School heads' transformational leadership and students' modernity: the multiple mediating effects of school climates

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Abstract

This study aimed to determine the mediating effects of school climate on the relationship between school heads' transformational leadership and students' modernity. We asked teachers to report on their school heads' transformational leadership, school climates, and students' modernity. Data were collected from 378 teachers from 42 middle and primary schools in five provinces in mainland China. Structural equation modeling (SEM) was adopted to test multiple mediating effects. Results indicated that school climates, including affiliation climate, innovation climate, and justice climate, were significantly affected by school heads' transformational leadership. All these three school climates had positive effects on students' modernity, and partially mediated the relationship between school heads' transformational leadership and students' modernity. These three mediating variables accounted for 35.1% of the total indirect effects; the innovation climate accounted for 15.6% of the total indirect effects, followed by justice climate (11.7%) and affiliation climate (7.8%). Results suggest that school climates are important factors that need special attention when school heads wish to develop students' modernity. In the implementation of transformational leadership, the combination of school climates and the establishment of innovation, justice, and affiliation climates should be emphasized.

Keywords School heads' transformational leadership · Students' modernity · School climates · Multiple mediating effects

Introduction

China is now in a critical period of modernization; the sprint of national modernization introduces hitherto unknown requirements for modern talents. As Inkeles (1985) indicated, if the transformation could not be realized by a nation from the traditional human to the modern people in psychology, thought, and behavior, the tragedy with failure and abnormal development will be inevitable. The perfect modern system, management style, and advanced technology, will become a mere pile of paper in traditional hands. Of the numerous factors that can influence the development of modern people, education is the most important one (Inkeles 1983). The years of school education, especially the early years, represent a critical period for students, as their thinking, conceptualizing, attitudes, and behaviors are forming. More than two-thirds of their waking hours are spent in school, during which time they are imperceptibly influenced by the concepts and behaviors of significant others. Significant others are people who have substantive influence in the process of individual socialization and psychological personality formation, such as school heads and teachers. A school head, as a guiding spirit and director of the school, can show traditional or modern thinking through the chosen leadership style, and thus his or her ideas arguably influence the development of the students' modernity.

Transformational leadership, as a modern style of leadership with contemporary significance, has become the focus of academic circles in recent years (Gong et al. 2009). The concept of school heads' transformational leadership is an extension of the theory in the field of education. A school head who enacts transformational leadership seeks to raise teachers' awareness of the importance of undertaking the task of education by stimulating their high-level needs. The objective is to build and establish an atmosphere of mutual trust between school heads and teachers, and to urge teachers to sacrifice their own interests for the development of the school by devoting themselves to exceeding educational performance expectations of their school (Bass 1995). In

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previous research on factors affecting students' modernity, more attention has been paid to the influence of family factors (Schnaiberg 1970; Portes 1973; Zhong et al. 2005), regional factors (Xia 1998), and individual differences (Yang 1989; Zhang and Zheng 2002), than to the influence of education factors in the school. Some researchers have questioned why school life and the life in which people live are different; the most common answer is, "School heads make a difference" (Pina et al. 2015). Thus, it is important to pay attention to the leadership of school heads. However, in the idea that school heads directly impact the development of students has been criticized as a simplistic bivariate model. Increasingly, scholars believe that the leadership of school heads does not directly affect students' development because most school heads do not directly teach lessons to students nor do they have direct contact with students; rather, their impact on students is often considered indirect (Leithwood et al. 2008). Thus, the impact process has been regarded as a "black box," for there are so many mechanisms and connections involved in it.

According to the comprehensive theoretical framework put forward by Hallinger et al. (1996), a school head's leadership role in school effectiveness must be located within both organizational and environmental contexts, and school climate is an important context that should be carefully considered when evaluating the effect of a school head's leadership on student achievement. Creating a good climate is an important part of school heads' leadership responsibilities, because youth development in any sense cannot avoid the influence of environmental factors. Individual development happens largely as a result of interacting with one's environment; cognition, emotion, behavior, and other aspects of innate development are all shaped in interactive environments (Hou 2004). Drawing on Hallinger's model, this study aimed to identify how school heads' transformational leadership influenced the modernity of their students and what roles the school climates played in that influence?

Literature review and hypotheses

Students' modernity

Individual modernity comprises one's cognitive attitudes, ideology, value orientation, and behavior patterns. It represents a set of characteristics commonly possessed by individuals in modern society. Different from individual modernity, students' modernity in this study is a concept of group orientation. It is measured by the modernity of a student group as a whole and is a special embodiment of modernity in the students' era. It is a series of modern ideas, attitudes, values, and behavioral patterns that students should possess in a school environment and is the fundamental

goal of educational modernization in developing countries (Chu 2013). After World War II, Latin American countries have gone through successive modernization setbacks like resource exhaustion and environmental disruption. For many years, they realized that the core factors determining national development were not economic capital and natural resources but rather their national accomplishments. If national accomplishments do not conform to modernization, any injected funds will be like seeds sown into barren soil. A national mentality of petty farmers will become the shackle of state, society, and economic development, which makes progress in national modernization difficult (Inkeles 1983). In a review of difficult and tortuous modernization paths in developing countries, the Chilean intellectual, Salazar Bandi in 1971 said that backward and underdevelopment not only are statistical index outlining social and economic figure, but also a psychological state (Yu and Chen 2014). Since then, individual modernity has gradually gained more attention. Studies have found that individual modernity has a positive influence on individual adaptability (Bai et al. 2016; Pillutla et al. 2007; Xie et al. 2008). For example, students with a high level of modernity tend to cooperate well with others on projects (Pillutla et al. 2007), help to reduce the stress of individual work, and have better health (Xie et al. 2008).

School heads' transformational leadership and students' modernity

A school head is a key factor for explaining school differences and student differences (Pina et al. 2015). Many studies show that school heads' leadership has a positive effect on student development despite predicted indirect results (Robinson et al. 2008; Day et al. 2011). Students' modernity cannot be taught like knowledge but can be shaped by edifying and cultivating in daily life. Therefore, students' modernity requires an external example that imposes imperceptible influence on personality and actions (Tian 2011). School heads who support a transformational leadership style can be a better personality example among students. They typically have exceptional personal charm and are able to provide a solid moral example. Furthermore, effective leaders can provide role shaping, facilitate change and promotion of students' persistence, exemplify social values, and create innovative goals (Zhang 2008), all of which encourages students to adopt modern qualities like their school head. School heads can also act as behavioral examples because they can inspire students to be open-minded and self-confident, to continually reflect on and improve themselves, and can offer personalized care to individual students facing developmental difficulties (Wang and Tian 2016). All these skills are beneficial to students' development of modern qualities. Accordingly, we proposed:

Hypothesis 1 School heads' transformational leadership has a positive connection with students' modernity.

School heads' transformational leadership and school climates

The concept of school climate, originating from organizational climate research, refers to relatively long-lasting and steady environment characteristics (Hoy and Hannum 1997) that are experienced and affected greatly by teachers and students at school. It is categorized into three dimensions: affiliation climate, innovation climate, and justice climate (Wang 2016).

Studies find that transformational leadership can enhance members' emotional commitment to the organization (Wu 2013). School heads' idealized influence make members identify with their ability, and often produce a strong emotional attachment to the leadership and organization. Under this influence of leadership, the members regard their leader as an example, unswervingly execute the orders of the leaders, and be full of passion in their work or study (Zhang and Chen 2011). An important function of transformational leadership is to shape a school's climate and to help that school form an organizational culture and a structure of care, respect, and cooperation (Yu et al. 2002). Studies also found that transformational leaders can create an equal and free organizational climate, which stimulates enthusiasm and promotes trust and cooperation among members (Li and Ling 2008a, b). In addition, they encourage teachers and students to join directly in the school decision making and establish a school organizational structure that develops participatory decision making and encourages teachers and students to make choices independently. The students can thus realize their own effect on the whole school and believe that they can inspire their school's vision. In this way, the affiliation climate is possible to form (Wang and Tian 2016).

Ekvall and Ryhammar (1999) found a strong relationship between transformational leadership and innovation climate. An important responsibility of a school head who enacts transformational leadership is to shape a trustful, open, and protected environment for teachers and students (Wang and Tian 2016). This forms the basis of school educational innovation, as teachers and students are free to reflect on their thought and behavior patterns and to share new ideas (Zhang 2008). Indeed, a key feature of transformational leadership is the creation of an organizational environment and climate that encourages innovations and allows members to both succeed and fail (Bass and Avolio 1990; Li and Ling 2008a, b). Thus, students can boldly explore and try new ways of carrying out tasks without fear of being punished for failure. In addition, leaders with transformational leadership generally set up a great and beautiful vision, make members passionate, create an innovative organizational environment and climate, encourage their subordinates to be brave in exploring and trying, and support them (Li and Ling 2008a, b). Furthermore, school heads who support transformational leadership often also provide innovative examples that inspire students to display their intelligence, which encourages them to share new, and even seemingly unrealistic, ideas. Through personalized care (e.g., showing support and concern), school heads can also help members overcome their fear of challenges (Gong et al. 2009).

Empirical studies indicate that transformational leadership has positive relationship with justice climate (Meng et al. 2007). School transformational leaders attach importance to justice, ethics, and value issues and through sound moral example can have beneficial effects on members (Zhang 2008). Thus, they create a just school climate that makes students feel fairly treated (Liu et al. 2013). Using the principles of inclusive education, these leaders, moreover, respect the possibility and specificity of each child's development and treat each one as a unique individual undergoing vigorous development. Transformational leadership accepts each student and helps them overcome participative obstacles, reduce rejection, and—for those in unfavorable situations—develop physical and mental harmony with the help of teachers and other students (Zhu et al. 2012). The climate is characterized by a group orientation toward treating each member in a consistent and fair way (Jeewon and Fred 2010). Empirical studies have shown that transformational leadership has positive and significant influences on organizations' procedural justice (Gumusluoglu et al. 2013), interactive justice (Zhu et al. 2012), interpersonal justice, information equity (Mayer et al. 2007), and distributive justice (Liu et al. 2013). On the basis of the foregoing accumulated information, we proposed the following hypotheses:

Hypothesis 2a School heads' transformational leadership has a positive effect on school affiliation climate.

Hypothesis 2b School heads' transformational leadership has a positive effect on school innovative climate.

Hypothesis 2c School heads' transformational leadership has a positive effect on school justice climate.

School climates and students' modernity

A sense of affiliation with school improves a student's adaptability, interactions with other students, ability to restrain and constrain themselves and join in various teacher-guided activities, and their communication and cooperation with other students; all of the above are important modernity qualities (Wang 2016). Yogev (1987) indicate that individuals who perceive themselves to belong to mainstream groups in a society or organization tend to be characterized

by modern values and behavior patterns. Empirical research suggests that teachers' care and close relationships with students can significantly predict students' social participation. Students who have better relationships with teachers and companions also possess higher-level abilities of social-emotional adjustment (Murray and Greenberg 2000), which translates into good social participation and interaction. Furthermore, participation plays an important role in students' social contact and personality development, helping them gain valuable experience in hard choices, getting a sense of conquest and control, and developing their altruism; these experiences serve to encourage their citizen activity and benefit them for life (Agirdag et al. 2013). Once this virtuous positive circle is formed, students' personalities and their cognition in school activities begin to show maturity, and they make more responsible decisions. Additionally, students may feel they belong at school and are accepted by other members; they form close relationships in school, which promotes their sense of responsibility for their school (Wang 2016).

Inkeles (1983) states that school has a substantive effect on individual modernity. Education is one of the life experiences that has had the greatest impact in making people modern (Inkeles et al. 1997). Because of a longer educational trajectory, people not only have abundant knowledge, but they also willingly accept new concepts and experience more new things (Weithorn 1998). Bain et al. (2001) indicate that an organization's innovation climate is positively related to the innovation of its members. Further, members' creativity is highest when they perceive that their organization attaches importance to creative work (Farmer et al. 2003). School is also an important place for individuals to shape their positivity and independence, which are important modernity qualities (Wang and Tian 2016). Positivity suggests an upward direction, constantly striving to become stronger, forging ahead enthusiastically. Independence refers to independent thinking, self-assertiveness, and not blind obedience. Creativity stands for nonconformity, innovative consciousness and abilities, and world-changing innovative behaviors (Chu 2013). An innovative school climate offers space that allows students to think independently, inspires their personalized thoughts, and expands their breadth of mind and field of vision with respect to encouragement of thinking and tolerance of errors, to interest, curiosity, and exploration in the world, to thinking and questioning constantly, as their narrow-minded thinking becomes ever wider (Inkeles 1983).

A good school climate must have a justice climate, in which fairness and justice can be enjoyed by all teachers and students; children from poor families, or those suffering from mental and physical disabilities, can expect equal and just treatment in a climate that does not discriminate in its care (Wang 2016). Unfair expectations on students can result in low academic achievement, school participation, classroom learning opportunities, and self-expectations (Agirdag et al. 2013). A teacher's fair treatment of students is often a function of whether they obtained fair treatment and experienced a fair climate at school. When they perceive unfair treatment from school, they will deliver naturally this value and experience to students, which accelerates the development of students' unfairness and injustice (Wang and Tian 2016). In a fair organizational climate, members show high level of modernity, such as feeling valued, strengthening their self-efficacy and pride, participating more in organizational activity, communicating and cooperating with others, and showing more responsibility for their organization (Zhang 2017).

On the basis of the above theories and findings, we proposed the following hypotheses:

Hypothesis 3a School affiliation climate has a positive effect on students' modernity.

Hypothesis 3b School innovation climate has a positive effect on students' modernity.

Hypothesis 3c School justice climate has a positive effect on students' modernity.

Mediating effects of school climates

Many scholars believe that a school head's leadership has a great influence on students (Leithwood et al. 2008; Hallinger et al. 1996); however, this influence is conveyed indirectly through other factors. School climate is one possible factor (Hallinger et al. 1996). As an integrated cognitive and behavioral phenomenon, school climate is inevitably shaped and guided by the school heads' cognitive and behavioral style, while school climate determines members how to think and feel aspects of environment, and respond to relevant behavior reactions (Salancik and Pfeffer 1978). As a concept of social cognition, school climate tends to offer hints for members' role behavior from its leader. Organizational climate reflects particular aspects of role behavior and to what extent they are encouraged, supported by, and rewarded by the leader (Guo and Duan 2003). As mentioned above, transformational leadership contributes to forming an attributive, innovative, and fair school climate. The value guide and behavior mode contained in this climate must influence changes in students' mentalities and ideas, and encourage them to adjust their cognitive behavioral modes to conform to their school's culture.

According to the above theories, we proposed:

Hypothesis 4 School affiliation climate, innovation climate, and justice climate play multiple mediating roles between

school heads' transformational leadership and students' modernity. A model of this study is illustrated in Fig. 1 and is based on the foregoing literature review.

Methods

Sample and data collection

In this study, all the variables (school heads' transformational leadership, school climates, and students' modernity) were measured by teachers, as they have a more direct feel for these factors. The data were collected in this way, moreover, to effectively link school heads' transformational leadership and students' modernity that have no direct contact, and to avoid parameter estimation bias caused by cross-level errors (Fang et al. 2011) and to avoid pupils' lack of understanding of modernity led to invalid responses. When students' modernity was measured by teachers, it was brought into the model as a group variable. Random cluster sampling was adopted in this research and samples were drawn from five provinces: Yunnan, Guizhou, Chongqing, Xinjiang, and Guangxi. Two counties were chosen from each province based on economic development level, and five schools were selected from each county based on the schools' education development level. Forty-two middle and primary schools from 10 counties voluntarily participated in this survey. Of the 500 questionnaires collected, 378 were valid (75.6%). The number responses varied across provinces and schools, depending on schools' size and their willingness to participate in this study: Chongqing had the most participants ($n=149$, 39.4%) and Xinjiang had the least ($n=26$, 6.9%)

(Table 1). In China, the number of teacher staff also varies greatly from school to school, ranging from hundreds of teachers in the large-size central schools to only a few teachers in some remote rural teaching sites. To make things worse, some teaching sites are confronting the situation that there is only one teacher working for the whole school in some counties (Zhan 2013). As a result, only one teacher was surveyed in some schools. Male teachers accounted for 41.9% (150) of participants and female teachers for 58.1% (208); 180 teachers (47.6%) from the Han ethnic group and 173 ethnic minority teachers (45.8%) participated in the research. Some teachers did not provide all their demographic information.

Measures

School heads' transformational leadership

School heads' transformational leadership (SHTL) was measured by teachers using the adapted Multifactor Leadership Questionnaire (MLQ-6S) (Bass and Avolio 1990). It includes four dimensions with 12 questions each. The dimensions are as follows: Idealized Influence (II) (e.g., Headmaster makes the people with her/him feel good); Inspirational Motivation (IM) (e.g., Headmaster enables us to identify and follow the vision s/he describes); Intellectual Stimulation (IS) (e.g., Headmaster encourages us to think about old problems with new ideas); and Individualized Consideration (IC) (e.g., Headmaster helps us to improve ourselves).
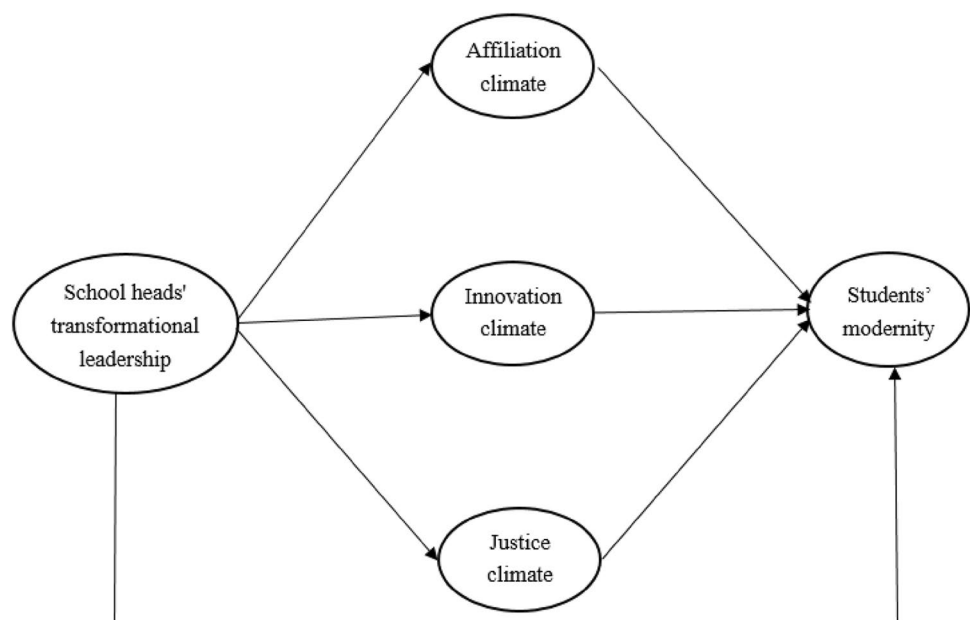
Fig. 1 Research model

Table 1 Distribution of participants by province

Province	Counties	Schools	Number of valid respondents	Percent (%)
Guangxi (42, 11.1%)	C1	S1	4	1.10
		S2	9	2.40
		S3	5	1.30
		S4	6	1.60
		S5	5	1.30
	C2	S6	5	1.30
		S7	4	1.10
		S8	2	0.50
		S9	1	0.30
		S10	1	0.30
Chongqing (149, 39.4%)	C1	S1	12	3.20
		S2	21	5.60
		S3	33	8.70
		S4	7	1.90
		S5	12	3.20
	C2	S6	5	1.30
		S7	15	4.00
		S8	1	0.30
		S9	16	4.20
		S10	26	6.90
Yunnan (57, 15.1%)	C1	S1	7	1.90
		S2	5	1.30
		S3	3	0.80
		S4	7	1.90
		S5	7	1.90
	C2	S6	3	0.80
		S7	10	2.60
		S8	3	0.80
		S9	9	2.40
		S10	4	1.10
Guizhou (104, 27.5%)	C1	S1	4	1.10
		S2	6	1.60
		S3	10	2.60
		S4	8	2.10
		S5	9	2.40
	C2	S6	9	2.40
		S7	7	1.90
		S8	23	6.10
		S9	12	3.20
		S10	16	4.20
Xinjiang (26, 6.9%)	C1	S1	18	4.80
	C2	S2	8	2.10
Summary			378	100

Students' modernity

Students' modernity (SM) was measured by teachers using a "Questionnaire of Students' modernity" (Wang 2016). This Questionnaire contains two aspects of subjectivity and sociality with eight dimensions: Justice (e.g., Every student is given equal respect in our school); Responsibility (e.g., Students try to finish the assignments given to them); Participation (e.g., Students are active in group discussion activities); Communication (e.g., Students can communicate with their friends to eliminate misunderstandings); Self-efficacy (e.g., Students believe that as long as they work hard, they can improve their academic performance); Persistence (e.g., Students think that the things that are well planned must be stuck to until the end); Openness (e.g., Students can quickly adapt to a new teacher); and Reflectivity (e.g., Whether it is a success or a failure, students will reflect on it).

School climate

School climate was measured by teachers using a "Questionnaire of School Climate," which was adapted from the Questionnaire of Organizational Climate created by Bock et al. (2005). It includes three dimensions: Affiliation climate (e.g., People in school have close relationships with each other); Innovation climate (e.g., Our school encourages members to put forward constructive opinions); and Justice climate (e.g., I believe that the school is fair to every member).

Analysis strategy

Structural equation modeling (SEM) was used in this study. It allows the simultaneous examination of specific assumptions of multiple dependent variables and is also fault-tolerant and flexible. Given that the development of students' modernity is the result of multiple factors, the degree of influence of those different factors on students' modernity will vary. Thus, to identify the key influencing factors on the dependent variable, SEM was applied as the main methodology. It was constructed on the survey data to verify the mediating effects of school climates between school heads' transformational leadership and students' modernity and to identify the key mediating factors between those two variables. SPSS21.0 and Amos21.0 were used for data processing and analysis, mainly for testing correlations among variables and the goodness-of-fit of the statistical models, and for identifying key factors and verifying the intermediary effect mechanisms.

Results

Validity and reliability of measures

As illustrated in Table 2, confirmatory factor analysis (CFA) showed that the fit statistics ($\chi^2/df < 5$, RMR = < 0.05, RMSEA < 0.08, GFI > 0.9, NFI > 0.9, IFI > 0.9, TLI > 0.9, CFI > 0.9) for school heads' transformational leadership, students' modernity, and school climates strongly supported their structures. Reliability tests showed that the Cronbach's alpha coefficients of school heads' transformational leadership, students' modernity, and school climates were 0.916, 0.890, and 0.913, respectively. All three questionnaires showed good validity and reliability.

Test of common method bias

Common method bias refers to artificial co-variation generated between a predictive variable and a targeted variable resulting from data with the same origins or grader and measuring environment and project context. A test of common method bias was conducted using Harman's one-factor test (Zhou and Long 2004). Variable topics like school heads' transformational leadership, school climates, and students' modernity are typically assessed using exploratory factor analysis (EFA), to test the size of the interpretation ratio of the first common factor in unrotated factor analyses. The results of EFA in this study showed that the interpretation ratio of the first common factor was 25.621%, which is obviously less than 40%. The confirmatory factor was further adopted and set common-factor number as 1. These results showed that the fit index was not satisfactory ($\chi^2/df = 5.892$, RMSEA = 0.11, NFI = 0.79, TLI = 0.82, CFI = 0.82). These two methods revealed that there was no serious common method bias in this research and that it was suitable to conduct further analysis.

Correlation analysis

As shown in Table 3, teacher's background of gender and ethnics were not significantly correlated with school heads' transformational leadership, three school climates, and students' modernity. The correlation between school heads' transformational leadership and students' modernity was positively significant, $r = 0.624$, $p < .01$, and Hypothesis 1 was supported. School affiliation climate, innovation climate, and justice climate were also positively correlated with school heads' transformational leadership and students' modernity, respectively ($r = 0.489$ to 0.696, $p < .01$). The significant correlations laid a foundation of further multiple mediation effect analysis.

Measurement model

In order for the structural portion of a structural regression model to be identified then, its measurement portion must be identified (Kline 2010). Bollen (1989) describes this requirement as the two-step rule. Confirmatory factor analysis (CFA) showed that the fit statistics ($\chi^2/df = 1.722$, RMSEA = 0.044, NFI = 0.943, TLI = 0.970, CFI = 0.945) strongly supported the measurement model (Fig. 2).

Table 2 Fit statistics of the three questionnaires

Questionnaires	χ^2/df	RMR	RMSEA	GFI	NFI	IFI	TLI	CFI
School heads' transformational leadership	4.475	0.043	0.076	0.912	0.912	0.930	0.901	0.929
Students' modernity	2.365	0.043	0.036	0.947	0.900	0.940	0.930	0.939
School climates	4.836	0.024	0.071	0.916	0.937	0.949	0.928	0.949

Table 3 Correlation analysis

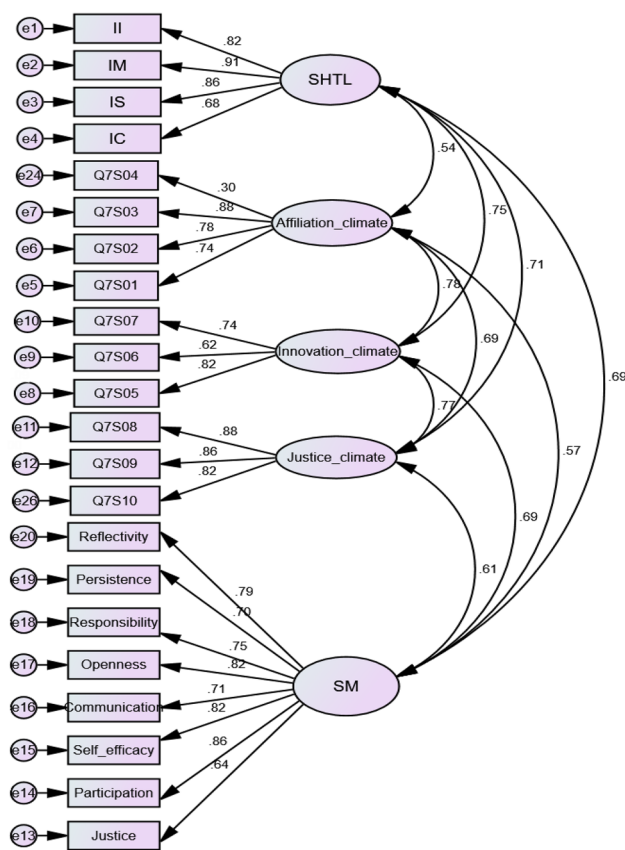|	1	2	3	4	5	6	7
1. Ethnic	1						
2. Education	0.038	1					
3. School heads' transformational leadership	− 0.063	− 0.045	1				
4. Affiliation climate	0.020	− 0.017	0.489**	1			
5. Innovation climate	− 0.089	− 0.089	0.626**	0.623**	1		
6. Justice climate	0.006	− 0.055	0.696**	0.615**	0.679**	1	
7. Students' modernity	− 0.028	− 0.013	0.624**	0.400**	0.485**	0.460**	1

**p < .01

Fig. 2 Measurement model

Structural regression model

Preacher and Hayes (2008) suggest that the traditional three-step regression is not suitable for the test of multiple mediating effects and that a path coefficient product should be used. Given that the three mediating variables in this study could have significant correlations, the method of SEM was adopted to test the multiple mediating effects

of school climates. The partial multiple mediating effect was first examined, which was the influence of school heads' transformational leadership on students' modernity through school climates, while allowing school heads' transformational leadership to have a direct impact on students' modernity. As Table 4 shows, all the fit indexes were ideal, which indicated that partial mediation effect fit the data. Next, the complete mediation effect model was tested by removing the direct influence of the school heads' transformational leadership on students' modernity. Table 4 shows that the fit indexes of the full mediation model significantly deteriorated. Using a likelihood ratio test of nested models, the suggestions offered by Wen, Hau, and Marsh (2004) for big sample Chi-square test were followed: when $N \leq 150$, $p = .01$; when $N = 200$, $p = .001$; when $N = 250$, $p = .0005$; when $N \geq 500$, $p = .0001$. The size of the sample in this study was 378, therefore, when $p < .0005$, these two models could be thought of as significantly different. The index ($\triangle \chi^2 = 12.897$, $\triangle df = 1$, $p < .001$) in Table 4 positively supports their significant difference. Meanwhile, in the partial mediating effect model, the effect of transformational leadership on students' modernity was still significant, $\beta = 0.35$, $p < .01$. Both of the above results gave us reason to accept the partial mediation model.

As shown in Fig. 3, school heads' transformational leadership had a positive effect on affiliation climate ($\beta = 0.60$, $p < .001$), innovation climate ($\beta = 0.78$, $p < .001$), and justice climate ($\beta = 0.73$, $p < .001$), so Hypotheses 2a, 2b, and 2c were supported. School affiliation climate ($\beta = 0.13$, $p < .05$), innovation climate ($\beta = 0.20$, $p < .05$), and justice climate ($\beta = 0.16$, $p < .05$) had positive effects on students' modernity, so Hypotheses 3a, 3b, and 3c were supported.

To more intuitively analyze the role played by the mediating variables, we calculated and situated the mediation effect and the indirect effect. As shown in Fig. 3, affiliation climate, innovation climate, and justice climate played mediating roles between school heads' transformational

Table 4 Comparison of partial mediation effect and full mediation effect ($N = 378$)

Model	χ^2	df	χ^2/df	RMR	RMSEA	GFI	NFI	IFI	TLI	CFI	$\triangle\chi^2(\triangle df)$
1. Partial mediation effect model	548.734	230	2.386	0.042	0.061	0.891	0.907	0.944	0.932	0.943	
2. Full mediation effect model	561.631	231	2.431	0.043	0.062	0.888	0.905	0.942	0.930	0.941	12.897 (1)***

Path of "School heads' transformational leadership → students' modernity" was added in the partial mediation effect model, while the full mediation effect model did not have this path

***$p < .001$

Fig. 3 Test for paralleling and multiple mediating effects of school climate (*N* = 378)
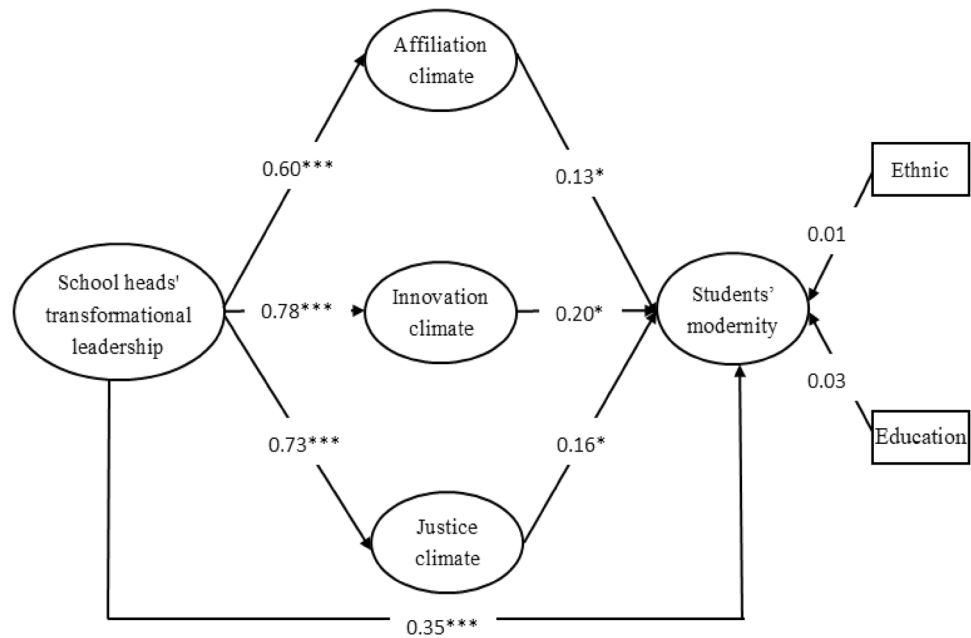
leadership and students' modernity, so Hypothesis 4 was supported. All three mediating variables accounted for 35.1% of the total indirect effects. As for individual mediating effect, innovation climate accounted for 15.6% of the total indirect effects and thus played the greatest role, followed by justice climate (11.7%) and affiliation climate (7.8%).

Discussion

School heads' transformational leadership can significantly predict the school climates

This is similar to the results reported in existing research (McCarley et al. 2016; Engels et al. 2008; Leithwood et al. 1999). The school climate reflects the mental outlook and personality of a school, and the individual's psychology and behavior are deeply influenced by it. Behind the affiliation climate is a high level of commitment or loyalty. This kind of commitment or loyalty is similar to a psychological contract between individuals and the school, reflecting the individual recognition of school and participation in school development (Adeyemi 2008). Existing research also shows that transformational leadership is conducive to enhancing the level of commitment of members, is conducive to enhancing the members' faith and acceptance of the organization's goals and values, and is willing to make extraordinary efforts in the interests of the organization (Yousef 2000). School heads' transformational leadership is committed to building a caring school that respects and protects the fundamental rights and interests of students, respects the law of physical

and mental development of children, and strives to consider problems from the children's perspective, and is committed to shaping a safe and caring environment in which children and their parents are encouraged to participate; all of these characteristics are conducive to shaping trust in and ownership of the school climate (Ballard 2008).

Transformational leadership also facilitates the formation of an innovative school climate. An important responsibility of a school head who enacts transformational leadership is to create a trustful, free, and protected school environment for faculty and to inspire them to reflect on their cognitive and behavioral patterns, all of which constitutes the basis of school education innovation (Cohen et al. 2009). Li and Ling (2008a, b) point out that one of the important features of transformational leadership is to create an organizational environment and climate that encourages their member's innovation and allows members to fail. Their members are emboldened to explore and to try innovative methods to perform their tasks, without fear of being punished for failure. By setting up a long-term vision, the transformational leader also inspires passion in their members, improves their morale, communicates often with members, and provides guidance and support through their difficulties (Engels et al. 2008).

Transformational leadership is also conducive to the formation of a just school climate. School transformational leaders pay particular attention to equity, ethics, and value issues, which have a clear moral role for members in creating a fair school climate in which members feel they are treated fairly. Through the concept of inclusion, they are able to respect the possibilities and particularities of each

child's development (Liu et al. 2013). They believe that every child is a living person who is in a thriving development; they accept every student and help them overcome barriers to participate in the school, so that those children who are in disadvantaged environments will enjoy harmonious development of physical and mental health with the help of teachers and other students.

School climates have positive effect on students' modernity

School education is the most important factor influencing students' modernity (Holsinger and Theisen 1977; Inkeles 1983). Furthermore, interacting with their school environment is a key part of the modernization process (Daniel 1965); individual independence, persistence, and openness are often the by-products of these interactions (Robert 1968). Those who have a longer educational experience are not only knowledgeable but also tend to be more actively involved in the activities of the regional community. They are willing to accept new ideas, to be exposed to new things, and are more concerned about subordinates and ethnic minorities. School climate is also an important place for the formation of students' subjectivity (Chu 2013). Good school climate affords spaces in which students are encouraged to reflect on their thinking and become more tolerant of their mistakes. Thus, their personalized thinking is inspired, their mind and vision is opened up, they gradually become more curious and explore the outside world, while continuously thinking and questioning, so that their thinking ability expands (Inkeles 1983).

The school is also an important place for children's socialization. In a good school climate, children can learn to adapt and meet with teachers and other children, learn to restrain themselves, participate in various activities guided by the teacher, and communicate with other children, all of which expands children's contacts outside their family, facilitates the formation of good relationships between teachers and students, and has a positive meaning (Eshbach and Henderson 2010). Empirical studies have found that teachers' care and their close relationship with students significantly predict students' social skills and social participation. The ability to adjust socially and emotionally is also higher in students who have good teacher–student relationships and peer relationships (Murray and Greenberg 2000), which helps them handle relationship with ease in society. Further, participation plays an important role in the social and personal development of students, as it enables them to gain valuable experience in making difficult choices, to gain a sense of conquest and control, and to develop the quality of altruism, thus establishing an encouraging pattern from which they can

continue to benefit (Fletcher et al. 2000). Once this cycle is formed, students are able to show maturity in personality and cognition and to make responsible decisions in school activities. They feel that they are part of the school and are accepted, and they form intimate relationships with other members of the school; thus a sense of their responsibility toward the school is promoted.

School climates play multiple mediating roles between school heads' transformational leadership and students' modernity

As mentioned earlier, the influence of school heads on student development is often indirect, but there are key points in this long relationship sequence, and the school climate is one of them. This study found that the school climates played significant intermediary roles between school heads' transformational leadership and students' modernity. This means that the school climate is the key element in the developmental process of modern students. When describing a vision for the future of their school, encouraging teachers and students to reflect, and giving them care, it is necessary to attach importance to these factors in combination with the school climate, and to pay attention to the establishment of innovation, affiliations, and justice climates.

Results showed that these three mediating variables accounted for 35.1% of the total indirect effects and had a partial mediating effect on the relationship between school heads' transformational leadership and students' modernity. This indicates that compared with the full mediating effect, the partial mediating effect model is more appropriate and more mediating variables should be explored. As for individual mediating effects, the innovative climate accounted for over 15.6% of the total indirect effects, making it the most important intermediary climate.

This means that school heads should try to establish a harmonious school climate with a high level of innovation, affiliation, and justice to facilitate students' modernity development, with special focus on the innovation climate. In Sergiovanni's (2004) view, promotion of unique school climate transform is the fifth leadership of school heads. School heads plays a critical role in building and improving the school climate in view of students' modernity. School heads should thus take a firm position on school climate establishment to forestall controversy, and to show the value of paying attention to the care of all students and of the far-reaching significance of climate construction, so that an orientation to modernity is reflected in all aspects of the school (Bencivenga and Elias 2003).

Equivalent and alternative models

When compared with the equivalent model of "student modernity → school climates → school heads' transformational leadership," the model in this research is more applicable and has greater theoretical explanatory power. Although the path–goal theory holds that a leader's leadership style can be changed in different situations, and leaders will lead differently in different situations, this theory applies more to the "leader–member" relationship of adult groups. The personality and psychological development of primary and secondary school students is far from fully developed, and is more influenced by "important others" in school. Therefore, the top-down influence is the main mode in the primary and secondary school environment. In the traditional mode of Oriental Confucianism especially, "honouring the teacher and respecting his teaching," the influence transmission from top to bottom is more important than that from bottom to top.

In order to explore the influence mechanism of school heads' leadership on the development of students' modernity, more alternative models need to be further compared and verified. As the results of this study show, school climate only plays a partial mediating role between school heads' leadership and student modernity, and more mediating variables need to be considered. In Hallinger's (1996) proposed model of "indirect impact of school heads' leadership on students' development," the impact of the school heads was also exerted through students' significant others (especially the teachers) and their practices except school environment. This indicates that more attention should be paid to other mediating variables such as teacher quality and their teaching activities.

Contributions and recommendations

This research advances knowledge on the school climates that affect students' modernity and explores the formative mechanisms of that modernity. New attempts are made to study individual modernity and previous limited views focused on family, region, and individuals are expanded. School is an important place for the formation of students' modernity. While students have direct contact with their school environment, teacher qualifications, and teacher-derived learning activities, and do not have direct contact with their school head, all of these factors are affected by a school head's leadership. As a more meaningful school heads' leadership style, transformational leadership respects student subjectivity and potential more compared with traditional transactional leadership that focuses on exchange of interests and paternalistic leadership that gives the superior authoritarian control. Although transformational leadership has already established its effectiveness in fields such as enterprise and government, less evidence has been obtained in educational areas, particularly in basic education. This study has shown the positive effect of transformational leadership on school climate and students' modernity development; it is a meaningful expansion of insight in this area. As mentioned, school heads have an indirect effect on students' development, and there are key mediating variables like school climate in a sequence of relations. The results firstly suggest that school heads should abandon their negative thought pattern of regarding students as "marks" and "promotion." Instead, they should realize the significance of students' modernity development, and educate students to contribute to their country's modernization. Secondly, old leadership style should be taken place by transformational leadership style. In this case, teachers can be stimulated to meet high-level needs, and devote themselves to the cultivation of students' modernity. Thirdly, school heads are supposed to put school climate high up the agenda. Reforming measures should be taken as soon as possible. It is essential for school to provide a place of fairness, a source of innovation, and a sense of belonging. It is possible to have education with less indoctrination.

References

Adeyemi, T. (2008). Organizational climate and teachers' job performance in primary schools in Ondo state, Nigeria: An analytical survey. *Asian Journal of Information Technology, 7*(4), 138–145.

Agirdag, O., Van Houtte, M., & Van Avermaet, P. (2013). School segregation and self-fulfilling prophecies as determinants of academic achievement in Flanders. In S. D. Groof & M. Elchardus (Eds.), *Early school leaving and youth unemployment*. Amsterdam: Amsterdam University Press.

Bai, X., Lai, D. W. L., & Chow, N. W. S. (2016). Measuring older adults' individual modernity: Validation of the adapted multidimensional scale of chinese individual modernity. *SAGE Open*, 1–13.

Bain, P. G., Mann, L., & Pirola-Merlo, A. (2001). The innovation imperative: The relationships between team climate, innovation, and performance in research and development teams. *Small Group Research, 32*(1), 55–73.

Ballard, R. (2008). *Principal's leadership style and school climate as perceived by teachers in African American Christian schools in the Baltimore-Washington, DC metropolitan area*. PhD Dissertation, Capella University, US.

Bass, B. M. (1995). Theory of transformational leadership redux. *The Leadership Quarterly, 6*(4), 463–471.

Bass, B. M., & Avolio, B. J. (1990). *Transformational leadership development: Manual for the multifactor leadership questionnaire*. Palo Alto: Consulting Psychologists Press.

Bencivenga, A., & Elias, M. (2003). Academic learning thrives in a caring, sharing educational community. *Middle School Journal, 34*(5), 16–22.

Bock, G. W., Zmud, R. W., Kim, Y. G., & Lee, J. N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate. *MIS Quarterly, 29*(1), 87–111.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Chu, H. (2013). The essence and evaluation of educational modernization. *Educational research, 406*(11), 4–10 **(in Chinese)**.

Cohen, J., Pickeral, T., & McCloskey, M. (2009). The challenge of assessing school climate. *Educational Leadership, 66*(4), 1–7.

Daniel, L. (1965). *The passinft of traditional society*. NewYork: Free Press.

Day, C., Sammons, P., Leithwood, K., & Hopkins, D. (2011). *Successful school leadership and achievement: Linking with learning*. New York: McGraw-Hill International.

Ekvall, G., & Ryhammar, L. (1999). The creative climate: Its determinants and effects at a Swedish university. *Creativity Research Journal, 12*(4), 303–310.

Engels, N., Hotton, G., Devos, G., Bouckenooghe, D., & Aelterman, A. (2008). Principals in schools with a positive school culture. *Educational Studies, 34*(3), 159–174.

Eshbach, E., & Henderson, J. (2010). The symbolic relationship between new principals and the climate of the schools in which they lead. *E-Journal of Organizational Learning and Leadership, 8*(1), 16–48.

Fang, J., Chiou, H., & Zhang, M. Q. (2011). Analysis of contextual effects on multilevel structural equation modeling: Compared with multilevel modeling. *Advances in Psychological Science, 19*(2), 284–292 **(in Chinese)**.

Farmer, S. M., Tierney, P., & Kung-McIntyre, K. (2003). Employee creativity in Taiwan: An application of role identity theory. *Academy of Management Journal, 46*(5), 618–630.

Fletcher, A. C., Elder, G. H., & Mekos, D. (2000). Parent influences on adolescent involvement in community activities. *Journal of Research on Adolescence, 10*(1), 29–48.

Gong, Y., Huang, J. C., & Farh, J. L. (2009). Employee learning orientation, transformational leadership, employee creativity: The mRole of employee creative self-efficacy. *Academy of Management Journal, 52*(2), 765–778.

Gumusluoglu, L., Karakitapoğlu-Aygün, Z., & Hirst, G. (2013). Transformational leadership and R&D workers' multiple commitments: Do justice and span of control matter? *Journal of Business Research, 66*(11), 2269–2278.

Guo, G., & Duan, X. (2003). Transformational leader behavior and creativity: The mediations of intrinsic motivation and workplace climate for creativity-analysis on the management practice of Chinese companies. *Science of Science and Management of Science and Technology, 29*(3), 189–196 **(in Chinese)**.

Hallinger, P., Bickman, L., & Davis, K. (1996). School context, principal leadership, and student reading achievement. *The Elementary School Journal, 96*(5), 527–549.

Holsinger, D. B., & Theisen, G. L. (1977). Education, individual modernity, and national development: A critical appraisal. *Journal of Developing Areas, 11*(3), 315–334.

Hou, C. (2004). *Children's psychological growth theory: The socialization of children in the perspective of growth*. Nanjing: Nanjing Normal University press **(in Chinese)**.

Hoy, W. K., & Hannum, J. (1997). Middle school climate: An empirical assessment of organizational health and student achievement. *Educational Administration Quarterly, 33*(3), 290–311.

Inkeles, A. (1983). *Exploring individual modernity*. New York: Columbia University Press.

Inkeles, A. (1985). *Individual modernity*. Chengdu: Sichuan Renmin Press **(in Chinese)**.

Inkeles, A., Broaded, C. M., & Cao, Z. (1997). Causes and consequences of individual modernity in China. *China Journal, 37*(37), 31–59.

Jeewon, C., & Fred, D. (2010). Are transformational leaders fair? A multi-level study of transformational leadership, justice perceptions, and organizational citizenship behaviors. *Leadership Quarterly, 21*(3), 409–421.

Kline, R. B. (2010). *Principles and practice of structural equation modeling*. New York: Guilford Press.

Leithwood, K., Harris, A., & Hopkis, D. (2008). Seven strong claims about successful school leadership. *School Leadership & Management: Formerly School Organization, 28*(1), 27–42.

Leithwood, K., Jantzi, D., & Steinbech, R. (1999). *Changing leadership for changing times*. Buckingham: Open University Press.

Li, R., & Ling, W. (2008a). Commentary on the research of transformational leadership theory. *Soft science, 2008, 22*(2), 70–73 **(in Chinese)**.

Li, R., & Ling, W. Q. (2008b). A review of the researches on transformational leadership. *Soft science, 22*(2), 70–73 **(in Chinese)**.

Liu, Z., Xia, N., Ma, C. Q., & Wang, S. J. (2013). An empirical study on the influence of transformational leadership style on the satisfaction of employee job. *Journal of Hunan University (Social Science), 27*(2), 42–47 **(in Chinese)**.

Mayer, D., Nishii, L., Schneider, B., & Goldstein, H. (2007). The precursors and products of justice climates: Group leader antecedents and employee attitudinal consequences. *Personnel Psychology, 60*(4), 929–963.

McCarley, T. A., Peters, M. L., & Decman, J. M. (2016). Transformational leadership related to school climate: A multi-level analysis. *Educational Management Administration and Leadership, 44*(2), 322–342.

Meng, T., Liu, P., & Jing, R. (2007). The empirical research on the relation between the transformational leadership conduct and the organizational citizenship behavior based on the organizational justice. *Science Research Management, 28*(6), 123–129 **(in Chinese)**.

Murray, C., & Greenberg, M. T. (2000). Children's relationships with teachers and bonds with school: An investigation of patterns and correlates in middle childhood. *Journal of School Psychology, 38*(5), 423–445.

Pillutla, M. M., Farh, J. L., Lee, C., & Lin, Z. (2007). An investigation of traditionality as a moderator of reward allocation. *Groups and Organization Management, 32*(2), 233–253.

Pina, R., Cabral, I., & Alves, J. M. (2015). Principal's leadership on students' outcomes. *Social and Behavioral Sciences, 197*(25), 949–954.

Portes, A. (1973). The factorial structure of modernity: Empirical replications and a critique. *American Journal of Sociology, 79*(1), 15–44.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879–891.

Robert, D. (1968). *On what is learned in school*. Reading: Addison-Wesley Publishing Co.

Robinson, V. M. J., Lloyd, C. A., & Rowe, K. J. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational administration quarterly, 44*(5), 635–674.

Salancik, G. R., & Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly, 23*(2), 224–253.

Schnaiberg, A. (1970). Rural urban residence and modernism: A study of Ankara Province, Turkey. *Demography, 7*(1), 71–85.

Sergiovanni, T. J. (2004). *The principalship: A reflective practice perspective*. Boston: Administrative Organization.

Tian, F. (2011). The principal's personality charm and cultivation. *Journal of Hebei Normal University (Philosophy and social science), 6*, 246–248 **(in Chinese)**.

Wang, S. T. (2016). *A study on the effect mechanism of Principal Transformational Leadership on students' modernity*. Xi'an: Xi'an Jiao Tong University press **(in Chinese)**.

Wang, S. T., & Tian, L. X. (2016). Principal leadership and students' modernity development: A case study of schools in western China. *Journal of East China Normal University (Educational edition), 34*(1), 84–89 **(in Chinese)**.

Weithorn, L. A. (1998). Youth participation in family and community decision making. *Family Futures, 2*(1), 6–9.

Wen, Z. L., Hau, K. T., & Marsh, H. W. (2004). Structure equation model testing: Cutoff criteria for goodness of fit indices and chi-square test. *Acta Psychological Sinica, 36*(2), 186–194 **(in Chinese)**.

Wu, X. (2013). The effects of transformational leadership on employees' organizational commitment. *Commercial Research, 435*(7), 99–108 **(in Chinese)**.

Xia, Y. (1998). The college student's modernity and tradition of the personality and their relationship with mental health. In X. H. Yang (Ed.), *A new review of Psychology*. Nanjing: Nanjing Normal University Press **(in Chinese)**.

Xie, J. L., Schaubroeck, J., & Lam, S. (2008). Theories of job stress and the role of traditional values: A longitudinal study in China. *Journal of Applied Psychology, 93*(4), 831–848.

Yang, G. (1989). *Chinese psychology and behavior*. Taiwan: Laurel book publishing company. **(in Chinese)**.

Yogev, A. (1987). Modernity and ethnic affiliation in Israeli schools: A dependence approach. *Ethnic and Racial Studies, 10*(2), 203–223.

Yousef, D. A. (2000). Organizational commitment: A mediator of the relationships of leadership behavior with job satisfaction and performance in a non-western country. *Journal of Managerial Psychology, 15*(1), 6–24.

Yu, H., Leithwood, K., & Jantzi, D. (2002). The effects of transformational leadership on teachers' commitment to change in Hong Kong. *Journal of Educational Administration, 40*(4), 368–389.

Yu, S., & Chen, Y. (2014). A study on the social communication and cross cultural adaptation of Africans in China. *Journal of Northeast Normal University (Philosophy and Social Sciences), 269*(3), 245–248. **(in Chinese)**.

Zhan, X. H. (2013). Investigation report on teaching points of "One Teacher, One School" in Wuyuan county. *Theoretical Guide, 8*, 31–32 **(in Chinese)**.

Zhang, X. (2008). Research on the transformation of principal role: Based on the theory of transformational leadership of Burns. *Educational Development Research, 5*, 46–50 **(in Chinese)**.

Zhang, X. (2017). The connotation of organizational justice climate and its impact on work outcomes. *Modern enterprise, 5*, 32–33.

Zhang, X. G., & Zheng, X. (2002). A comparative research on adolescent's modernity in personality between town and countryside. *Psychological Development and Education, 18*(3), 6–11 **(in Chinese)**.

Zhang, Z., & Chen, W. (2011). A comparative study of the relationship between transactional leadership, transformational leadership and organizational climate. *Economic Herald, 11*, 85–86 **(in Chinese)**.

Zhong, Y. P., Lu, G. S., & Wei, X. L. (2005). The effects of individual modernity on the demand for higher education among senior secondary students. *Peking University Education Review, 3*(4), 38–49 **(in Chinese)**.

Zhou, H., & Long, L. (2004). Statistical remedies for common method biases. *Advances in Psychological Science, 12*(6), 942–950 **(in Chinese)**.

Zhu, W., Sosik, J., Riggio, E., & Yang, B. (2012). Relationships between transformational and active transactional leadership and followers' organizational identification: The role of psychological empowerment. *Leadership and Organizational Identification, 13*(3), 186–213.