmental Assets in the Neighborhood* was applied. This scale was developed in Spain (Oliva, Antolín, & López, 2012); it measures the perception that adolescents have of different factors in the neighborhood where they live and that can promote their psycho-social adjustment and development. It is a self-report instrument made up of 22 items, answered on a seven-point ordinal scale (1 = totally false, 7 = totally true). The instrument has five first order factors: *support, attachment to the neighborhood, insecurity, social control, activities for young people*, and one second order factor that groups the five dimensions, called *neighborhood resources*. A psychometric study in Chile conducted on the *Scale for the Assessment of Developmental Assets in the Neighborhood* (Gálvez-Nieto, Trizano-Hermosilla, Alvarado, Tereucán, & Polanco, 2019) demonstrated a suitable fit in terms of factorial structure and reliability. In this study, the factors presented satisfactory reliability indices, the factor that obtained the highest reliability was attachment to the neighborhood district (Cronbach's alpha = .932; McDonald's Omega = .933) and an extracted variance index of .820; the factor with the lowest reliability was social control (Cronbach's alpha = .734; McDonald's Omega = .742) and an extracted variance index of .511.

Procedure

First, school principals were contacted and authorization to apply the questionnaires was obtained. Then, information meetings were held with fathers, mothers and/or guardians to obtain informed consent and to protect the ethical principles of the project. The students who agreed to participate in the study did so voluntarily, anonymously and they signed an informed consent. This study has the approval of the Research Ethics Committee at the Universidad de La Frontera as stated in the research protocol assessment file.

Data analysis

In order to fulfill the aim of the study, a latent class cluster analysis (LCCA) was performed. The LCCA has numerous advantages over other cluster analysis techniques (Oppewal, Paas, Crouch, & Huybers, 2010). Three main reasons explain the choice of a LCCA in this study: (1) the selection of the optimal number of clusters is based on statistical criteria like the Bayesian information criterion (BIC) or the consistent Akaike information criterion (CAIC); (2)

the LCCA is particularly useful when the number of clusters is not known a priori, as in this study, and (3) the LCCA can include variables measured on different types of scales (continuous, ordinal or nominal) simultaneously, and incorporate, flexibly, covariates to characterize the groups obtained.

Since the data have a hierarchical structure, as the 2683 students who comprised the sample are nested in 32 schools, it was considered appropriate to use multilevel modeling for LCCA. In particular, the non-parametric approach proposed by (Vermunt, 2003) can analyze the heterogeneity at both the individual level (identifying different clusters for the students) and the aggregate level (identifying different classes for the schools). The process entails, first of all, estimating LCCA models to identify the number of optimal clusters at the individual level. Second, once the number of clusters has been determined to group the students, multilevel LCCA models are estimated to evaluate the number of classes or profiles at school level.

In all cases, the models estimated to identify the heterogeneity in the students and schools included four indicators that correspond to the standardized scores of the two factors on the CECSCE, i.e., SSC and STR, and the two factors on the AAI-A scale, i.e., PAA and PAT. Additionally, a series of relevant covariates (age, sex, type of school, family typology and the standardized scores in the five factors on the *Scale for the Assessment of Developmental Assets in the Neighborhood*) was incorporated to characterize or profile the groups obtained.

The parameters of the model were estimated using Latent Gold® 5.1. The complete details on the estimation method for the parameters with Latent Gold® 5.1 are available in the work by Vermunt and Magidson (2016). For the estimation of the multilevel LCCA models, the school was used as a grouping variable. In this multilevel approach the "GClasses" command is used, available in the advanced module of Latent Gold® 5.1 in order to specify the number of latent classes at school level.

Results

Number of school climate clusters/classes, utility of the indicators and covariates

In order to select the suitable number of clusters/latent classes, BIC and CAIC were used following the recommendations of Wedel and Kamakura (2000). Both criteria are more conservative than the Akaike information criterion (AIC) and tend to opt for more parsimonious models. Considering these two criteria, first of all, ten LCCA models were considered that incorporate from 1 cluster (complete homogeneity in the sample) to 10 clusters or groups at individual level (students). The six-cluster model is the one with the lowest value in the BIC and CAIC. Second, starting from this six-cluster model at individual level, the heterogeneity at aggregate level was assessed for the schools following a multilevel LCCA model and from 2 to 10 classes were incorporated. The model with six clusters of students and two classes of schools is the one that provides the lowest BIC and CAIC, which indicates that it is the most parsimonious and with a better fit to the data (Table 3).

Once the number of clusters for the students (six) and classes for the schools (two) had been chosen, the significance of the indicators used was evaluated to determine the groups and the covariates used to characterize them. With respect to the four indicators, the Wald statistic associated significance levels below .001: evidence that the four variables were useful for segmenting, based on their perception of school climate (SSC), relations with the teachers (STR), positive attitude to authority (PAA) and positive attitude to transgression (PAT). The percentage of variance explained for these four indicators varies between 27.14% for PAT and 59.46% for SSC.

Table 3
Evaluation of models with different numbers of clusters (student level) and classes (school level).

Number of clusters/classes	Log-likelihood (LL)	BIC(LL)	CAIC(LL)	Classification error
1-Cluster	−12,111.21	24,283.78	24,291.78	.0000
2-Cluster	−11,151.29	22,540.38	22,571.38	.0785
3-Cluster	−10,880.06	22,174.35	22,228.35	.1331
4-Cluster	−10,775.64	22,141.94	22,218.94	.1462
5-Cluster	−10,645.21	22,057.51	22,157.51	.1523
6-Cluster[a]	−10,413.85	21,771.22	21,894.22	.1611
7-Cluster	−10,339.22	21,798.38	21,944.38	.1925
8-Cluster	−10,297.29	21,890.96	22,059.96	.2361
9-Cluster	−10,244.20	21,961.21	22,153.21	.2439
10-Cluster	−10,190.37	22,029.99	22,244.99	.2658
6-Cluster/2-Classes[a]	−10,364.35	21,718.24	21,847.24	.1424
6-Cluster/3-Classes	−10,368.35	21,772.26	21,907.26	.1716
6-Cluster/4-Classes	−10,360.13	21,801.86	21,942.86	.1451
6-Cluster/5-Classes	−10,349.71	21,827.05	21,974.05	.1528
6-Cluster/6-Classes	−10,345.10	21,863.85	22,016.85	.1572
6-Cluster/7-Classes	−10,350.20	21,920.06	22,079.06	.1742
6-Cluster/8-Classes	−10,349.20	21,964.09	22,129.09	.1694
6-Cluster/9-Classes	−10,343.04	21,997.80	22,168.80	.1503
6-Cluster/10-Classes	−10,384.26	22,126.28	22,303.28	.1954

Note. BIC: Bayesian information criterion, CAIC: consistent Akaike information criterion.
[a] Best model according to BIC and CAIC.

Table 4
Significance of indicators/covariates and proportion of explained variance of the model indicators.

Indicators	Robust Wald Statistic	p	R^2
ZSSC	301.065	<.001	.5295
ZSTR	226.687	<.001	.5946
ZPAA	115.591	<.001	.4912
ZPAT	3705.593	<.001	.2714

Covariates	Robust Wald Statistic	p
Age	13.512	.019
Sex	20.428	<.001
Type of school	30.530	.002
Family structure	94.210	<.001
ZINSECURITY	14.821	.011
ZCONTROL	18.619	.002
ZSUPPORT	39.901	<.001
ZACTIVITIES	3.701	.590
ZATTACHMENT	1.739	.880

Note. The variables that incorporate a "Z" in front of their acronym were introduced in the latent class model as standardized variables ($M = 0$ and $DT = 1$).

With respect to the covariates, significant effects of age, sex, family structure, type of school, perception of insecurity, social control and support are observed. Activities for young people and attachment to the neighborhood do not have significant effects on the composition of the groups (Table 4).

Description of the student clusters

Figure 1 represents the six profiles corresponding to the six student clusters. Each cluster represents an underlying pattern of student perception regarding their school environment and shows the standardized average for each indicator. What follows is a description of each pattern and its characterization in relation to the covariates of the model:

Cluster 1

Student group that perceives deteriorated school climates. This group is the largest of the six (39.6%). These students present negative levels in the school climate indicators, student–teacher relationships and attitude to school rules. Despite these results, a comparison with group 3 reveals that the latter presents even lower values. In addition, cluster 1 registers a slightly higher level than the mean of the sample in terms of their positive attitude to norm transgression. A significant percentage of this cluster lives only with their mothers (34.1%) and has a higher average age ($M = 16.03$).

Cluster 2

Student group that perceives positive school climates, but with traits of transgressors against authority. This group is the second largest group, representing 32.6% of the sample. These students present slightly higher than average levels of school climate, student–teacher relationships and positive attitude to authority, and this is the second group with the highest levels of positive attitude to transgression. Students in this cluster are mainly in subsidized schools (64.7%).

Cluster 3

Student group that perceives toxic school climates and high levels of transgression. This group comprises 9.1% of the sample and presents the lowest levels of school climate and student–teacher relationships, low respect for school authorities and the highest levels of positive attitude to transgression. They are characterized as being mostly boys (55.47%), mainly from public schools (42.4%), with a significant percentage living only with their father or other people (more than 10%). With respect to their community environment, they perceive high levels of insecurity, low social control and support in their neighborhood.

Cluster 4

Student group with the lowest levels of transgression; it comprises 8.1% of the sample. It presents positive levels of school climate and student–teacher relationships, and high respect for school authorities and rules. This group stands out as being the one with the lowest levels of positive attitude to norm transgression. It concentrates a high percentage of girls (66.02%) and a high proportion lives only with their mother (33.9%).

Cluster 5

Student group that perceives healthy school climates. It contains 7.6% of the sample, exhibits the second highest school climate level, student–teacher relationships and respect for authority and rules; this group presents the second lowest level of transgression. This group has a high proportion of students in private schools (16.6%), who live mainly in families with their father and mother (67.1%). With respect to their community environment, they perceive high levels of security and social control in their neighborhood.
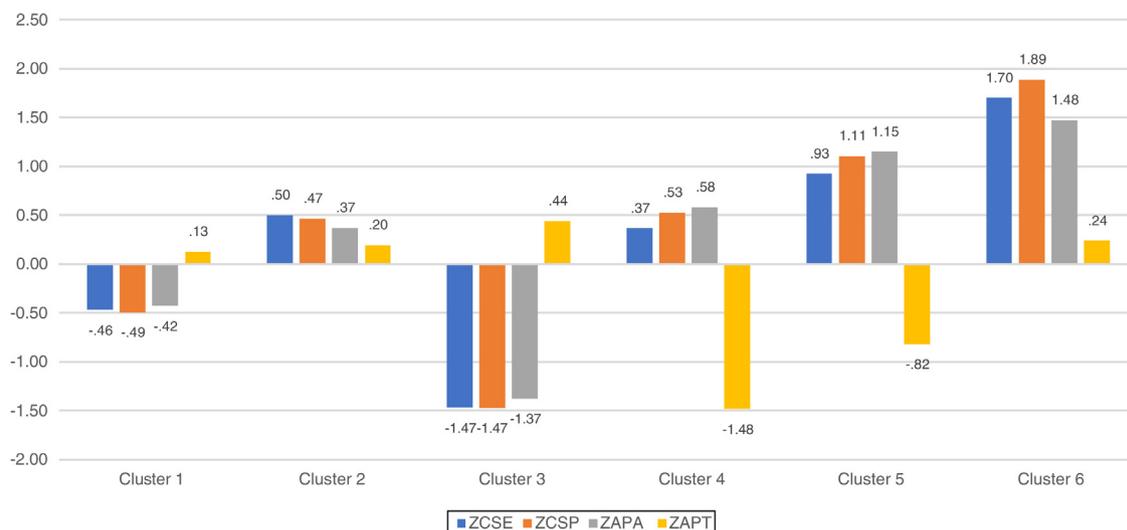
Figure 1. Mean scores on the indicators for the six student clusters.
Note. The indicators that incorporate a "Z" in front of their acronym are standardized variables (*M* = 0 and *DT* = 1).

Table 5
Mean scores in the indicators for the two classes of school and distribution of clusters of students from each class.

Indicators	Class 1	Class 2
ZSSC	.15	−.19
ZSTR	.16	−.18
ZPAA	.14	−.16
ZPAT	−.10	.07
Clusters		
Cluster 1	34.0%	48.7%
Cluster 2	41.5%	22.8%
Cluster 3	5.4%	13.2%
Cluster 4	8.5%	7.4%
Cluster 5	9.2%	3.8%
Cluster 6	1.5%	4.2%

Note. The indicators that incorporate a "Z" in front of their acronym are standardized variables (*M* = 0 and *SD* = 1).

Cluster 6

Student group with the best student–teacher relationships. This group is the smallest, representing 3.1% of the sample. It stands out as having the highest levels of school climate, student–teacher relationships and positive attitude to authority and rules; however, this group shares intermediate levels of positive attitude to transgression with cluster 2. This group is comprised largely of students from private schools who live in families with their father and mother (68.9%) and who perceive high levels of control and support in their neighborhood.

Description of the school classes

Table 5 presents the profile of the two types of school identified according to their school environment and attitude to institutional authority. The description of these two classes in detail is as follows:

Class 1

Schools with positive school climates. This class includes a total of 17 schools characterized as above-average levels in school climate and student–teacher relationships, as well as a high level of respect for authority and rules. These schools have below-average levels in positive attitude to norm transgression. Students in cluster 2 predominate in this class of schools (41.5%).

Class 2

Schools with negative school climates. This class includes 15 schools and has the opposite profile to those in Class 1. Students in cluster 1 predominate in this class (48.7%); it is also worth noting that compared to class 1, it is has the highest percentage of students in cluster 3 (13.2%).

Discussion

This study endeavored to identify and describe school climate profiles by assessing individual, family and community variables in Chilean students. The results demonstrate that the six-cluster student model and two classes of type of school is the most parsimonious and with the best fit to the data.

In relation to the two classes of school, opposite or antagonistic profiles are observed, with quite similar relative sizes that must be the target of differential interventions concerning education policy in Chile.

With respect to the student clusters, it is noted in particular that a significant 48.7% of the adolescents are in groups that assess school climate negatively. Both clusters 1 and 3 present deteriorated or toxic school climate indicators. Unfortunately, to this is added a worrisome positive attitude to norm transgression present in some of the clusters, where the perception of school social climate seems more encouraging. Both are grouped in cluster 2 of schools.

For Chile this is alarming because in the last 20 years various efforts have been made on this issue (Magendzo, Toledo, & Gutiérrez, 2013). The results of this study, mainly in the previously described clusters, describe the school coexistence policies currently in effect (Ministerio de Educación de Chile, 2015, 2019) as being insufficient to approach the problem as required.

On the other hand, the students who perceive healthy school climates, who experience respectful student–teacher relationships, who follow the rules and who present low levels of transgression, are a small group. These are students who attend private schools, come from traditional families (father and mother) and live in communities with high levels of security and social control. Unfortunately, this image does not represent the reality of most of the country's adolescents, where only 8.5% have the chance to attend private schools (Ministerio de Educación de Chile, 2017).

Although there is evidence that the characteristics of the neighborhood of origin affect students' academic outcomes when these

are not aligned with the school rules (McCoy, Roy, & Sirkman, 2013), it must also be recognized that when the school has a positive climate (Konold, Cornell, Shukla, & Huang, 2017), this can insulate students from the negative effects of neighborhood violence, becoming a safe haven for them (Patton, Woolley, & Hong, 2012).

In the individual sphere, age is a significant variable. These results agree with studies that suggest that the perception of school climate improves at a younger age (Muñoz et al., 2014). Another notable aspect in the results is family structure. The findings agree with other studies such as the one by Fan, Williams, and Corkin (2011), who observed that one-parent families often provide young people with fewer academic stimuli, since they must deal with a series of economic-related needs. However, in the present study one finding in particular is worthy of note: in cluster 4 there is a high proportion of adolescent girls who only live with their mother; curiously, in this group the one-parent structure acts as a protective factor.

Although these clusters reflect a dimension that goes from the deteriorated climate to the positive environment, meaning the school's performance could be limited, Chilean public policies in education can make an important contribution from its psychosocial approach. Interventions based on workshops to prevent school violence are not enough; interventions are needed that can extend to environments beyond the school (Safran & Oswald, 2003), like the family and neighborhood. It is impossible to ignore that as long as social conditions — which involve the spaces where Chilean adolescents live — are not considered by the coexistence policy, the results will continue to be challenging. This requires training for teachers, school professionals and psychologists to understand that school climate includes a series of factors that must be addressed by comprehensive reforms (Sulak, 2018).

Finally, an important limitation of this study must be recognized. Given that the present study worked solely with the perception that students express about school climate, it is possible that this perspective is biased given that other actors in the education environment were not included. Therefore, future lines of enquiry must include teachers' perceptions of the school climate in order to better respond to what is suggested in the literature with respect to the dimensions that must be considered for its study and intervention (Wang & Degol, 2016). In addition, it is suggested that new studies go beyond this work, designing and assessing intervention models. Thus, evidence is developed that can bolster the current public policy that was recently enacted (Ministerio de Educación de Chile, 2019) and the 11 recommendations that accompany it.

Conflicts of interest

The authors declare there is no conflict of interest with respect to the publication of this article.

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References

Aldridge, J. M., & McChesney, K. (2018). The relationships between school climate and adolescent mental health and wellbeing: A systematic literature review. *International Journal of Educational Research*, *88*, 121–145. http://dx.doi.org/10.1016/j.ijer.2018.01.012

Alonso-Tapia, J., & Nieto, C. (2019). Clima emocional de clase: naturaleza, medida, efectos e implicaciones para la educación. *Revista de Psicodidáctica*, *24*(2), 79–87. http://dx.doi.org/10.1016/j.psicod.2018.08.002

Bear, G. G., Yang, C., Chen, D., He, X., Xie, J. S., & Huang, X. (2018). Differences in school climate and student engagement in China and the United States. *School Psychology Quarterly*, *33*(2), 323–335. http://dx.doi.org/10.1037/spq0000247

Bronfenbrenner, U. (2002). *La ecología del desarrollo humano: experimentos en entornos naturales y diseñados*. Barcelona: Paidós.

Cava, M. J., Estévez, E., Buelga, S., & Musitu, G. (2013). Propiedades psicométricas de la Escala de Actitudes hacia la Autoridad Institucional en adolescentes (AAI-A). *Anales de Psicología*, *29*(2), 540–548. http://dx.doi.org/10.6018/analesps.29.2.138031

Daily, S. M., Mann, M. J., Kristjansson, A. L., Smith, M. L., & Zullig, K. J. (2019). School climate and academic achievement in middle and high school students. *The Journal of School Health*, *89*(3), 173–180. http://dx.doi.org/10.1111/josh.12726

Devenish, B., Hooley, M., & Mellor, D. (2017). The pathways between socioeconomic status and adolescent outcomes: A systematic review. *American Journal of Community Psychology*, *59*(1-2), 219–238. http://dx.doi.org/10.1002/ajcp.12115

Fan, W., Williams, C. M., & Corkin, D. M. (2011). A multilevel analysis of student perceptions of school climate: The effect of social and academic risk factors. *Psychology in the Schools*, *48*(6), 632–647. http://dx.doi.org/10.1002/pits.20579

Gage, N. A., Larson, A., Sugai, G., & Chafouleas, S. M. (2016). Student perceptions of school climate as predictors of office discipline referrals. *American Educational Research Journal*, *53*(3), 492–515. http://dx.doi.org/10.3102/0002831216637349

Gage, N. A., Prykanowski, D. A., & Larson, A. (2014). School climate and bullying victimization: A latent class growth model analysis. *School Psychology Quarterly*, *29*(3), 256–271. http://dx.doi.org/10.1037/spq0000064

Gálvez-Nieto, J. L., Salvo, S., Pérez-Luco, R., Hederich, C., & Trizano-Hermosilla, Í. (2017). Invarianza factorial del Cuestionario para Evaluar Clima Social del Centro Escolar en estudiantes chilenos y colombianos. *Revista Latinoamericana de Psicología*, *49*(2), 119–127. http://dx.doi.org/10.1016/j.rlp.2016.09.003

Gálvez-Nieto, J. L., Salvo, S., Trizano, I., Hederich, C., & Polanco, K. (2018). Equivalencia factorial de la Escala de Actitudes hacia la Autoridad Institucional en adolescentes (AAI-A) chilenos y colombianos. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*, *46*(1), 109–119.

Gálvez-Nieto, J. L., Trizano-Hermosilla, I., Alvarado, J. M., Tereucán, J., & Polanco, K. (2019). Adaptación y validación de la Escala de Evaluación de los Activos del Barrio en una muestra de adolescentes chilenos. *Revista Mexicana de Psicología*, *36*(2), 119–131.

Gálvez-Nieto, J. L., Vera-Bachmann, D., Trizano, I., & García, J. A. (2015). Examen psicométrico de la Escala de Actitudes hacia la Autoridad Institucional (AAI-A), en estudiantes chilenos. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*, *39*(1), 57–67.

Gálvez-Nieto, J. L., Vera-Bachmann, D., & Trizano, I. (2015). Estudio confirmatorio del Cuestionario para evaluar Clima Social del Centro Escolar en Chile. *Revista Mexicana de Psicología*, *32*(2), 160–168.

Konold, T., Cornell, D., Shukla, K., & Huang, F. (2017). Racial/Ethnic differences in perceptions of school climate and its association with student engagement and peer aggression. *Journal of Youth and Adolescence*, *46*(6), 1289–1303. http://dx.doi.org/10.1007/s10964-016-0576-1

Laurito, A., Lacoe, J., Schwartz, A. E., Sharkey, P., & Ellen, L. G. (2019). School climate and the impact of neighborhood crime on test scores. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, *5*(2), 141. http://dx.doi.org/10.7758/rsf.2019.5.2.08

Magendzo, A., Toledo, M. I., & Gutiérrez, V. (2013). Descripción y análisis de la ley sobre violencia escolar (N°20.536): Dos paradigmas antagónicos. *Estudios Pedagógicos (Valdivia)*, *39*(1), 377–391. http://dx.doi.org/10.4067/S0718-07052013000100022

McCoy, D. C., Roy, A. L., & Sirkman, G. M. (2013). Neighborhood crime and school climate as predictors of elementary school academic quality: A cross-lagged panel analysis. *American Journal of Community Psychology*, *52*(1-2), 128–140. http://dx.doi.org/10.1007/s10464-013-9583-5

Ministerio de Educación de Chile. (2015). *Política nacional de convivencia escolar 2015-2018*. Santiago de Chile: Ministerio de Educación de Chile.

Ministerio de Educación de Chile. (2017). *Estadísticas de la educación 2016*. Santiago de Chile: Ministerio de Educación de Chile.

Ministerio de Educación de Chile. (2019). *Política nacional de convivencia escolar*. Santiago de Chile: Ministerio de Educación de Chile.

Muñoz, M. T., Lucero, B. A., Cornejo, C. A., Muñoz, P. A., & Araya, N. E. (2014). Convivencia y clima escolar en una comunidad educativa inclusiva de la provincia de Talca, Chile. *Revista Electrónica de Investigación Educativa*, *16*(2), 16–32.

O'Malley, M., Voight, A., Renshaw, T. L., & Eklund, K. (2015). School climate, family structure, and academic achievement: A study of moderation effects. *School Psychology Quarterly*, *30*(1), 142–157. http://dx.doi.org/10.1037/spq0000076

Oliva, A., Antolín, L., & López, A. M. (2012). Development and validation of a Scale for the Measurement of Adolescents' Developmental Assets in the Neighborhood. *Social Indicators Research*, *106*(3), 563–576. http://dx.doi.org/10.1007/s11205-011-9822-9

Oppewal, H., Paas, L. J., Crouch, G. I., & Huybers, T. (2010). Segmenting consumers based on how they spend a tax rebate: An analysis of the Australian stimulus payment. *Journal of Economic Psychology*, *31*(4), 510–519. http://dx.doi.org/10.1016/j.joep.2010.03.013

Patton, D. U., Woolley, M. E., & Hong, J. S. (2012). Exposure to violence, student fear, and low academic achievement: African American males in the critical transition to high school. *Children and Youth Services Review*, *34*(2), 388–395. http://dx.doi.org/10.1016/j.childyouth.2011.11.009

Ramelow, D., Currie, D., & Felder-Puig, R. (2015). The assessment of school climate: Review and appraisal of published student-report

measures. *Journal of Psychoeducational Assessment*, *33*(8), 731–743. http://dx.doi.org/10.1177/0734282915584852

Reaves, S., McMahon, S. D., Duffy, S. N., & Ruiz, L. (2018). The test of time: A meta-analytic review of the relation between school climate and problem behavior. *Aggression and Violent Behavior*, *39*, 100–108. http://dx.doi.org/10.1016/j.avb.2018.01.006

Rudasill, K. M., Snyder, K. E., Levinson, H., & Adelson, J. (2018). Systems view of school climate: A theoretical framework for research. *Educational Psychology Review*, *30*(1), 35–60. http://dx.doi.org/10.1007/s10648-017-9401-y

Safran, S. P., & Oswald, K. (2003). Positive behavior supports: Can schools reshape disciplinary practices? *Exceptional Children*, *69*(3), 361–373. http://dx.doi.org/10.1177/001440290306900307

Shukla, K., Konold, T., & Cornell, D. (2016). Profiles of student perceptions of school climate: Relations with risk behaviors and academic outcomes. *American Journal of Community Psychology*, *57*(3-4), 291–307. http://dx.doi.org/10.1002/ajcp.12044

Steffgen, G., Recchia, S., & Viechtbauer, W. (2013). The link between school climate and violence in school: A meta-analytic review. *Aggression and Violent Behavior*, *18*(2), 300–309. http://dx.doi.org/10.1016/j.avb.2012.12.001

Sulak, T. N. (2018). School climate: The controllable and the uncontrollable. *Educational Studies*, *44*(3), 279–294. http://dx.doi.org/10.1080/03055698.2017.1373630

Thapa, A., Cohen, J., Guffey, S., & Higgins-D'Alessandro, A. (2013). A Review of school climate research. *Review of Educational Research*, *83*(3), 357–385. http://dx.doi.org/10.3102/0034654313483907

Trianes, M. V., Blanca, M. J., De la Morena, L., Infante, L., & Raya, S. (2006). Un cuestionario para evaluar el clima social del centro escolar. *Psicothema*, *18*(2), 272–277.

Van Eck, K., Johnson, S. R., Bettencourt, A., & Johnson, S. L. (2017). How school climate relates to chronic absence: A multi–level latent profile analysis. *Journal of School Psychology*, *61*, 89–102. http://dx.doi.org/10.1016/j.jsp.2016.10.001

Vats, R. (2019). A study of 9th grade students' perception regarding school climate. *International Journal of Scientific Research in Science and Technology*, 553–561. http://dx.doi.org/10.32628/IJSRST1962112

Vermunt, J. K. (2003). Multilevel latent class models. *Sociological Methodology*, *33*(1), 213–239. http://dx.doi.org/10.1111/j.0081-1750.2003.t01-1-00131.x

Vermunt, J. K., & Magidson, J. (2016). *Technical guide for Latent GOLD 5.1: Basic, Advanced, and Syntax.* Belmont, MA: Statistical Innovations.

Villalobos, C., Wyman, I., Schiele, B., & Godoy, F. (2016). Composición de género en establecimientos escolares chilenos: ¿Afecta el rendimiento académico y el ambiente escolar? *Estudios Pedagógicos (Valdivia)*, *42*(2), 379–394. http://dx.doi.org/10.4067/S0718-07052016000200022

Wang, M. T., & Degol, J. L. (2016). School climate: A review of the construct, Measurement, and impact on student outcomes. *Educational Psychology Review*, *28*(2), 315–352. http://dx.doi.org/10.1007/s10648-015-9319-1

Wedel, M., & Kamakura, W. A. (2000). *Market segmentation: Conceptual and methodological foundations* (2nd ed). Boston: Kluwer Academic.

White, R., & Renk, K. (2012). Externalizing behavior problems during adolescence: An ecological perspective. *Journal of Child and Family Studies*, *21*(1), 158–171. http://dx.doi.org/10.1007/s10826-011-9459-y