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ORIGINAL RESEARCH

Longitudinal Relations Between School Climate and Prosocial Behavior: The Mediating Role of Gratitude

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Purpose: The school climate, which refers to the quality and character of school life, is associated with a wide range of developmental outcomes. Although researchers have shown considerable interest in uncovering the links between school climate and prosocial behavior, the mechanisms underlying this association remain unclear. Therefore, the current study was designed to investigate the mediating role of gratitude between school climate and adolescents' prosocial behavior.

Methods: A sample of 632 Chinese adolescents (363 girls and 269 boys; M_{age} = 16.83 years at time 1, SD = 0.68 years) completed a battery of sociometric and self-report questionnaires that measured school climate, gratitude, and prosocial behavior in three waves.

Results: Correlation analysis showed that school climate, gratitude, and prosocial behavior were all significantly and positively intercorrelated across the three waves. Importantly, gratitude completely mediated the relationship between school climate and prosocial behavior (β = 0.005 [95% confidence interval = 0.001, 0.013]) in the three-wave longitudinal mediation model.

Conclusion: As a positive disposition, gratitude fosters prosocial behavior and serves as a mediator between school climate and prosocial behavior. This study provides a theoretical explanation for cultivating adolescents' prosocial behavior and theoretical guidelines for interventions of schools and other socializing agents.

Keywords: prosocial behavior, gratitude, school climate, adolescents, longitudinal mediation model

Introduction

Prosocial behavior—which includes voluntary actions such as helping, sharing, consideration, concern, and defending[1]—has important health and social implications for adolescents. Evidence points to links between prosocial behavior and better physical health,[2] positive academic outcomes (such as academic self-efficacy, higher grade point average), greater happiness,[3] and less aggression.[4] Notably, the development of prosocial behavior during adolescence is essential for fostering positive social interactions, thus improving interpersonal understanding among individuals in society.[5] Given the importance of prosocial behavior, it is critical to understand how adolescents develop prosocial actions.

Adolescence is a key period for understanding prosocial behavior development, with a decrease in comprehension from early adolescence to middle adolescence followed by a rebound in late adolescence.[6,7] Though a wealth of studies have focused on the impact of parental socialization,[8] some researchers found that school experiences play an important role in the development of prosocial behavior. School is the second-most frequent place of activity for adolescents after their home. Individuals are profoundly influenced by school climate,[9] which influences literally every aspect of school life. A positive school climate is associated with a range of desirable outcomes;[10] moreover, it has been extensively examined as a factor influencing students' behaviors (such as prosocial behavior).[11] However, there is limited knowledge about longitudinal associations between perceived school climate and prosocial behavior as well as the underlying mechanisms at play. Therefore, the purpose of the current study was to prospectively investigate the effects of school

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climate on adolescents' prosocial behavior and the mediating role of gratitude by using data from a longitudinal investigation that assessed both constructs repeatedly over time.

School Climate and Adolescents' Prosocial Behavior

According to the National School Climate Council (2007),[12] school climate is defined as the overall quality and character of school life. However, due to the wide range aspects in the school context, it is hard to conceptualize the actual definition of school climate.[13] In the current study, we focused on a developmental perspective that emphasizes the importance of "the need for trusting and caring relationships" and "the need for autonomous self-expression, choice, and decision-making" in successful adolescents development.[14] According to developmental theories, teacher–student support,[15] student–student support,[16] and opportunities for autonomy in the classroom[17] are three major components on which researchers of school climate have mainly focused their attention. Student–student support is defined as the perception of emotional support among peers (such as caring for each other and trusting one another);[16] teacher–student support typically involves both emotional and academic support, with a strong emphasis on social support;[15] and opportunities for autonomy in the classroom refer to the freedom for choice and decision-making with regard to learning and classroom life.[18]

Here, we outline two theoretical frameworks for explaining how school climate influences the development of prosocial behavior in adolescents. First, based on bio-ecological theory,[19] during the process of human development, an active biopsychological organism interacts reciprocally with its immediate surroundings. As one of the immediate developmental contexts, school exerts a tremendous amount of influence on adolescents.[19,20] Second, social cognition theory also contributes to understanding the association between school climate and prosocial behavior. Social cognitive theory[21] illuminates the generative process of meaning and behavior in relation to person and environment. In social cognitive theory, motivation is defined as a goal-directed behavior that is dependent upon context and plays an essential role in behavior.[22,23] Individuals are more likely to engage in prosocial actions if they have certain motivations behind them.[24] In particular, environmental factors directly affect how students perceive themselves as active learners. From this theoretical perspective, by facilitating supportive teacher–student relationships and maintaining an environment where students feel emotionally safe, adolescents can be motivated to act prosociality.[25]

Empirical evidence also indicates a link between school climate and prosocial behavior. In their study, Luo et al[26] found a significant positive association between school climate and prosocial behavior. Another cross-sectional study relying on self-determination theory indicated that responsibility and school climate can predict basic psychological needs, which could, in turn, improve prosocial behavior and reduce antisocial behavior and violence.[27]

A longitudinal study by Luengo Kanacri et al[28] also suggested that higher levels of a positive school climate predict more prosocial behaviors; specifically, positive, supportive relationships and interactions with peers[29] and teachers[30] tend to increase students' prosocial behavior.

School Climate and Gratitude

According to theoretical perspectives and empirical evidence, gratitude may mediate the effects of school climate on adolescents' prosocial behavior.

Gratitude is considered a core strength that improves people's physical and mental health.[31] The practice of experiencing and expressing gratitude can boost adolescents' mood, strengthen their ties with society, and foster their sense of purposeful engagement with the world.[32] Attachment theory[33] addresses the psychological connectedness between close relationships. From an attachment perspective, the experience of gratitude can be expected to be fostered by feelings of being protected, accepted, and valued by others. Consistent warm and comforting interactions with emotional support provided by peers and teachers foster secure feelings.[34] A securely attached adolescent tends to feel grateful for other people's kindness and perform prosocial actions.

Gratitude and Prosocial Behavior

Gratitude has a positive relationship with prosocial behavior. According to moral affect theory, gratitude serves three essential functions, including a moral barometer function, a moral motive function, and a moral reinforcement function.[35]

As a moral barometer, gratitude is the response to the feeling of being benefited by another person's moral behavior. As a moral motive function, it stimulates grateful individuals to act prosocially toward helpers or others. Finally, as a moral reinforcement function, when gratitude is expressed, it increases the probability that benefactors behave morally in the future. In accordance with this view, gratitude promotes not only the beneficiary's prosocial behavior but also enhances the benefactor's prosocial behavior.

A meta-analystic review[36] identified 91 studies across 65 papers in order to shed light on the relationship between gratitude and prosociality. Its results indicated that there was a positive association between gratitude and prosociality ($r = 0.37$), and this correlation was significantly larger in reciprocal outcomes. The study authors also found that gratitude was related to receiving help from someone you have helped, reciprocating favors, and helping others after being helped. Therefore, gratitude and prosocial responding are positively and reciprocally related. Additionally, the result of a longitudinal study conducted over a period of four years also revealed that gratitude growth predicts increases in prosocial behavior.[37]

The Current Study

To sum up, the primary aim of the current study was to examine the effects of school climate on adolescents' prosocial behavior, and we also explored the underlying mechanism responsible for these effects. Based on the theories and empirical evidence mentioned above, we hypothesized that (1) school climate would positively correlate with adolescents' prosocial behavior across three waves and (2) gratitude at Time 2 (the second measurement time, November 2021) would mediate the effects of school climate at Time 1 (the first measurement time, May 2021) on prosocial behavior at Time 3 (the third measurement time, May 2022).

Methods

Study Design

This was a longitudinal investigation aimed at examining mediation models in three waves of panel data. In mediation models, a predictor affects an outcome variable through a mediator (school climate → gratitude → prosocial behavior). Mediation models consider appropriate time lags in data collection even when the actual manipulation of variables is impractical.[38] Thus, the availability of three-wave panel data allowed us to assess how school climate affects adolescents' prosocial behavior over time through gratitude.

Participants and Procedure

A cluster-sampling approach was used to sample all 11th-graders from three high schools located in the south of China. Data from three waves were collected at intervals of six months. At Time 1, a total of 678 students were recruited for this study. After excluding responses that were illogical or missing, data were available for 632 students (363, 57.44% girls; 269, 42.56% boys; age range = 15–19 years, M_{age} = 16.83 years, SD = 0.68 years) across three waves with an overall attrition rate of 6.8%. To examine the potential impact of attrition, we compared data from students who did and did not participate at Time 3 with research variables measured at Time 1. The results of attrition analysis indicated that there were no significant differences in observed variables ($ps > 0.05$) between participants who remained involved in the three surveys and those who dropped out.

To determine whether our sample size was adequate, we used the Monte Carlo power analysis for indirect effects.[39] We entered the smallest effect sizes obtained during a previous study[26] for the links between school climate and gratitude ($r = 0.33$), and school climate and prosocial behavior ($r = 0.12$).[40] Based on meta-analyses, gratitude correlates with the outcome variable prosocial behavior at approximately 0.37.[36] With a power of 0.80, an estimated sample size of N = 88 is adequate for testing relationships between such sizes. Thus, the sample size for the present study provided adequate statistical power (>80%) for detecting small indirect effects.

Procedure

Three waves of investigation were conducted in classes for students in May 2021 (Time 1), November 2021 (Time 2), and May 2022 (Time 3). Students were told in advance of the investigation that it was intended to gain a better understanding of their school lives and relationships with classmates and teachers. We stressed the sincerity of their answers and informed them of their right to refuse to participate and withdraw from the investigation. Informed consent was obtained from all subjects involved in the study. For those participants younger than 18 years of age, parental informed consent was also obtained. Following this, participants completed a set of paper-and-pencil questionnaires during school time. During each wave, it took about 20 min to complete the survey. All participants completed their surveys in the presence of the researchers, who collected the surveys at once after participants had completed them. All measures were administered by well-trained postgraduate students with a psychology background.

Measures

Perceived School Climate

School climate was measured with a 25-item scale adapted from the work of Jia et al.[18] Three aspects of school climate were assessed by a combined measure, including teacher support, ie, emotional support from the teacher, with one item related to academic support (such as "Teachers believe I can do well"); student–student support (such as "Students respect one another"); and opportunities for autonomy (such as "Students are given the chance to help make decisions"). Items were rated on a four-point scale (1 = never, 4 = always), and negatively keyed items were reverse-coded. Higher scores indicated that participants perceived a more positive school climate. Cronbach's alpha values were 0.85, 0.86, and 0.88 for Time 1, Time 2, and Time 3, respectively.

Gratitude

Gratitude was assessed among participants with a six-item revised gratitude questionnaire,[41] which was translated into Chinese by Wei et al.[42] This questionnaire is a self-report measure designed for assessing the experiences and expressions of gratefulness and appreciation in daily life as well as perceptions when benefiting from others. The questionnaire covers four aspects of gratefulness, including the gratitude intensity facet (such as "I feel thankful for what I have received in life"), the gratitude frequency facet (such as "Long amounts of time can go by before I feel grateful to something or someone"), the gratitude span facet (such as "I sometimes feel grateful for the smallest things"), and the gratitude density facet (such as "I am grateful to a wide variety of people"). Each item was rated on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree), and Cronbach's alpha values for the current sample were 0.86, 0.88, and 0.92 for Time 1, Time 2, and Time 3, respectively.

Prosocial Behavior

Prosocial behavior was assessed with a revised prosocial behavioral tendencies measure,[43] which is a multidimensional measure of prosocial behaviors in adolescence. The original version of this prosocial behavioral tendencies measure[44] includes six types of prosocial behaviors, specifically public (4 items), anonymous (5 items), dire (3 items), emotional (4 items), compliant (2 items), and altruism (5 items). The revised version consists of 26 items and was more appropriate to use in this study considering the cultural background and development stage of adolescence in China. In the Chinese version, three items were added to the compliance subscale and two items were deleted from the altruism subscale. Each participant was asked to rate how much the statements described them on a five-point scale (1 = no description at all, 5 = highly describes me), and Cronbach's alpha values for the current study were 0.93, 0.93, and 0.95 for Time 1, Time 2, and Time 3, respectively.

Analytic Plan

Before conducting analysis, measurements of skew and kurtosis were performed to examine the assumptions of normality. The results indicated that the school climate, gratitude, and prosocial behavior of the three waves were normally distributed, with skew and kurtosis values within the normal limits (skew $< \pm 2$, kurtosis $< \pm 7$).[45,46] First, descriptive statistics and correlations were employed using SPSS version 28.0 (IBM Corporation, Armonk, NY, USA). Next, we used Mplus Version 8.3 statistical software (Muthén & Muthén, Los Angeles, CA, USA)[47] to estimate

autoregressive cross-lagged models, which aimed to test the association of perceived school climate and prosocial behavior. Finally, structural equation model analyses were conducted to test a longitudinal mediation model in which perceived school climate predicted adolescents' prosocial behavior both directly and indirectly through their gratitude disposition. With full-information maximum likelihood estimation, path analyses were conducted. In the present study, the magnitude and significance of indirect effects were evaluated using a 95% confidence interval (CI) and 5000 bootstrap samples. If an estimate did not contain 0 within its 95% CI, then it could be deemed significant at $p < 0.05$.

Control Variable

Due to prior studies showing that sex and age are associated with prosocial behavior, we included both as control variables in the present study. Therefore, statistical models included sex and age as variables for a certain degree of control. We encoded participants' sex with dummy variables.

Common Method Variance Test

In this study, all data were gathered from adolescents' self-reports, and the results might have been affected by common method bias,[48] so three steps were taken to minimize the impact of common method bias. Prior to collecting data, different questionnaires were separated, and negative items were reverse-coded. Next, we stressed the importance of data privacy during data collection. Finally, to improve the precision of the research, single-factor confirmatory factor analysis (CFI = 0.29, TLI = 0.28, RMSEA = 0.07, SRMR = 0.10) with Mplus version 8.3 was conducted. The results showed that there were no serious common method biases in the present study.

Results

Descriptive Statistics and Correlations

Descriptive statistics and correlations for the observed variables are presented in Table 1. As we can see, school climate, gratitude, and prosocial behavior were all significantly and positively intercorrelated across time. Moreover, one-way repeated-measures analysis of variance was conducted to determine whether there were differences in the observed variables across the three waves. The results showed that the means of school climate ($F(2, 631) = 9.73$, $p < 0.001$, $\eta^2 = 0.01$), gratitude ($F(2, 631) = 8.22$, $p < 0.001$, $\eta^2 = 0.01$), and prosocial behavior ($F(2, 631) = 20.26$, $p < 0.001$, $\eta^2 = 0.01$) differed in statistically significantly fashion between timepoints. Post hoc analysis with a Bonferroni adjustment revealed that perceived school

Table 1 Correlations of Research Variables Across Three Waves

	1	2	3	4	5	6	7	8	9
1. School Climate (Time 1)	1								
2. Gratitude(Time 1)	0.48***	1							
3. Prosocial Behavior (Time 1)	0.45***	0.47***	1						
4. School Climate (Time 2)	0.46***	0.27***	0.25***	1					
5. Gratitude (Time 2)	0.24***	0.48***	0.32***	0.39***	1				
6. Prosocial Behavior (Time 2)	0.33***	0.28***	0.51***	0.37***	0.38***	1			
7. School Climate (Time 3)	0.42***	0.28***	0.27***	0.52***	0.32***	0.25***	1		
8. Gratitude (Time 3)	0.23***	0.42***	0.30***	0.28***	0.50***	0.26***	0.51***	1	
9. Prosocial Behavior (Time 3)	0.16***	0.21***	0.41***	0.18***	0.26***	0.39***	0.33***	0.45***	1
Mean	68.39	34.51	89.95	69.26	35.28	86.46	67.64	34.28	89.86
Standard Deviation	8.54	6.09	14.25	8.69	5.80	14.52	9.59	6.95	15.35

Note: *** P < 0.001.

climate was statistically significantly increased from Time 1 to Time 2 (−0.88 [95% CI = −1.73, −0.02]) and decreased from Time 2 to Time 3 (1.63 [95% CI = 0.76, 2.45]), but not statistically significantly decreased from Time 1 to Time 3 (0.75 [95% CI = −0.19, 1.69]). From Time 1 to Time 2, post hoc analysis with a Bonferroni adjustment indicated that gratitude was statistically significantly increased (−0.77 [95% CI = −1.35, −1.94]). Nevertheless, gratitude showed a significant decrease from Time 2 to Time 3 (1.01 [95% CI = 0.39, 1.63]). Similar to school climate and gratitude, prosocial behavior significantly decreased from Time 1 to Time 2 (3.48 [95% CI = 2.12, 4.85]), while it significantly increased from Time 2 to Time 3 (−3.40 [95% CI = −5.00, −1.82]).

Longitudinal Mediation Model

A series of competing cross-lagged path analyses were performed to test the inter-predictive effects among all observed variables, and the results are presented in Table 2.

Model 1 was the baseline model, which estimated the stability coefficients of the relationship among the three variables. Besides, error variances among the three variables across three waves were correlated. Results indicated that it was necessary to add other cross-lagged paths to further examine the relationships among the three variables; thus, model 2 added the paths of gratitude to school climate and prosocial behavior to gratitude based on model 1. The chi-squared difference test showed that model 2 performed better than model 1 ($\Delta x^2 = 33.92$, $\Delta df = 8$, $p < 0.001$). Model 3 added the whole cross-lagged paths of all observed variables, and the chi-squared difference test showed that model 3 performed significantly better than model 2 ($\Delta x^2 = 27.34$, $\Delta df = 4$, $p < 0.001$). Based on model 1, model 4 tested a model that added paths of school climate to gratitude and gratitude to prosocial behavior. In this final model, the following parameters were found to be adequate for fitting the data better than in model 3: $x^2(16) = 158.04$, $p < 0.001$; RMSEA = 0.10, 95% CI = 0.087, 0.117; CFI = 0.91; TLI = 0.86. Except for the path of school climate (Time 1) to prosocial behavior (Time 3), other factor loadings for the constructs were significant and ranged from 0.06–0.48 (see Figure 1).

In summary, model 4 was finally adopted as it fit the data best. Figure 1 shows that the variables in the adopted model were moderately stable over time. A total of nine significant concurrent correlations were found. At each wave, school climate, gratitude, and prosocial behavior had a positive relationship with one another. Despite the stability of constructs throughout time and their correlations within time, significant cross-lagged paths were observed; notably, Time 1 school climate predicted Time 2 gratitude, Time 2 school climate predicted Time 3 gratitude, Time 1 gratitude predicted Time 2 prosocial behavior, and Time 2 gratitude predicted Time 3 prosocial behavior.

The standardized indirect effect of school climate at Time 1 on prosocial behavior at Time 2 through gratitude at Time 3 was significant, and the associated CI excluded 0 ($\beta = 0.005$ [95% CI = 0.001, 0.013]). However, school climate at Time 1 did not significantly predict prosocial behavior at Time 3 directly, which meant that gratitude completely mediates the relationship between school climate and prosocial behavior according to the longitudinal model.

Discussion

In the present study, we examined the longitudinal relationship between school climate and prosocial behavior as well as the mediating role of gratitude in Chinese adolescents. All observed variables showed relatively moderate stability across the three waves. With three waves of data, we constructed a longitudinal mediational model that controlled for construct stability and provided more accurate estimates of cross-lagged effects.[49] Our results suggested that adolescents' gratitude

Table 2 Fit Indices of Each Model Among School Climate, Gratitude, and Prosocial Behavior

Model	X^2	*df*	CFI	TLI	RMSEA	SRMR	ΔX^2	Δdf
Model 1	175.72	24	0.90	0.86	0.10	0.10		
Model 2	141.80	16	0.92	0.87	0.10	0.07	33.92***	8
Model 3	114.46	12	0.93	0.81	0.01	000	27.34***	4
Model 4	158.04	16	0.91	0.86	0.10	0.08	43.58***	4

Note: ***P < 0.001.

Abbreviations: *df*, degree of freedom; CFI, Comparative Fit Index; TLI, Tucker–Lewis Index; RMSEA, root mean square error of approximation; ΔX^2, Satorra-Bentler Chi-square difference test.

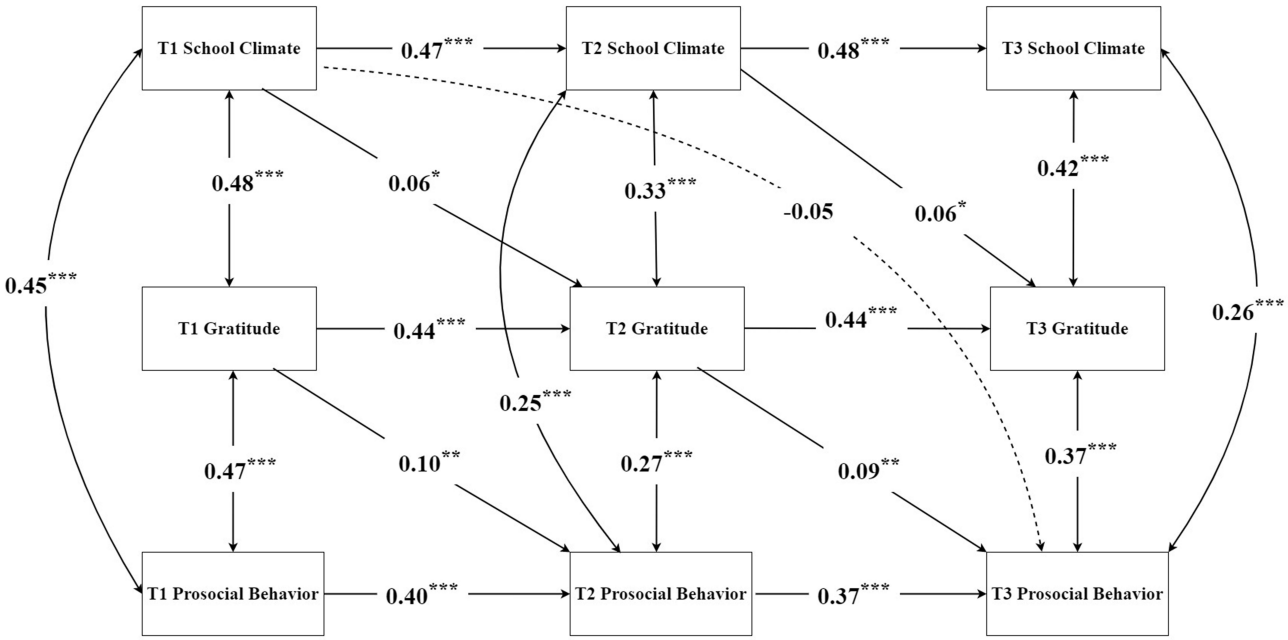

Figure 1 A three-wave longitudinal mediation model showing standardized path coefficients for associations among school climate, gratitude, and prosocial behavior.
Notes: *P<0.05, **P <0.01, ***P <0.001; N = 632.

disposition completely mediates the effect of school climate on prosocial behavior, which means that adolescents with a positive school climate are more grateful and behave more prosocially as a result.

School Climate and Prosocial Behavior

In the past decades, it has been widely demonstrated that adolescents' behaviors can be greatly influenced by their school experience. In this study, the association between perceived school climate and prosocial behavior in middle school students was examined based on both theory and empirical evidence. As expected, school climate and prosocial behavior were found to be moderately positively correlated at three timepoints (rs = 0.48, 0.33, and 0.16). Bio-ecological theory regards development as a process of "individual–environment" interactions.[19] For adolescents, school is the environment where they are directly connected, which will undoubtedly influence their behavior. Furthermore, in line with social cognitive theory,[21] a positive school climate fosters supportive relationships between peers and between teachers and students, which further motivates students to engage in prosocial behavior.

Even so, it should be noted that correlation coefficients gradually decline over time. According to Cialdini,[50] the development of prosocial actions can be divided into three stages: presocialization, awareness of norms, and internalization. Presocialization, children are unaware of prosocial actions and do not act altruistically, as they risk losing resources. When individuals enter the second stage, they are more likely to act prosocially because they have learned that others expect them to help and may punish them for not doing so. Then, in the third stage, acting prosocially makes individuals feel better and is intrinsically satisfying. Approximately 10–12 years of age is the time when children move from the stage of presocialization to that of secondary socialization. In most cases, by the time most children are 15–18 years old, their motivations to display prosocial behaviors have changed from being entirely external to being internally motivated. In this section, learning experience,[50,51] socialization experience,[50] and culture[51] are determinant factors for shifting through these stages. In collective cultures, individuals develop prosocial value orientations from childhood, which encourage them to make cooperative choices that are beneficial to both participants.[52] When Chinese adolescents reach the awareness of norms stage, they realize the society in which they live values and desires helpfulness. In their later years, they internalize the external norms that motivated them to help. As a result, we found that the correlations between school climate and prosocial behavior decreased over time in our study.

The Mediating Effect of Gratitude

Consistent with our hypothesis, the effect of school climate on prosocial behavior was completely mediated by gratitude. That is to say, school climate helps to increase adolescents' gratitude, while gratitude further promotes the incidence of adolescents' prosocial behavior. According to the findings of this study, school climate has a positive and direct impact on gratitude. Gratitude is not innate,[53] but rather can be developed over time under the specific influence of environmental factors. From the perspective of Bronfenbrenner's ecosystem theory,[19] school serves as a microsystem that can have both direct and indirect influences on adolescents.[54] In this light, peers, teachers, and other adults in the school setting can assist adolescents in gaining a deeper understanding of gratitude in a variety of ways. Therefore, a positive school climate, which generates a conductive environment, is crucial for cultivating gratitude dispositions. Our findings are also supported by attachment theory,[33] in that a positive school climate facilitates secure attachments in student–student and teacher–student relationships. Teachers, for instance, encourage appreciative responses in students by pointing out and reinforcing kind actions in the classroom or by modeling reciprocity and thankfulness when they cooperate with students in activities or play with them on daily basis, which helps to instill gratitude.[55]

Our study revealed that gratitude is associated with prosocial behavior. In accordance with moral affect theory,[35] adolescents with gratitude expressions are more likely to adopt moral actions such as prosocial behavior. When individuals feel and express gratitude, they experience stronger feelings of self-efficacy as well as a sense of social worth, which motivates them to engage in prosocial actions.[56] Furthermore, cultural norms may be important for understanding the findings. It has been reported in previous studies that higher levels of collectivism are associated with greater levels of prosocial behavior.[57] Gratitude is a powerful tool for collective countries to use to maintain harmony and reciprocity among their members.[58] A key aspect of school life in China is gratitude education. Thus, it follows that our participants should be more likely to experience gratitude and exhibit prosocial responses.

The mediation effects in this study, however, were quite small, and the 95% CIs of the indirect effects were very close to including 0, suggesting weak evidence for indirect effects. A possible explanation for this result is that the longitudinal design of this research controlled the effects of previous levels in all variables.[59] Autoregressive effects explain a large percentage of variance in the outcomes, thereby limiting the theoretically possible range of cross-lagged effects from other constructs. This is why cross-lagged effects do not adhere to the effect size conventions for correlation coefficients, in which 0.1 is considered small.[60,61] Another possible explanation for the weak indirect effects is the mechanisms might underlie the school climate–gratitude and gratitude–prosocial behavior links. For example, in Grant and Gino's work,[56] self-worth was found to mediate the effects of beneficiaries' gratitude expressions on the prosocial behavior of helpers. From a communal perspective, thanking helpers for their efforts inspires them to provide more help in the future by providing a sense of being valued. In spite of this, we believe that our findings are potentially meaningful owing to the theoretical support for the mediation effects.

Strengths, Limitations, and Future Research

Two distinct findings of this study contribute to the literature on the relationship between school climate and prosocial behavior. First, a longitudinal mediation model was introduced to describe the mechanism by which school climate influences prosocial behavior. A mediation model can improve statistical inference and allow for examining intraindividual variation, both of which are valuable in developmental research. Second, while most of the previous studies on school climate and adolescents' prosocial responses were conducted in Western countries, the current study included a representative sample from China, which is a collectivist Eastern country. Cross-cultural research has the potential to be a productive area of research in the future.

Several issues should be noted. First, while longitudinal data that have been carefully collected and analyzed through the suggested longitudinal mediation models are likely to provide reliable and interpretable conclusions,[62] causality probably cannot be tested due to our study's non-experimental design. By examining effects over time (such as having a clear temporal order of predictor and outcome) and controlling for previous levels of constructs (such as autoregressive effects),[63,64] longitudinal studies can offer some insight into hypothesized models. It is important to note, however, that the results of any observational study might be influenced by other variables, such as genetics or other environmental factors.[65]

Second, this study did not examine other aspects of school climate that might influence adolescents' prosocial behavior. For instance, respect for diversity is an important part of the school climate that should be considered.[25] A prior longitudinal study showed that perceptions of discrimination experiences in the school had a negative association with altruistic prosocial behaviors.[11] Research on the prospective impact of discrimination experiences and related aspects of school climate (such as academic climate)[13] that might influence prosocial behavior should be undertaken in the future.

Third, the current study relied on self-report for data collection, which may contribute to common method bias. Common method variance arises when information on two or more variables is obtained from the same source. Particularly, reports from the same rater are frequently affected by response biases, such as implied theories, social desirability, and mood. To control for specific biases, future studies should include data from multiple informants and utilize multiple measurement methods.

Finally, prosocial behaviors can be divided into a variety of categories. We assessed six types of prosocial behaviors with prosocial behavioral tendencies measure. Research on how school climate affects specific types of prosocial behavior can be conducted in the future.

Implications for Practice

In addition to enriching the theoretical discussions in this field, these findings may have profound implications for practical work. Silke et al[66] summarized the factors influencing prosocial responding among adolescents and drew conclusions that there are two factors associated with adolescents' prosocial behavior, including (1) individual aspects, such as personality, self-efficacy, self-esteem/self-concept, emotional regulation, social skills, personal values, knowledge, and moral reasoning, and (2) contextual aspects, including sex, parents/family, peers, schools, media, neighborhood, culture, sports, club membership, religion, target characteristics, victimization, aggression, and previous prosocial tendencies. In the current study, we found that a contextual aspect (positive school climate) and individual aspects (gratitude) contribute to the variance in fostering adolescents' prosocial behavior. Particularly, we found that a directly perceived school climate has an impact on prosocial behavior completely through gratitude, which indicated that it might be more efficient and effective to promote adolescents' prosocial behavior by developing their gratitude feelings and expressions. Therefore, some implicit suggestions can be proposed from the current work.

Model-based programs designed to construct a positive school atmosphere can be implemented. For instance, Hellison's Teaching Personal and Social Responsibility (TPSR) model-based program has been proven to be effective in promoting the school climate[67] and prosocial behaviors.[67,68] The TPSR model[69] was designed to promote life skills for young people at risk of social exclusion through physical activity. However, researchers who applied this model to other school subjects also found that it was an effective methodology for implementing other curriculum subjects.[67] The goals of the TPSR model include five levels,[69] as follows: (1) respecting the rights and feelings of others, (2) effort and cooperation, (3) self-direction, (4) helping others and leadership, and (5) transfer of responsibility outside the physical activity setting. Levels 1 and 2 are essential for developing responsibility and establishing a positive learning environment. Then, the following two levels enhance the learning environment by encouraging independent work, helping roles, and leadership roles. Finally, the goal of the fifth level is to achieve the ability to apply the learned skills outside of the learning environment and serve as a responsible role model for others. Thus, TPSR-based programs are a useful tool for fostering a positive school climate and promoting prosocial behavior.

In light of the finding concerning the completely mediated effect of gratitude, gratitude interventions are recommended. Simple and practical strategies to promote gratitude, such as listing things for which one is grateful, journaling, or expressing one's gratitude to the person to whom one is grateful, can be taught to adolescents.[70] Aside from these common strategies, modern gratitude interventions, such as social media apps, are also helpful and effective in promoting gratitude.[71,72]

Conclusions

In the present research, we gained a deeper understanding of the relationship between school climate and prosocial behavior among adolescents. Overall, the pattern of findings suggests that the perceived school climate can predict adolescents' prosocial behavior and that this association is completely mediated by gratitude. Theoretically, the current

study sheds light on the mechanism through which the perceived school climate influences prosocial behavior. Practically, the findings suggest that creating a positive school climate and enhancing adolescents' grateful virtue are vital to cultivating prosocial behavior. Overall, the present study provides crucial insights into factors of extrapersonal influence and intrapersonal variables that affect adolescents' prosocial behavior.

Data Sharing Statement

Data and other materials related to this research will be provided to qualified researchers on request.

Ethics Statement

The study was conducted according to the guidelines of the Declaration of Helsinki ethical standards. Guangxi Science and Technology Normal University, Shiyuan College of Nanning Normal University and Guangxi Normal University reviewed and approved the study protocol. Subjects were fully informed of the content and purpose of the survey before participating. Informed consent was obtained from all subjects involved in the study. For those participants who were under the age of 18, parental informed consents were also obtained.

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Disclosure

The authors report no conflicts of interest in this work.

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