Links between Chinese vocational school students’ perception of parents’ emotional support and school cooperation climate and their academic performance: The mediating role of school belonging

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The role of social environmental factors on student academic achievement has been conceptualized from the perspective of the ecological system theory. In the present study, a strengths-based approach derived from the theory of positive youth development was adopted to explore the two favorable aspects of proximal social environments, including parents’ emotional support and school cooperation climate, and to examine how these two factors influence the academic performance among Chinese senior-secondary vocational school students. Participants were 1,940 students (55.4% male) who took part in the Programme for International Student Assessment (PISA) 2018 test from four regions in China. The students completed the questionnaires to assess parents’ emotional support, school cooperation climate, school belonging, and academic performance. By adopting the structural equation model, the results revealed that school belonging fully mediates the association between parents’ emotional support and academic scores, and the association between school cooperation climate and academic scores. In addition, multiple group comparison analyses showed there were some gender differences in the relationships between school cooperation climate and academic performance. The practical significance of the influence of parental support and school cooperation climate on student academic achievement was also discussed.

KEYWORDS
school belonging, academic performance, parental emotional support, school cooperation climate, vocational school students, China

Introduction

As the equalizer of social equity, the development of vocational education has been a concern for all sectors of society. Students in China, after 9 years of compulsory education, are generally admitted to secondary vocational schools through the results of the high school entrance examination. Students who attend secondary vocational schools perform
worse than those who attend academic senior high schools. In 2020, there were about 16,633,700 students in secondary vocational schools in China, accounting for about 40 percent of the total number of students in senior high schools (Ministry of Education of the People's Republic of China, 2021). According to a survey of Chinese secondary vocational students in 2020, about 65% of 16,900 secondary vocational graduates would continue their studies in institutions of higher learning, which has become the main destination of secondary vocational graduates (Tian, 2022). The academic performance of secondary vocational students deserves attention.

In April 2022, the Chinese government passed an amendment to the Vocational Education Act, highlighting the importance of vocational education to Chinese contribution to global economic and social development. The amendment focuses on the cultivation of quality and student development in vocational education. Studies in western societies (such as Germany, Greece, Italy, Croatia, Austria, and other countries) showed that the academic performance of students in secondary vocational education was often relatively weak (Hanushke and Woessmann, 2006; Kuzminina and Carnoy, 2016). Studies in China showed similar results (Xu, 2015; Loyalka et al., 2016). In terms of the influencing factors of students' academic performance in secondary vocational education, most of the existing studies focused on the influence of family socioeconomic status (Loyalka et al., 2016) and parents' educational level (Xu, 2015). Less attention has been paid to social-psychological environmental factors.

The Positive Youth Development Theory emphasizes that socially environmental support is of great significance in adolescent development (Lerner et al., 2005). The positive youth development (PYD) approach moves beyond the negative, deficit focused view of youth (e.g., psychopathology and problem behaviors) and emphasizes the strengths of youth, and their positive qualities and outcomes (Lerner et al., 2009). Adolescents' positive development is defined as a process in which an individual's ability to positively interact with the social environment is constantly improved (Guo et al., 2017). In this process, positive social environmental factors play a key role in individual development. Researchers have found that school factors (e.g., school belonging, and group identification at school) and family factors (parent support) both have a positive predictive effect on academic performance based on the frameworks of The Positive Youth Development Theory (Paricio Herrera et al., 2020; Burns et al., 2022). In addition, the environmental factors of academic performance have been conceptualized from the perspective of ecological system theory (Bronfenbrenner, 1979). The theory posits that human development occurs in ecological systems, where the individual interacts with various environments. According to Ecological System Theory (Bronfenbrenner, 1979), the proximal environmental subsystems, such as family and school, play an important role in individual development (Lippert et al., 2019; Gao et al., 2020). School factors and family factors have been found to be closely related to students' academic performance under the framework of Ecological System Theory (Liu Teng and Zhu, 2019; Kim Sanders et al., 2020).

Therefore, this study attempts to explore the impact of family and environmental factors on the academic performance of secondary vocational students in China.

Parents' emotional support refers to the emotional support parents provide to students in the learning process [Organisation for Economic Cooperation and Development (OECD), 2019] and is a crucial part of students' family environment. Researchers have found that parents' emotional support has a positive predictive effect on academic performance among primary school students (Côté et al., 2014), middle school students (Song et al., 2015), and college students (Li et al., 2022). But few studies have explored such relationship patterns among secondary vocational students.

School climate includes the social environment, social interaction, and social norms related to school and learning (Anderson, 1982), including the student–student relationship, the teacher-student relationship, commons values, and other dimensions (Lee et al., 2017). School climate has been shown to be related to students' academic development (Berkowitz, 2021; Demirtas-Zorbaz et al., 2021). School cooperation climate is the evaluation of students for their school cooperation tendency [Organisation for Economic Cooperation and Development (OECD), 2019] and is an important part of school climate. A higher level of school cooperative climate has been shown to be associated with better academic performance of students (Scheerens et al., 2013; Schachner et al., 2021).

School belonging is the feeling of being accepted, respected, included, and supported in the school environment (Goodenow and Grady, 1993). School belonging has been seen as an important factor in academic performance. Some studies focused on the direct impact of students' school belonging on their academic performance (Korpershoek et al., 2020; Tan et al., 2022), and other research has further explored the mediating role of school belonging on the relationships between family and school factors and students' academic performance. Studies on the mediating role of school belonging have shown that parent involvement can influence the academic performance of middle and high school students (Kuperminc et al., 2007), that peer cooperation can influence academic performance of American middle school students (Knisled et al., 2018), and that school climate can influence academic performance among Chinese middle school students (Huang, 2022). However, few studies focus on vocational students.

In addition, researchers have been concerned about gender differences in the academic performance of students (Reilly et al., 2019; Steegh et al., 2019), and research has shown that there are gender differences in the academic performance of vocational education students (Lovat and Darmawan, 2019). Gender is an important moderating variable in studies on the impact of family and school factors on students' academic performance (Guo et al., 2018). In addition, gender is an important moderating variable in the relationship between school factors and students' academic performance (Hughes and Coplan, 2018). Therefore, it is necessary to compare gender differences in the relationship between research variables.
Research on the influence of family and environmental factors on students’ academic performance mostly focused on students in basic education and academic-oriented schools, but few on students in vocational education. Some researchers have paid attention to the influence of family socioeconomic status and school conditions (e.g., expenditure level) on students’ math or computer performance (Zhang, 2017; Li et al., 2020), but these studies mostly focused on the influence of material or economic conditions, and have not involved parents’ emotional support, school climate and students’ psychological factors. In addition, some studies on Chinese secondary vocational education students indicated that students’ parents have weak emotional support and students have a weak sense of belonging to school (Liu and Geng, 2018; Huang, 2020). This line of research explored parents’ emotional support and school climate, but did not further examine the impact of these factors on students’ academic performance. These factors are momentous aspects that affect students’ academic performance, and vocational education students are no exception. In this regard, this study focuses on vocational education students in China, expecting to contribute to and enrich vocational education research within the framework of the Theory of Positive Youth Development and the Ecological Systems Theory.

Based on the frameworks of the Ecological Systems Theory and the Theory of Positive Youth Development, the present study used the Programme for International Student Assessment (PISA) 2018 data from four regions in China to investigate the influence of parents’ emotional support and school cooperation climate on the academic performance of secondary vocational students, and explored the mediating role of students’ school belonging. This study also compared the gender differences in the relationship between the variables. The main research hypotheses are as follows:

1. Parents’ emotional support and school cooperation climate would be directly related to the academic performance among secondary vocational students.
2. Parents’ emotional support and school cooperation climate would indirectly influence the academic performance of secondary vocational students through the mediating role of school belonging.
3. Gender would moderate the role of parents’ emotional support and school cooperation climate on the academic performance of secondary vocational students.

Materials and methods

Participants

The PISA 2018 test was conducted in four cities in China [Beijing, Shanghai, Jiangsu, and Zhejiang; Organisation for Economic Cooperation and Development (OECD), 2019]. The PISA program is a large-scale international student assessment program conducted by the Organization for Economic Cooperation and Development (OECD) since 2000 to investigate the cognitive abilities of 15-year-old students in reading, mathematics, science, and other aptitudes with mature measurement tools, and high data reliability [Organisation for Economic Cooperation and Development (OECD), 2019]. The full sample included 12,058 students from 361 schools. This study firstly selected secondary vocational students, and obtained 2,088 valid samples of secondary vocational students without outliers. Since the ages of PISA samples were concentrated in 15–16 years old, most students of this age were in the year one of senior high school in China. To ensure the validity, this study sample comprised students in year one of secondary vocational school, totaling 1,940 students (55.4% male). Nearly 50% of the students attended schools in urban areas with a population of more than 1 million. The average family socioeconomic level (ESCS) score for the student sample was −0.82 (the OECD average was 0). Nearly 15% of the students’ parents had received an undergraduate education or above. The percentage of missing variables in the study samples ranged from 0 to 0.4%, and there was no case wherein half the variables were missing. The results of Little’s MCAR test showed that the data met the hypothesis of MCAR ($\chi^2 (df = 49) = 52.635, p = 0.335$). Missingness was handled via full information maximum likelihood in the following analyses.

Measures

School belonging

School belonging was measured by the scale of the sense of belonging to school [Organisation for Economic Cooperation and Development (OECD), 2019]. There are three items rated on a 4-point Likert scale ranging from “1” (strongly agree) to “4” (strongly disagree). An example item is “I feel like an outsider (or left out of things) at school.” Cronbach’s $\alpha$ is 0.801.

Parents’ emotional support

Parents’ emotional support was measured by the scale on the perception of parental emotional support [Organisation for Economic Cooperation and Development (OECD), 2019]. There are three items rated on a 4-point Likert scale ranging from “1” (strongly disagree) to “4” (strongly agree). An example item is “My parents support my educational efforts and achievements.” Cronbach’s $\alpha$ is 0.903.

School cooperation climate

School cooperation climate was measured by the scale on the perception of cooperation in school [Organisation for Economic Cooperation and Development (OECD), 2019]. There
are three items rated on a 4-point Likert scale ranging from "1" (not at all true) to "4" (extremely true). An example item is "It seems that students are cooperating with each other." Cronbach's $\alpha$ is 0.935.

### Academic performance

Student academic performance was measured based on reading literacy, mathematics literacy, and science literacy [Organisation for Economic Cooperation and Development (OECD), 2019]. In the PISA 2018 test, all reading, mathematics, and science literacy scores are converted into standardized scores with a mean value of 500 and a standard deviation of 100 based on the sample levels of participating OECD countries. In this study, the first plausible value of students' reading, mathematics, and science literacy was used for data analysis. Cronbach's $\alpha$ value of the test scores of the three subjects is 0.910.

### Background variables

The questionnaires of the PISA 2018 include some important demographic variables. Gender and the index of economic, social, and cultural status (ESCS) were selected in this study. Gender is the gender information reported by students. In this study, "1" is male, and "0" is female. The ESCS is a score obtained by factor analysis of family possessions, parents' education, and parents' highest occupational status. The mean and standard deviation of ESCS in OECD countries or economies are 0 and 1, and it is an important reflection of students' social and economic status.

### Data analysis

The data analysis includes three parts. First, we reported the descriptive statistics and correlation results. Second, the structural equation model (SEM) was used to explore whether parents' emotional support, school cooperation climate, and school belonging were related to students' academic performance and whether the role of parents' emotional support and school cooperative climate on students' academic performance were mediated by school belonging. Finally, the gender differences in the relationship between variables were explored by using the multiple groups comparison analyses.

The SEM was used to analyze the relationship between variables; it is suitable for analyzing the complex relationship with multiple variables and can effectively control the influence of measurement errors. When the root mean square error of approximation (RMSEA) of the model is lower than 0.08 and the comparative fit index (CFI) and the Turkey-Lewis index (TLI) are higher than 0.90, the model is considered a good fit. The standardized factor loadings for any items in the model should be higher than 0.40. $\Delta \chi^2$ and $\Delta df$ were used in the multiple groups comparison. The data analysis was via Mplus 8.3 (Muthén and Muthén, 2017).

### Results

#### Descriptive analysis

Descriptive statistics and correlation analysis results of the variables are shown in Table 1. Correlation analysis results showed that there were significant positive correlations among the variables.

#### SEM analysis

The SEM model was used to explore the relationship between variables. The model structure is shown in Figure 1, and the model fits well (CFI = 0.981, TLI = 0.976, RMSEA = 0.046, $\chi^2 = 366.000, df = 71, p < 0.001$). The results of direct effect analysis showed that neither parents' emotional support nor school cooperative climate had significant predictive effects on academic performance, while school belonging had significant positive predictive effect on academic performance. Parents' emotional support and school cooperation climate both positively predicted school belonging. Therefore, the first hypothesis (i.e., parents' emotional support and school cooperation climate would be directly related to the academic performance among secondary vocational students) was not supported.

To test the mediation effects, the bootstrap method was used to test indirect effects, and 1,000x random sampling was used for standard error estimation. The results showed that the effect size of the parents' emotional support—school belonging—academic performance pathway was 0.028 ($p < 0.01, 95\% CI: [0.010, 0.048]$), and that parents' emotional support significantly predicted students' academic performance through the mediating role of school belonging. The results also showed that the effect size of the school cooperation climate—school belonging—academic performance pathway was 0.015 ($p < 0.01, 95\% CI: [0.006, 0.029]$), and that school cooperation climate significantly predicted students' academic performance through the mediating role of school belonging (see Figure 1). Therefore, the second hypothesis (i.e., parents' emotional support and school cooperation climate) would indirectly influence the academic performance of secondary vocational students through the mediating role of school belonging was supported.

#### Multigroup comparison

The gender of students was used as a grouping variable to compare the gender differences. Model 0 is the model in which all path coefficients of the structural model were estimated freely. Model 1 to Model 5, respectively, defined that the relationship...
The results showed that there were significant gender differences in the relationship between school cooperation climate and academic performance, between school belonging and academic performance, between parents’ emotional support and school belonging, and between school cooperation climate and school belonging. Model 6 defined that the above five relationship paths were equal. Table 2 shows the comparison between each model and Model 0.

The results showed that there were significant gender differences in the relationship between school cooperation climate and academic performance (γ = 0.110, p < 0.05), though for boys, school cooperation climate had no significant effect on academic performance (γ = −0.006, p > 0.05). In other paths, the model did not become significantly worse if the path coefficients of male and female students were set equally. Therefore, there were no significant gender differences in the relationship between parents’ emotional support and academic performance, between school belonging and academic performance, between parents’ emotional support and school belonging, between school cooperation climate and school belonging. Therefore, the third hypothesis (i.e., gender would moderate the role of parents’ emotional support and school cooperation climate on the academic performance of secondary vocational students) was partially supported.
Discussion

The present study is one of the few studies that focus on the relationship between parent’s emotional support, school cooperation climate, school belonging, and students’ academic performance among secondary vocational school students. The findings of the study align with the research hypothesis derived from the Theory of Positive Youth Development and the Ecological System Theory. It was found that both parents’ emotional support and school cooperation climate were positively correlated with students’ perception of school belonging, which in turn affected their academic performance. This implies that students with higher parental emotional involvement and a more cooperative school climate enhances their sense of school belonging and further improves their performance in science, reading, and math. This finding reveals that school belonging fully mediates the association between environmental factors (parents’ emotional support, school cooperation climate, etc.) and students’ academic performance.

This is consistent with the findings of other studies that students’ school belonging plays a mediating role in the relationship between school bullying and academic performance (Huang, 2022). A learning environment that offers encouragement and achievement opportunities can enhance the development of a positive self-image, which can result in higher achievement (Mitchell and Conn, 1985; Roeser et al., 1996; Sánchez et al., 2005). Moreover, there was no direct effect of parents’ emotional support and school cooperation climate on students’ academic performance, which highlights the importance of school belonging to students’ academic performance. In terms of the effect size of the indirect effects, parents’ emotional support had a greater effect on secondary students’ academic performance relative to school cooperation climate.

Through an analysis of the above effects on different gender groups, the study found that in terms of the direct effect, school cooperation climate has a significant and positive impact on girls’ academic performance, while it has no such impact on boys’ performance. The result means that girls may benefit more from a positive and cooperative school climate and may face certain challenges due to a competitive school climate. This may be related to difference in socialization development between boys and girls. Girls always exhibit more conformity and obedience traits in school (Ding and Hall, 2007) and are more susceptible to the school climate. In school behaviors, girls show stronger and more persistent engagement compared to boys (Li and Lerner, 2011), which may lead to better performance. In terms of the indirect effect, there is no significant gender difference, and both parents’ emotional support and school cooperation climate positively predict boys’ and girls’ sense of school belonging, which further positively predict their academic performance. These findings may make significant contributions and enrichment to the existing literature on the psychological study of vocational education students.

The findings of the study have many policy implications. In China, most secondary vocational education students are diverted to the vocational track after competitive failures in highly selective academic examinations. For these academically lagging students, parents’ emotional support, a cooperative school climate, and a sense of school belonging are important influences on their academic performance. China is a society that emphasizes academic achievement. Entrance to secondary vocational education has been long considered as failure in academic domains, and children’s poor academic performance may discourage parents. Against this background, education for parents of secondary vocational school students should be strengthened. It is necessary to encourage parents to give more emotional support to children who did not perform well in the past and lead them to believe that parental support can promote their children’s performance in the secondary vocational schools.

Vocational schools may need to launch various types of programs to facilitate cooperation among students and promote a cooperative, win-win campus culture. Effective intervention measures might be taken to enhance students’ sense of school belonging, such as providing curriculum resources including additional classes to help students adapt to life and study in high schools. Considering the gender difference, as Hackett et al. (1992) have mentioned, attention should be paid to the perceived stress and strain of girls, and more encouragement and support should be given by teachers and counselors to help girls make academic progress.

This paper is that it is one of the first to analyze the effect of parents’ emotional support and school cooperation climate on secondary vocational students’ sense of school belonging and their academic performance. The results of the study revealed the
importance of school belonging for secondary vocational education students. Previous studies in Belgium and the United States have found that students in vocational schools have lower sense of belong (Smerdon, 2002; Van Houtte and Van Maele, 2012) and learning involvement (Van Houtte and Stevens, 2009) than academic school students. However, few studies have examined the relations between school belonging and academic achievement among vocational students and its mediating effect. This paper is an enrichment of the Positive Youth Development and the Ecological System Theory, as well as an enrichment of the study of learning in secondary vocational education.

In addition, it also explored the effect of home and school climate on students' sense of school belonging and emphasized that students' school belonging not only needs to be enhanced by the school environment, but also by parents who provide a high level of emotional support for their children at home. This can help children develop a sense of security at school outside of the home (Chen, 2017; Chen et al., 2019), which leads to an increased sense of school belonging.

Limitations

There are several limitations to the current study. Firstly, the study used cross-sectional data to explore the correlations between different factors. Secondly, the findings apply only to secondary vocational schools in eastern China, and whether the conclusions are valid for the central and western regions remain to be verified. The PISA 2018 survey in China only covered four regions, including Beijing, Jiangsu, Zhejiang and Shanghai, where the school facilities and the teaching quality of secondary vocational schools are generally much better than those in central and western China. Thirdly, the academic performance of vocational education students is measured by reading literacy, mathematical literacy and science literacy, which may be not comprehensive enough. In order to reflect the characteristics of vocational education in China, we should add the scores of specialized skills courses to the dependent variables to assess the academic level of vocational education students. Fourthly, the research focused on 15-year-old high school freshmen, and the findings were obtained from this sample. The perceived school climate is significantly different across grades and ages (Ding and Hall, 2007). Sánchez et al. (2005) found that for high school seniors who were considering their future plans, school belonging is less salient in predicting their grades; in contrast, sense of belonging is more likely to play a role in predicting the performance of younger students, such as 1st- or 2nd-year high school students. Their conclusions are consistent with the findings of this paper. Finally, this study was conducted on secondary school students in the context of China's national conditions and culture. In countries with different cultures and different educational systems, gender plays a different role in predicting the relationship between school environmental factors and students' academic achievement (Legewie and DiPrete, 2012; Eugene, 2020).

Future direction

There are several recommendations for the future studies. Firstly, longitudinal data can be used to analyze the casual effect of parents’ emotional support, school climate and school belonging on the academic performance among Chinese vocational students. Secondly, future studies can collect and analyze the data of secondary vocational education students in regions with different levels of economic development and cover vocational schools with different quality levels in China, which can obtain more representative research results. Thirdly, the academic performance of secondary vocational students should not be limited to their academic scores, professional course scores and qualification certificates should also be included in the academic performance, and the academic performance of secondary vocational students can be reflected more comprehensively through multiple indicators. Fourthly, future studies can explore the relationship between the relevant variables of senior secondary vocational students, and the results can also be compared with those of lower grades. Finally, cross-cultural comparative studies based on large-scale international tests can be used to compare differences between countries and cultures in relation to relevant variables in the future.

Conclusion

In summary, this study adds to the literature about the factors that influence academic performance among Chinese vocational school students. In support of the Ecological Systems Theory and the Theory of Positive Youth Development, this study showed evidence of school belonging as a mediating variable between parents' emotional support and school cooperation climate and academic performance. These results may enhance our understanding of how positive social environmental factors may be conceptualized in prevention and intervention for improving academic performance among Chinese vocational school students. More work (e.g., additional mediating mechanisms) is needed to better understand the relationships between family and school environments and academic performance among Chinese vocational school students.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found at: https://www.oecd.org/pisa/data/2018 database/.

Ethics statement

Given that secondary data was used for the analysis, ethical review and approval was not required for the study on human participants in accordance with the local legislation and
institutional requirements. Written informed consent from the patients/ participants or patients/participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

Y-BL and B-BC conceived of the study, developed the hypotheses, motivated the data analyses, oversaw the data analysis, interpreted the results, and drafted and revised the manuscript. X-YH performed the statistical analyses, interpreted the results, and drafted the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Anderson, C. S. (1982). The search for school climate: A review of the research. Rev. Educ. Res. 52, 368–420. doi: 10.3102/00346543052003368

Berkowitz, R. (2021). School climate and the socioeconomic literacy achievement gap: multilevel analysis of evaluation, mediation, and moderation models. Child Youth Serv. Rev. 130:106238. doi: 10.1016/j.childyouth.2021.106238

Bronfenbrenner, U. (1979). The Ecology of Human Development: Experiments by Nature and Design. Cambridge, MA: Harvard University Press.

Burns, E. C., Collie, R. J., Van Bergen, P., and Martin, A. J. (2022). Intrapersonal and interpersonal psychosocial adjustment resources and achievement: A multilevel latent profile analysis of students and schools. J. Educ. Psychol. 0726. doi: 10.1037/edut0000726 [Epub ahead of print].

Chen, B.-B. (2017). Parent-adolescent attachment and academic adjustment: The mediating role of self-worth. J. Child Fam. Stud. 26, 2070–2076. doi: 10.1007/s10826-017-0728-2

Chen, B.-B., Wuiam, N., Dimitrova, R., and Chen, N. (2019). The relationships between family, school and community support and boundaries and student engagement among Chinese adolescents. Curv. Psychol. 38, 705–714. doi: 10.1007/s12144-017-9646-0

Côté, S., Bouchard, T., and Vauxau, C. (2014). The mediating effect of self-evaluation bias of competence on the relationship between parental emotional support and children’s academic functioning. Br. J. Educ. Psychol. 84, 415–434. doi: 10.1111/bjep.12045

Demirtas-Zorbaz, S., Akin-Arik, C., and Terzi, R. (2021). Does school climate that includes students’ views deliver academic achievement? A multilevel meta-analysis. Sch. Eff. Sch. Improv. 32, 543–563. doi: 10.1080/09243453.2021.1920432

Ding, C., and Hall, A. (2007). Gender, ethnicity, and grade differences in perceptions of school experiences among adolescents. Stud. Educ. Eval. 33, 159–174. doi: 10.1016/j.stueduc.2007.04.004

Eugene, D. R. (2020). A multilevel model for examining perceptions of school climate, socioeconomic status, and academic achievement for secondary school students. J. Educ. Stud. Placed Risk 25, 79–99. doi: 10.1080/10824669.2019.1670067

Gao, Q., Jia, G., Fu, E., Olfadji, Y., and Huang, Y. (2020). A configurational investigation of smartphone use disorder among adolescents in three educational levels. Addict. Behav. 103:106231. doi: 10.1016/j.addbeh.2019.106231

Goodenow, C., and Grady, K. E. (1993). The relationship of school belonging and friends’ values to academic motivation among urban adolescent students. J. Exp. Educ. 62, 60–71. doi: 10.1080/00220297.1993.9943831

Guo, H., Liu, F., Liu, W., Lin, X., and Lin, D. (2017). Positive youth development: theory, practice and prospective. J. Beijing Norm. Univ., Soc. Sci. 6, 5–13. doi: 10.3969/j.issn.1002-0209.2017.06.001

Gao, X., Xu, B., Zhou, H., Liu, C., Liu, J., Jiang, K., et al. (2018). Gender differences in how family income and parental education relate to reading achievement in China: The mediating role of parental expectation and parental involvement. Front. Psychol. 9:783. doi: 10.3389/fpsyg.2018.00783

Hackett, G., Betz, N. E., Casas, J. M., and Rocha-Singh, I. A. (1992). Gender, ethnicity, and social cognitive factors predicting the academic achievement of students in engineering. J. Couns. Psychol. 39:527. doi: 10.1037/0022-0167.39.4.527

Hanushek, E. A., and Woessmann, L. (2006). Does educational tracking affect performance and inequality? Differences-in-differences evidence across countries. Econ. J. 116, C63–C76. doi: 10.1111/1468-0297.2006.01076.x

Huang, M. (2020). A study on the factors influencing non-cognitive skills of senior-secondary vocational school students. Mech. Voc. Educ. 5, 46–45.

Huang, L. (2022). Exploring the relationship between school bullying and academic performance: The mediating role of students’ sense of belonging at school. Educ. Stud. 48, 216–232. doi: 10.1080/00356340.2020.1749032

Hughes, K., and Coplan, R. J. (2018). Why classroom climate matters for children high in anxious solitude: A study of differential susceptibility. Sch. Psychol. Q. 33, 94–102. doi: 10.1037/spq0000201

Kim Sanders, J. E., Makubuya, T., and Yu, M. (2020). Risk factors of academic performance: experiences of school violence, school safety concerns, and depression by gender. Child Youth Care Forum 49, 725–742. doi: 10.1007/s10964-020-09552-7

Kuijf, S., Camacho-Thompson, D. E., Juvenon, J., and Graham, S. (2018). Friends in activities, school-related affect, and academic outcomes in diverse middle schools. J. Youth Adolesc. 47, 1208–1220. doi: 10.1007/s10964-018-0817-6

Korpershoek, H., Canrnsus, E. T., Fokkens-Bruinsma, M., and de Boer, H. (2020). The relationships between school belonging and students' motivational, social-emotional, behavioural, and academic outcomes in secondary education: A meta-analytic review. Rev. Pap. Educ. Res. 35, 641–680. doi: 10.1002/eper.02671522.2019.1615116

Kuperminc, G. P., Darnell, A. J., and Alvarez-Jimenez, A. (2007). Parent involvement in the academic adjustment of Latino middle and high school youth: teacher expectations and school belonging as mediators. J. Adolesc. 31, 469–483. doi: 10.1016/j.adolescence.2007.09.003

Kuzmiwa, J., and Carney, M. (2016). The effectiveness of vocational versus general secondary education: evidence from the PISA 2012 for countries with early tracking. Int. J. Manpow. 37, 2–24. doi: 10.1108/IJM-01-2015-0022
Lee, E., Reynolds, K. J., Subasic, E., Bromhead, D., Lin, H., Marinov, V., et al. (2017). Development of a dual school climate and school identification measure-student (SCASIM-S). Contemp. Educ. Psychol. 49, 91–106. doi: 10.1016/j.cedpsych.2017.01.003

Legewie, J. and DiPrete, T. A. (2012). School context and the gender gap in educational achievement. Am. Sociol. Rev. 77, 463–485. doi: 10.1177/0003122412440802

Lerner, R. M., Lerner, J. V., Almerigi, J. B., Theokas, C., Phelps, E., Gesta-Dottori, S., et al. (2005). Positive youth development, participation in community youth development programs, and community contributions of fifth-grade adolescents: findings from the first wave of the 4-H study of positive youth development. J. Early Adolesc. 25, 17–71. doi: 10.1177/0091403204231604

Lerner, J. V., Phelps, E., Forman, Y., and Bowers, E. P. (2009). "Positive youth development," in Handbook of Adolescent Psychology, Vol 1: Individual Bases of Adolescent Development. 3rd Edn. eds. R. M. Lerner and L. Steinberg (Hoboken, NJ: Wiley), 524–558.

Li, Y. and Lerner, R. M. (2011). Trajectories of school engagement during adolescence: implications for grades, depression, delinquency, and substance use. Dev. Psychol. 47, 233–247. doi: 10.1037/a0021307

Li, X., Wang, Y.-W., and Kim, Y. H. (2022). The moderation of parental support on the relationship between race-related career barriers and academic achievement. J. Career Dev. 49, 363–377. doi: 10.1177/0092045520973535

Li, G., Xu, J., Li, L., Shi, Z., Yi, H., Chu, J., et al. (2020). The impacts of highly resourced vocational schools on student outcomes in China. Chin. World. Econ. 28, 125–150. doi: 10.1111/cwe.12358

Lippert, A. M., Corsi, D. J., and Venechuk, G. E. (1999). Schools influence adolescent e-cigarette use, but when? Examining the interdependent association between school context and teen vaping over time. J. Youth Adolesc. 48, 1899–1911. doi: 10.1007/s10964-019-01106-y

Liu, Y. and Geng, Y. (2018). Analysis of higher vocational students' adaptability and its impacts on the connection mode: based on empirical research in Beijing. Voc. Tech. Edu. 10, 53–58.

Liu Teng, X., and Zhu, D. (2019). Effect of self-esteem and parents' psychological control on the relationship between teacher support and Chinese migrant children's academic achievement. A moderated mediation. Front. Psychol. 10.2342. doi: 10.3389/fpsyg.2019.02342

Lovat, A., and Darmawan, I. G. N. (2019). The academic performance of vocational education and training pathway university students and the effects of gender and age. Aust. J. Educ. 63, 307–321. doi: 10.1007/978-3-030-04411-9_16

Loyalka, P., Huang, X., Zhang, L., Wei, J., Yi, H., Song, Y., et al. (2016). The impact of vocational schooling on human capital development in developing countries: evidence from China. World Bank Econ. Rev. 30, 143–170. doi: 10.1093/wber/lbw050

Ministry of Education of the People's Republic of China (2021). Statistical bulletin on the development of the nation education in China in 2020. Available at: http://www.moe.gov.cn/jyb_sjzl/sjzl_fztjgb/202108/t20210827_555004.html (Accessed June 10, 2022).

Mitchell, W., and Conn, C. P. (1985). Power of Positive Students. New York: NY: Morrow.

Muthén, L. K., and Muthén, B. O. (2017). Mplus User's Guide. 8th Edn. Los Angeles, CA: Muthén and Muthén.

Organisation for Economic Cooperation and Development (OECD). (2019). PISA 2018 Assessment and Analytical Framework. Paris: PISA, OECD Publishing.

Paricio Herrera, M., Rodrigo, M. F., and Viguera, P. (2020). Association between group identification at school and positive youth development: moderating role of rural and urban contexts. Front. Psychol. 11.1971. doi: 10.3389/fpsyg.2020.01971

Reilly, D., Neumann, D. L., and Andrews, G. (2019). Gender differences in reading and writing achievement: evidence from the national assessment of educational progress (NAEP). Am. Psychol. 74, 445–458. doi: 10.1037/amp0000356

Roeser, R., Midgley, C., and Urdan, T. C. (1996). Perception of the school psychological environment and early adolescents' psychological and behavioral functioning in school. The mediating role of goals and belonging. J. Educ. Psychol. 88, 408–422.

Sánchez, B., Colón, Y., and Esparrza, P. (2005). The role of sense of school belonging and gender in the academic adjustment of Latino adolescents. J. Youth Adolesc. 34, 619–628. doi: 10.1007/s10964-005-8950-4

Schachter, M. K., Schwarzenthal, M., Moffit, U., Civitillo, S., and Jiang, L. (2021). Capturing a nuanced picture of classroom cultural diversity climate: multigroup and multilevel analyses among secondary school students in Germany. Contemp. Educ. Psychol. 65.181971. doi: 10.1016/j.cedpsych.2021.101971

Scheerens, J., Witziers, B., and Steen, R. (2013). A meta-analysis of school effectiveness studies. Rev. Educ. Res. 361, 619–645. doi: 10.4348/1988-592X-RE-2013-361-235

Smerdon, B. A. (2002). Students' perceptions of membership in their high schools. Sociol. Educ. 75, 287–305. doi: 10.3367/0030709202790280

Song, J., Bong, M., Lee, K., and Kim, S. (2015). Longitudinal investigation into the role of perceived social support in adolescents' academic motivation and achievement. J. Educ. Psychol. 107, 821–841. doi: 10.1037/edu0000016

Steegh, A. M., Hofler, T. N., Keller, M. M., and Parchmann, I. (2019). Gender differences in mathematics and science competitions: A systematic review. J. Res. Sci. Teach. 56, 1431–1460. doi: 10.1002/tea.21580

Tan, Y., Fan, Z., Wei, X., and Yang, T. (2022). School belonging and reading literacy: A multilevel moderated mediation model. Front. Psychol. 13.816128. doi: 10.3389/fpsyg.2022.816128

Tian, Z. (2022). Senior-secondary vocational education and further education: misunderstandings, facts and policies. Available at: https://maps.wexin.qg.com/m/ETXDGCMSPRuzvL5h2IP_Lg.2022-04-09/2022-06-15 (Accessed June 15, 2022).

Van Houtte, M., and Stevens, P. A. (2009). School belonging and reading literacy: A multilevel moderated mediation model. Front. Psychol. 13.816128. doi: 10.3389/fpsyg.2022.816128

Van Houtte, M., and Van Maelle, D. (2012). Students' sense of belonging in technical/vocational schools versus academic schools: The mediating role of faculty trust in students. Teach. Coll. Rec. 114, 1–36. doi: 10.1007/106146811211400706

Xu, J. (2015). Reflections and comparative studies on literacy of students in China. Contemp. Educ. Psychol. 25, 17–71. doi: 10.1016/j.cedpsych.2012.07.004

Zhang, W. (2017). Analysis of factors influencing the quality of general education: A multilevel moderated mediation model. Front. Psychol. 8:2342. doi: 10.3389/fpsyg.2017.02342. doi: 10.3389/fpsyg.2012.00010