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The association between parents' and teachers' autonomy support and students' learning enjoyment: The role of self-efficacy for self-regulated learning and self-regulated learning

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Abstract: To explore the relationship between parents' and teachers' autonomy support and students' learning enjoyment, and the role of self-efficacy for self-regulated learning and self-regulated learning (SRL) in this relationship. A convenient sampling method was adopted to investigate 737 junior middle school and primary school students (boys = 49.53%, mean age = 12.54 years, SD = 1.48) by using the parent and teacher autonomy support scale, learning enjoyment scale, self-efficacy for self-regulated learning scale and self-regulated learning questionnaire. SPSS 20.0 and AMOS 24.0 were employed to perform the data analysis. Results indicated that: (1) Self-efficacy for SRL mediated the relationships between parents' and teachers' autonomy support and learning enjoyment, respectively; (2) SRL also mediated the relationships between parents' autonomy support and learning enjoyment; (3) Self-efficacy for SRL and SRL sequentially mediated the relationships between parents' and teachers' autonomy support and learning enjoyment, respectively. This study contributes to a deeper understanding of how autonomy support from parents and teachers relates to students' learning enjoyment, and offers practical implications for interventions aimed at enhancing self-regulated learning and fostering positive academic emotions among primary and junior middle school students.

Keywords: parents' autonomy support; teachers' autonomy support; learning enjoyment; self-efficacy for SRL; self-regulated learning

Introduction

Learning enjoyment refers to a positive emotional state associated with learning activities, accompanied by high arousal in learning-related tasks (Pekrun, 2006; Hawrot & Nusser, 2024). The higher the degree of learning enjoyment, the better the academic performance (Hagenauer & Hascher, 2014; Grecu et al., 2026). As academic emotions profoundly affect diverse facets of students' learning, it is of great value to explore their predictive antecedents (Goetz et al., 2016). Students' perceived teachers' autonomy support was found to be positively correlated with students' learning enjoyment in the course, but negatively correlated with anxiety (Hall & Webb, 2014; Lo, 2024). Longitudinal studies showed that parental structural support positively predicted children's learning enjoyment, while parental control negatively affected children's learning enjoyment (Buff et al., 2017). However, the effect of parents' autonomy support on children's learning enjoyment remains unclear in current research. Moreover, the influence of children's intrinsic factors on learning enjoyment should not be overlooked. Individuals with higher academic self-efficacy tend to report greater learning enjoyment (Sağkal & Sönmez, 2022). Adopting self-regulated learning strategies can enhance students' academic emotional engagement (Park & Yun, 2018), which includes cultivating positive emotions such as learning enjoyment (Zare et al., 2024).

However, limited empirical research has examined the associations between parents' and teachers' autonomy support and learning enjoyment. Furthermore, the majority of relevant existing evidence originates from European and American samples, while few investigations have explored the link between autonomy support and learning enjoyment within Chinese cultural settings. This study addresses this research gap by exploring the relationship between parents' and teachers' autonomy support and learning enjoyment among Chinese primary and junior middle school students. In order to better enhance students' learning enjoyment, it is essential to explore the specific processes and mechanisms that account for the connection between autonomy support and students' learning enjoyment.

Parents' and teachers' autonomy support and learning enjoyment

Self-determination theory holds that obtaining autonomy in learning and work is one of the basic needs of individuals (Ryan & Deci, 2020). Autonomy support from parents and teachers promotes children's sense of volition, which is crucial for healthy development (Fousiani et al., 2014). When providing autonomy support, parents or teachers show respect and empathy for children's thoughts and feelings, and support their independent expression and decision-making (Van der Kaap-Deeder et al., 2023; Ryan et al., 2015). Such autonomy support enhances children's feelings of having options and competencies (Fousiani et al., 2014; Grolnick et al., 2000). The satisfaction of autonomy needs arising from autonomy-supportive contexts is a key factor in enhancing individual well-being (Deci & Ryan, 2000; Milyavskaya & Koestner, 2011). Teachers' autonomy support was empirically demonstrated to enhance students' learning enjoyment while reducing their academic anxiety (Black & Deci, 2000). However, the association between autonomy support from parents and teachers and students' learning enjoyment still lacks empirical verification, and the mechanisms accounting for this association have not been explained either.

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The mediating effect of self-efficacy for SRL

As a specific type of belief related to a particular domain, self-efficacy is strongly associated with students' prior learning experiences of targeted tasks (Bai et al., 2019). Self-efficacy refers to the belief in an individual's capacity to perform and achieve a certain task (Bandura, 1977). In this study, self-efficacy for SRL is defined as students' perceived capability to successfully conduct self-regulated learning in a specific academic field (Zimmerman et al., 1992). According to control-value theory (Pekrun, 2006), cognitive assessment, including perceived competence and expectancy beliefs like self-efficacy, is a key antecedent of academic emotions. Hence, academic self-efficacy, as a form of such assessment, can be assumed to significantly impact on academic emotions (Mega et al., 2014; Hayat et al., 2020). A latent profile analysis indicated that there are significant differences in reading enjoyment of Chinese university students among the four groups with low, moderate, medium-low, and high levels of self-efficacy (Yang et al., 2024a). Greater English reading enjoyment was often observed among students with higher levels of self-efficacy (Wang & Hu, 2022). According to self-determination theory, autonomy support from parents and teachers plays a pivotal role in nurturing students' self-efficacy by satisfying their basic psychological needs (Bai & Gu, 2022; Deci et al., 1981). Prior research indicated that autonomy support offered by parents and teachers enhanced learners' academic self-efficacy (Kingsford-Smith et al., 2024; Won & Shirley, 2018). This suggests that self-efficacy for SRL may mediate the association between autonomy support and students' learning enjoyment.

The mediating effect of SRL

Self-regulated learning (SRL) refers to the active and constructive process in which learners set their own learning goals and attempt to monitor, regulate, and control their cognition, emotion, motivation, and behavior under the guidance and constraints of goals and situational characteristics (Pintrich, 2000; Zimmerman, 1989). Children's SRL not only predicted academic achievement (Dent & Koenka, 2016) but also served as an essential competency for lifelong learning (Cornford, 2002). According to Pintrich's (2000) framework, self-regulated learning unfolds across four phases: planning, monitoring, control, and reflecting. Drawing on self-determination theory (Deci & Ryan, 2000), self-regulated learning can be effectively cultivated when the learning environment fulfills learners' basic psychological needs for autonomy, relatedness, and competence. Teachers and parents play crucial roles in providing such an environment (Schuitema et al., 2016). The autonomy support perceived by students from their parents and teachers significantly predicted their SRL levels (Bardach et al., 2023; Flunger et al., 2019). Adopting self-regulated learning strategies enhanced students' academic emotional engagement (Park & Yun, 2018), which encompassed the cultivation of positive emotions such as learning enjoyment (Zare et al., 2024). Therefore, it can be inferred that SRL may mediate the association between autonomy support provided by parents and teachers and students' learning enjoyment.

The chain mediating role of self-efficacy for SRL and SRL

Basic education constitutes the critical developmental stage for children's self-regulated learning (Vandevelde et al., 2013). Meanwhile, self-efficacy acts as a vital predictor of learners' cognitive strategy adoption and self-regulation (Zimmerman, 2002). During this critical period, if children fail to fully establish robust self-efficacy beliefs (Kim et al., 2022; Usher & Pajares, 2008), this may hinder the development of SRL in the future (Meneghetti et al., 2007; Dignath & Büttner, 2008). Some studies also found English self-efficacy was identified as a meaningful positive antecedent of students' self-regulated language learning strategies (Bai & Wang, 2023). As proposed by self-determination theory, satisfying students' autonomy needs through autonomy support facilitates self-efficacy formation and the development of SRL (Bai & Gu, 2022). An experimental study found that providing students with autonomous choice fostered a sense of responsibility and self-control, which in turn increased their willingness to participate in learning activities (Flowerday & Schraw, 2000). This effect was particularly pronounced among students with low self-efficacy for self-regulated learning (Kim et al., 2022). Teachers and parents play important roles in providing the learning environment (Schuitema et al., 2016), and the autonomy support they provide plays a vital role in fostering students' self-efficacy (Bai & Gu, 2022; Kim et al., 2022). According to control-value theory, when individuals perceive sufficient control over learning activities (due to autonomy support), they will effectively regulate the learning process and experience positive achievement emotions, specifically learning enjoyment. Therefore, there may exist a serial mediation pathway in which self-efficacy for SRL followed by SRL links parents' and teachers' autonomy support to students' learning enjoyment.

Goals of the study

Drawing on self-determination theory and control-value theory, the present research clarified the relationships between parents' and teachers' autonomy support, self-efficacy for SRL, SRL, and learning enjoyment. According to self-determination theory, parents and teachers who deliver autonomy support meet students' basic psychological autonomy needs (especially the need for autonomy), which further fosters the advancement of their SRL. According to control-value theory, when students perceive sufficient control over their learning activities (owing to autonomy support) and can effectively regulate their own learning process, it will trigger positive achievement emotions—that is, learning enjoyment. This research aims to investigate the serial mediating effects of self-efficacy for SRL and SRL on the link between parents' and teachers' autonomy support and students' learning enjoyment. Based on the foregoing theoretical analysis, Figure 1 shows the hypothesized model. The current study puts forward the hypotheses listed below:

Hypothesis 1: Self-efficacy for SRL mediated the association between parents' autonomy support and students' learning enjoyment.

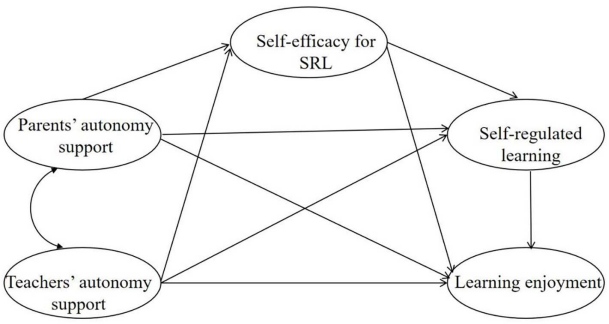

Figure 1. Hypothesized model. SRL, self-regulated learning

Hypothesis 2: Self-efficacy for SRL mediated the association between teachers' autonomy support and students' learning enjoyment.

Hypothesis 3: SRL mediated the association between parents' autonomy support and students' learning enjoyment.

Hypothesis 4: SRL mediated the association between teachers' autonomy support and students' learning enjoyment.

Hypothesis 5: Self-efficacy for SRL and SRL serially mediated the relationship between parents' autonomy support and students' learning enjoyment.

Hypothesis 6: Self-efficacy for SRL and SRL serially mediated the relationship between teachers' autonomy support and students' learning enjoyment.

Method

Participants and setting

Convenience sampling was adopted in the present research to recruit 737 Grade 4 to Grade 9 students from Chinese primary and junior middle schools as participants, with a valid questionnaire rate of 95.71%. The participants were 12.54 (SD = 1.48) years old on average, including 365 boys (49.53%). They were composed of 90 fourth-grade students (12.21%), 77 fifth-grade students (10.45%), 277 sixth-grade students (37.58%), 135 seventh-grade students (18.32%), 90 eighth-grade students (12.21%), and 68 ninth-grade students (9.23%).

Measures

Parent and teacher autonomy support

With the goal of measuring parents' autonomy support levels (Van der Kaap-Deeder et al., 2017), Van der Kaap-Deeder et al. (2023) undertook a revision of the Parental Autonomy Support Scale. The scale includes four items (e.g., "My parent took into account how I thought about things"). To measure teacher autonomy support, the same four items were adapted by simply replacing the word "parent" with "teacher".

Students rated each item on a 5-point Likert-like scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores reflecting greater autonomy support from parents or teachers. In the present study, parent and teacher autonomy support scales displayed good reliability ($\alpha = 0.85$ and $\alpha = 0.85$).

Self-efficacy for self-regulated learning

The Self-efficacy for Self-Regulated Learning subscale was derived from the Children's Self-Efficacy Scale (CSES), originally developed by Bandura (2006). In the current study, nine out of the ten original items demonstrated acceptable factor loadings (e.g., "Arrange a place to study without distractions"). Students rated each item on a 5-point Likert-like scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores reflecting greater self-efficacy. The scale displayed good reliability ($\alpha = 0.89$).

Self-regulated learning

Self-regulated learning was assessed using the revised Cognition and Emotion/Motivation Regulation (CEMOR) questionnaire developed by Ebbes et al. (2024). This instrument comprises five subscales: planning, monitoring, cognition control, emotion/motivation control, and reflecting. Of these, the planning subscale contains 4 items (e.g., "Before I started my homework, I asked myself: How can I make sure I don't make mistakes?"). The monitoring subscale also contains 4 items (e.g., "While doing my homework, I monitored whether I understood what I was doing"). The cognition control subscale includes 5 items (e.g., "During homework, I tried new ways to solve difficult exercises"). The emotion control subscale comprises 5 items (e.g., "During homework, I thought of things that make me happy"). The reflecting subscale contains 4 items (e.g., "After finishing homework, I asked myself: How can I make even fewer mistakes next time?"). All items are scored on a 5-point Likert-like scale (1 = strongly disagree, 5 = strongly agree), with higher scores reflecting greater self-regulated learning. For the five dimensions including planning, monitoring, cognition control, emotion control and reflecting, their respective Cronbach's alpha values obtained in this research were 0.88, 0.84, 0.90, 0.78 and 0.92.

Learning enjoyment

The learning-related enjoyment subscale of the Achievement Emotions Questionnaire revised by Bieleke et al. (2021) was used to measure students' level of learning enjoyment. Learning enjoyment was measured using a 4-item scale (e.g., When my studies are going well, it gives me a rush). All items are rated on a 5-point Likert-like scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores reflecting greater enjoyment. The scale showed good reliability ($\alpha = 0.81$).

Procedure

Ethical approval for this study was obtained from the Research Ethics Committee of Xinyang Normal University (Ethics No. XFEC-2024-049). Parents of the students consented to the study. The students assented to the study. They completed the surveys outside of class. Prior to participation, students were informed of the study's purpose, assured that their involvement was entirely voluntary, and guaranteed that all data collected would be treated with strict confidentiality throughout the analysis process.

Table 1. Means, SD, and intercorrelations

Variables	Correlations				
	1	2	3	4	5
1. Parents' autonomy support	1				
2. Teachers' autonomy support	0.57**	1			
3. Self-efficacy for SRL	0.53**	0.58**	1		
4. SRL	0.54**	0.55**	0.77**	1	
5. Learning enjoyment	0.54**	0.59**	0.76**	0.71**	1
Mean	3.99	4.01	3.96	3.74	3.94
SD	0.79	0.76	0.67	0.67	0.71

Note. $^{**}p < 0.01$. *SD* standard deviations, *SRL* self-regulated learning.

Data analysis

All statistical analyses were carried out with AMOS 24.0 based on Anderson and Gerbing's (1988) two-step structural equation model framework. We first validated the measurement model to ensure reliable representation of latent variables through their respective items. Once good fit statistics were obtained, maximum likelihood (ML) estimation was applied to examine the structural model. Referring to Hu and Bentler (1999), we regarded models as well-fitted when $\chi^2/df < 5$, CFI > 0.90, TLI > 0.90, SRMR ≤ 0.08, and RMSEA ≤ 0.08 (Cid et al., 2018). The mediation effect was evaluated using bias-corrected 95% CI generated from 5000 bootstrap samples, which offer superior interval estimation and statistical efficacy (MacKinnon et al., 2004).

Results

Descriptive statistics and correlations

Descriptive data and inter-variable correlation coefficients for all variables were displayed in Table 1. We calculated Pearson correlations among parents' autonomy support, teachers' autonomy support, self-efficacy for SRL, SRL, and learning enjoyment. As presented in Table 1, parents' and teachers' autonomy support were each positively correlated with self-efficacy for SRL, SRL, and learning enjoyment. Furthermore, self-efficacy for SRL was positively associated with SRL and learning enjoyment, and SRL was positively associated with learning enjoyment.

Measurement model

The measurement model included a total of 26 observable indicators measuring 5 distinct latent factors: parents' autonomy support, teachers' autonomy support, self-efficacy for SRL, SRL, and learning enjoyment. All factor loadings for the indicators of the latent factors were statistically significant ($p < 0.001$), confirming that each latent variable was adequately measured by its indicators. The model exhibited good fit: $\chi^2/df = 4.424$, RMSEA $= 0.068$, CFI $= 0.916$, TLI $= 0.906$, and SRMR $= 0.052$.

Structural model

Prior to incorporating mediating variables, the direct paths linking the two predictors (parents' autonomy support and teachers' autonomy support) to the outcome variable learning enjoyment (the criterion, $r = 0.372$, $p < 0.001$; $r = 0.502$, $p < 0.001$) both reached statistical significance. Next, we constructed a dual-mediator model containing self-efficacy for SRL and SRL as mediators, which displayed acceptable model fit indices: $\chi^2/df = 4.424$, RMSEA $= 0.068$, CFI $= 0.916$, TLI $= 0.906$, and SRMR $= 0.052$. Figure 2 illustrates the overall mediating effect structural model with standardized regression weights. The analysis results revealed that parents' autonomy support exerted significant positive predictive effects on self-efficacy for SRL ($\beta = 0.272$, $p < 0.001$), SRL ($\beta = 0.103$, $p < 0.05$), and learning enjoyment ($\beta = 0.099$, $p < 0.05$). Teachers' autonomy support significantly and positively predicted self-efficacy for SRL ($\beta = 0.459$, $p < 0.001$) and learning enjoyment ($\beta = 0.162$, $p < 0.001$), but its association with SRL wasn't significant ($\beta = 0.085$, $p > 0.05$), thereby rejecting Hypothesis 4. Additionally, self-efficacy for SRL had strong positive associations with SRL ($\beta = 0.710$, $p < 0.001$) and learning enjoyment ($\beta = 0.478$, $p < 0.001$). SRL also positively predicted learning enjoyment ($\beta = 0.297$, $p < 0.001$).

Bootstrapping with 5000 resamples was adopted in this research to test the mediation effect within the structural model. Indirect effects were evaluated at a 0.05 significance level, with statistical meaningfulness determined by 95% confidence intervals excluding zero. The bootstrap outcomes are presented in Table 2. Consistent with our predictions, both self-efficacy for SRL ($\beta = 0.127$, $p < 0.001$, 95% CI $= [0.059, 0.223]$) and SRL ($\beta = 0.030$, $p < 0.05$, 95% CI $= [0.003, 0.078]$) exerted significant mediating effects on the linkage between parents' autonomy support and learning enjoyment. Thus, Hypotheses 1 and 3 were supported. Self-efficacy for SRL demonstrated a significant mediating effect within the predictive path from teachers' autonomy support to learning enjoyment ($\beta = 0.219$, $p < 0.001$, 95% CI $= [0.140, 0.326]$). Therefore, Hypothesis 2 was supported. Importantly, the chain mediating effect of "self-efficacy for SRL-SRL" ($\beta = 0.056$, $p < 0.001$, 95% CI $= [0.023, 0.106]$) between parents' autonomy support and learning enjoyment were significant; the chain mediating effect of "self-efficacy for SRL-SRL" ($\beta = 0.097$, $p < 0.001$, 95% CI $= [0.048, 0.167]$) between teachers' autonomy support and learning enjoyment were significant, hence Hypothesis 5 and 6 were supported.

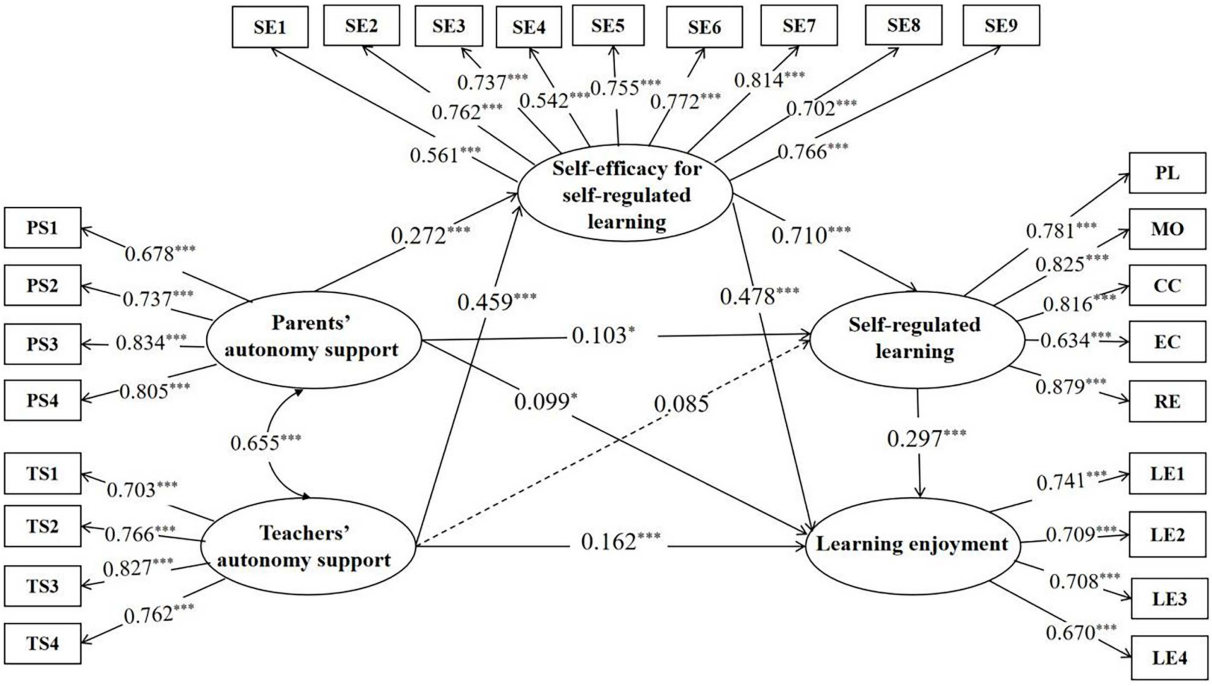

Figure 2. The mediation model (N = 737). *Note*. Factor loadings are standardized. PS1-PS4 are four parcels of parents' autonomy support; TS1-TS4 are four parcels of teachers' autonomy support; SE1-SE9 are nine items of self-efficacy for self-regulated learning; LE1–LE4 are four items of learning enjoyment; PL, planning; MO, monitoring; CC, cognition control; EC, emotion control; RE, reflecting. The path coefficient from Teachers' autonomy support to Self-regulated learning is not significant, and the other path coefficients are significant. *$p < 0.05$, ***$p < 0.001$.

Table 2. Bootstrap analyses of the significance of mediation

Model pathways	Indirect effect	SE	95% CI mean effect (lower and upper)	
PS-SE-LE	0.127***	0.041	0.059	0.223
PS-SRL-LE	0.030*	0.019	0.003	0.078
TS-SE-LE	0.219***	0.047	0.140	0.326
PS-SE-SRL-LE	0.056***	0.020	0.023	0.106
TS-SE-SRL-LE	0.097***	0.030	0.048	0.167

Note. PS, Parents' Autonomy Support; TS, Teachers' Autonomy Support; LE, Learning Enjoyment; SE, Self-Efficacy for SRL; SRL, Self-Regulated Learning. *$p < 0.05$, ***$p < 0.001$.

Discussion

Consistent with the first and second hypotheses, the positive association between parents'/teachers' autonomy support and students' learning enjoyment was mediated by self-efficacy for SRL. That is to say, parents' and teachers' autonomy support facilitated greater learning enjoyment among students by elevating their self-efficacy for SRL levels. These findings also supported the self-determination theory (Ryan & Deci, 2020) and related empirical studies (Bai & Gu, 2022; Bai & Wang, 2023). When parents or teachers respect children's ideas, opinions, and feelings, children develop a sense of competence in planning, monitoring, and regulating their learning activities, thereby strengthening their belief in their ability to engage in self-regulated learning (Bai & Gu, 2022; Yang et al., 2023). When students develop confidence in their self-regulated learning abilities and expect to succeed in academic tasks, they tend to enjoy the learning process and derive pleasure from it (Wang & Hu, 2022; Yang et al., 2024a).

For the third and fourth hypotheses, SRL mediated the associations between parents' autonomy support and students' learning enjoyment, as well as between teachers' autonomy support and students' learning enjoyment. This demonstrates that parents' autonomy support enhances students' learning enjoyment by improving their self-regulated learning. Parents who adopt an autonomy supportive approach respect their children's true thoughts, opinions, and feelings, rather than compelling them to behave, feel or think in predetermined ways. They also provide children with opportunities for independent expression and decision-making. Such parenting enables children to gradually take on academic responsibilities, facilitates the development of self-regulated learning (Flowerday & Schraw, 2000), and allows them to experience learning enjoyment. Nevertheless, the final model indicated that teachers' autonomy support had no

significant correlation with students' SRL. This finding was inconsistent with Hypothesis 4 and previous studies (Bardach et al., 2023; Flunger et al., 2019). This may be because of students' young age and poor self-control ability in learning, teachers' autonomy support can't promote students' self-regulated learning (Yang et al., 2024b). In addition, the association between teachers' autonomy support and students' SRL may be bidirectional instead of unidirectional (Zee & Koomen, 2020). When learners formulate individualized learning goals and engage in monitoring, controlling, and reflecting upon their learning activities, teachers may be more inclined to support their independent expression and decision-making (Pianta et al., 2008).

Furthermore, with regard to the fifth and sixth hypotheses, this research demonstrated that autonomy support from parents and teachers positively predicted students' learning enjoyment via the serial mediation roles of self-efficacy for SRL followed by SRL. This study suggests that when parents or teachers satisfy students' need for autonomy, such as respecting and empathizing with children's ideas and feelings, and supporting their independent expression and decision-making, students' self-efficacy for SRL will be enhanced (Bai & Gu, 2022). If learners hold the belief that they are capable of engaging in SRL, they will formulate personal learning goals and make efforts to monitor, control and reflect on their learning activities (Bardach et al., 2023; Zimmerman, 2002), and their positive academic emotions, such as learning enjoyment, will improve (Park & Yun, 2018; Zare et al., 2024). For Hypothesis 4, the mediating effect of SRL between teachers' autonomy support and learning enjoyment was not significant. However, for Hypothesis 6, the relationship between teachers' autonomy support and learning enjoyment was significantly serially mediated by self-efficacy for SRL and SRL. Due to the lack of self-efficacy for SRL, students lack confidence in conducting self-regulated learning. This makes the support provided by teachers difficult to effectively facilitate students' SRL and enable them to experience learning enjoyment.

Implications for theoretical and practice

Drawing on both self-determination theory and control-value theory, this study extends the current understanding of how learning enjoyment is shaped. While prior work has predominantly relied on self-determination theory to account for the link between autonomy support and academic self-efficacy, our framework incorporates an additional theoretical lens to offer a more comprehensive account (Bai & Gu, 2022), or used the control-value theory alone to study the impact of cognitive appraisals on academic emotions (Hayat et al., 2020). This study integrates the two theories into a chain-mediated model, revealing how external environmental factors (autonomy support from parents and teachers), through self-efficacy for SRL and SRL ultimately enhance students' learning enjoyment. This provides a more complete theoretical framework for understanding the formation mechanism of academic emotions.

More importantly, the results highlight the significance of the autonomy-supportive educational approach that respects children's ideas, opinions, and feelings. In current family education, parents should adopt an autonomy-supportive parenting style rather than forcing children to act, feel, or think in a specific way. By respecting children's authentic thoughts and feelings and providing them with opportunities for autonomous expression and decision-making, parents can gradually encourage children to take responsibility for their academic tasks, thereby promoting the development of self-regulated learning (Flowerday & Schraw, 2000), experiencing the enjoyment of autonomy learning (Hayat et al., 2020; Park & Yun, 2018). From the perspective of school education, teachers should implement autonomy-supportive teaching strategies, genuinely valuing students' ideas and allowing them to engage with challenging problems through independent inquiry. Providing students with space for autonomous choice and inquiry is essential for enhancing their self-efficacy for SRL (Bai & Gu, 2022), developing self-regulated learning (Flunger et al., 2019), and promoting more positive academic emotions (Black & Deci, 2000).

Limitations and future directions

Several limitations of this study should be acknowledged. First, the cross-sectional design precludes any causal inferences among the variables. Future research would benefit from employing longitudinal or experimental designs to establish causal directions. Second, the measurement of autonomy support relied solely on student-report, which may not fully capture the objective levels of support provided by parents and teachers. To obtain a more comprehensive assessment, subsequent studies could incorporate informant reports from both teachers and parents. Moreover, as this study was conducted within the Chinese cultural context, cultural differences in autonomy support—such as those between East Asian and Western educational approaches—may produce different results.

Conclusion

This study revealed several key findings. Both parents' and teachers' autonomy support were positively associated with students' learning enjoyment. Specifically, self-efficacy for SRL and SRL partially mediated the relationship between parents' autonomy support and learning enjoyment, whereas only self-efficacy for SRL served as a partial mediator in the link between teachers' autonomy support and learning enjoyment. Notably, a serial mediation via self-efficacy for SRL and SRL was significant for both support types. These findings carry practical implications: families and schools should actively cultivate autonomy-supportive environments. Practical strategies include empathically acknowledging students' perspectives and emotions, and providing opportunities for them to express opinions and make independent decisions. Such practices are likely to bolster students' self-efficacy for SRL, facilitate the development of SRL skills, and consequently enhance their learning enjoyment.

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Availability of Data and Materials: The data sets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval: All procedures performed in studies involving human participants were following the institution's ethical standards and were by the 1964 Helsinki declaration. Ethical approval for this study was obtained from the Research Ethics Committee of Xinyang Normal University (Ethics No. XFEC-2024-049). Parents of the students consented to the study. The students assented to the study. They completed the surveys outside of class.

Conflicts of Interest: The authors declare no conflicts of interest.

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