

Research on the Influence of Academic Burden on Students' Academic Achievement and Its Countermeasure under the background of "double Reduction"

Lei Zhang, Zhiqiang Zhou

Hunan University of Science and Technology, Xiangtan 411100, China

Abstract: Studying the impact of academic burden on students' academic achievement can provide important reference and basis for the implementation of "double reduction" policy. Based on the survey data of CEPS2015, OLS Model and Fixed Effects Model were used to analyze the influence of students' academic burden on their academic achievement. The results show that homework burden has an "inverted U-shaped" relationship with relative ranking, which can make students have positive educational expectations, but is not conducive to the healthy development of students' physical and mental health. Off-campus training can have a positive impact on students' educational expectations and a negative impact on students' physical and mental health. Meanwhile, off-campus training in midweek can promote students' relative ranking, while off-campus training on weekends has no effect on the relative ranking. Based on this, suggestions are put forward from the perspectives of government, school, parents and society.

Keywords: "double reduction" policy; Academic burden; Academic achievement; Academic self-efficacy.

1. Introduction

The excessive academic burden of primary and secondary school students not only affects their academic achievement, but also hinders their physical and mental health development, which is one of the most prominent problems at present. Therefore, Chinese authorities have introduced a set of guidelines to ease the burden of excessive homework and off-campus tutoring for students undergoing compulsory education in July 2021 (hereinafter referred to as the "Double Reduction" policy) [1]. The policy focuses on reducing the homework burden and off-campus training burden of students, aiming to promote the high-quality development of education and run the people's satisfaction education. A study on Chinese junior high school students' academic burden shows that 52.8% of students' average daily homework time exceeds the relevant state regulation [2]. Does this mean that increasing students' academic burden will improve students' academic achievement? What is the relationship between academic burden and student academic achievement? Analyzing students' academic burden under the "double reduction" policy helps us to fully understand the deep logic and theoretical basis behind the "double reduction" policy, effectively improve the cultivation quality and academic achievement. By using the data of China Education Tracking Survey (2014-2015), the paper intends to analyze the basic situation of the academic burden of junior middle school students in our country, and further explore the relationship between their academic burden and the academic achievement of middle school students, in order to provide theoretical and practical basis for the implementation of "double reduction" policy.

2. Literature review

Academic burden is an important research problem in pedagogy. For a long time, the relationship between academic

burden and academic achievement has been studied at different levels at domestic and abroad. A large number of empirical studies have concluded that homework burden and off-campus training burden are the main sources of academic burden [3], and excessive academic burden will have a negative impact on academic score and physical and mental health. Empirical data from the United States shows that students' academic burden is positively correlated with their score, and it is more significant among senior students [4]. Domestic studies have found that the academic score of students improves with the increase of homework time, and follows the law of diminishing marginal returns. There is a reasonable threshold value for homework time [2]. Some researchers also point out that excessive academic burden will bring a series of negative effects on the physical and mental health for students, which is an important reason for China to carry out "double reduction" policy [5]. It can be seen that the conclusions have not come to an agreement, and it is still difficult to clarify the impact of academic burden on academic achievement.

In general, the existing researches have made great contributions to the discussion of the influence of academic burden on academic achievement, but there are also some limitations. First, the research of academic achievement is not comprehensive, and most of the measurement index are limited to academic score. Second, the research pays more attention to the total time of homework or training course, lacks attention to the time allocation of homework (non-weekend and weekend).

3. Literature review

3.1. The influence of homework burden on students' academic achievement

As means to consolidate the teaching effect, homework has long been favored by teachers. When homework gradually shows the correlation with students' academic achievement, it

gets the close attention of parents, teachers and students, which leads to the heavy homework and becomes a burden. With the increase of homework time, the relative ranking of students began to rise. At the same time, according to the law of diminishing marginal returns, the impact of homework on students' relative ranking is that with the increase of homework time, students' academic load begins to increase, and the rise of students' relative ranking gradually slows down. Therefore, the homework time increasing cannot achieve the expected result of students' continuous rise in relative ranking. Excessive homework burden "gets half the result with less effort", leading to the decline of relative rank [5]. In addition to the relative rank, homework burden also has a significant positive impact on students' educational expectations. The more time that students spend on their studies, the more returns they expect, and the higher their educational expectations will be. The heavier the homework burden is, the longer years of education students expect. In addition, the physical and mental health of students is also an important aspect that cannot be ignored. With the increasing homework burden, students need to devote more time and energy to their homework and give up entertainment time, resulting in insufficient sleep, increased psychological pressure, and anxiety, depression and other negative emotions, so as to resist or even hate studying. Ultimately, it adversely affects academic achievement. In view of this, the following hypothesis is proposed:

H1: Homework burden has a significant effect on students' academic achievement.

H1-1: Homework burden in midweek and weekend has an inverted U-shaped effect on students' relative ranking.

H1-2: Midweek and weekend homework burden has a significant positive effect on educational expectations.

H1-3: Homework burden in midweek and weekends has a significant negative impact on students' physical health.

H1-4: Homework burden in midweek and weekends has a significant negative impact on students' mental health status.

3.2. Influence of off-campus training burden on students' academic achievement

Off-campus training, also known as "shadow education", refers to children's participation in organized and structured learning activities outside school, with the purpose of improving students' academic achievement [6]. Off-campus training widens gaps between families in terms of educational opportunities and academic achievement. On the one hand, students can generally accept the off-campus training from Monday to Friday, which can promote students' academic score and relative rank. On the other hand, students participate in the off-campus training in midweek has brought a heavy burden for them. During the weekend, students participating in training will have resistance, even have weariness of learning. the improvement of their academic score has no effect on the relative ranking of students will not have a significant impact. Secondly, participation in off-campus training will improve students' educational expectation. The more time they spend in off-campus training, the more they expect to get rewards, which is specifically manifested in the extension of years of education. Moreover, in addition to the homework burden, participation in off-campus training will also have an impact on the physical and

mental health Heavy off-campus course burden may cause changes in students' learning psychology, and even produce psychological problems. In view of this, the following hypothesis is proposed:

H2: Off-campus course burden has a significant impact on students' academic achievement.

H2-1: The burden of off-campus course burden in midweek has a significant positive impact on the relative rank, while on weekend has no impact.

H2-2: The burden of off-campus training in midweek and weekend has a significant positive effect on educational expectation.

H2-3: The burden of off-campus course burden in midweek and weekend has a significant negative effect on students' physical health.

H2-4: The burden of off-campus training in midweek and weekend has a significant negative effect on students' mental health.

4. Variable and model design

4.1. Data sources and variable description

The data used in this paper are from the China Education Tracking Survey designed and implemented by the China Survey and Data Center (NSRC) of Renmin University of China. The survey was based on the 2013-2014 school year, and the first successful follow-up of seventh graders was completed in 2014-2015. In this paper, only samples of students successfully tracked in 2015 were retained, and 7859 samples were obtained. Using Stata17.0 for data processing and empirical test.

The core explanatory variable is that students' academic burden includes homework burden in midweek and weekend, and off-campus training burden in midweek and weekend. The explained variables were students' academic achievement, as measured by the relative rank of the first semester midterm exam in 8 grade, educational expectations in 8 grade, and physical and mental health in 8 grades.

Other control variables were individual characteristic variables such as age, Registered permanent residence, gender, nationality, only child and cognitive score; family economic level, parents' marital status, parents' occupation, parents' education and other family characteristic variables, the above control variables are students in the 8 grade.

4.2. Data sources and variable description

In order to test the influence of academic burden level on students' academic achievement, the benchmark model is set based on hypothesis 1, 2, 3, 4, referring to the practice of Goldman and Zhu Min [7].

$$y = \beta_0 + \beta_1 rank + \beta_2 edu + \beta_3 hm + \beta_4 conrtols + \varphi + \mu_i + \varepsilon_{it} \quad (1)$$

5. Empirical test

5.1. Baseline regression analysis

In order to test the influence of academic burden on students' academic achievement, this paper uses the fixed effect model of school and class to carry out further empirical test. Table 1 reports the empirical results of the influence of homework burden and off-campus training burden on students' academic achievement.

Table 1. Influence of academic burden on academic achievement

		Rank	Expect	Physical	Mental			
					Frustrate	Unhappy	Boring	Sad
Home work burden	Midweek	-0.016 0.001***	0.036 0.000***	0.027 0.002***	0.086 0.000***	0.096 0.000***	0.063 0.000***	0.070 0.000***
	Weekend	-0.014 0.000***	0.042 0.000***	0.042 0.001**	0.083 0.000***	0.865 0.000***	0.060 0.000***	0.070 0.000***
Off-campus training burden	Midweek	0.006 0.015**	0.029 0.049**	0.028 0.003***	0.364 0.002***	0.054 0.000***	0.064 0.000***	0.053 0.000***
	Weekend	0.001 0.636	0.054 0.001***	-0.035 0.002***	0.034 0.011**	0.040 0.003***	0.034 0.012**	0.036 0.007***
Individual Character		Control	Control	Control	Control	Control	Control	Control
Family Character		Control	Control	Control	Control	Control	Control	Control
Fixed effect		Control	Control	Control	Control	Control	Control	Control

Note: The second row of each metric is the P values, * means significant at the 10% level, ** means significant at the 5% level, *** means significant at the 1% level.

5.2. Students' homework burden has an "inverted U-shaped" influence on the relative rank

The regression coefficients of homework burden and student achievement ranking in midweek and weekend are -0.016 and -0.014, respectively, both of which are significant at 1% level. In this case, the U-shaped test is carried out by adding the two items of weekly and weekend homework burden respectively. The reported results show that the P-values of the influence of weekly and weekend homework burden on students' relative ranking are 9.51e-07 and 5.23e-08 respectively, both of which are significant at the 1% level. Therefore, we have reason to believe that, there is not a simple linear relationship between students' homework burden and relative ranking, but an "inverted U-shaped" relationship showing first rising and then declining. That is to say, compared with too light and too heavy homework, medium homework burden can best improve students' relative ranking, which has the effect of improving their academic performance without increasing their homework burden. Therefore, students' homework burden should be kept at a moderate level, and H1-1 is valid.

5.3. Students' homework burden has a positive impact on educational expectations

The regression coefficients of midweek and weekend homework burden on students' educational expectation are 0.036 and 0.042, respectively, both of which are significant at 1% level. This indicates that with the increase of academic burden, students' educational expectation will be improved. The more time they invest in academic study, the higher return they expect, which is specifically reflected in the improvement of educational level. So H1-2 is valid.

5.4. Homework burden has a negative impact on physical health and a positive impact on mental health

First of all, the regression results of midweek and weekend homework burden on students' physical health are -0.027 and -0.042 respectively, which is significant at the 5% level, indicating that students' physical health status will decrease by 2.7% with the increase of midweek homework burden and 4.2% with the increase of weekend homework burden. Secondly, the regression coefficients of homework burden on students' mental health in midweek and weekend are 0.086, 0.096, 0.064, 0.053 and 0.364, 0.866, 0.060, 0.070, respectively, which are all significant at 1% level. It can be seen that the increase of homework burden is not conducive to the healthy development of students' physical and mental health, and the heavier the homework burden, the worse the physical and mental health of students. So H1-3 and H1-4 are valid.

5.5. Midweek off-campus training has a positive impact on the relative ranking, while weekend off-campus training has no impact on the relative rank

The regression coefficient of midweek off-campus training burden on students' relative ranking is 0.006, which is significant at the 1% level; the regression coefficient of weekend off-campus training burden on students' relative ranking is 0.001, and the P value is 0.636, which is greater than 0.1, and the influence is not significant. It can be seen that the off-campus training in midweek has a positive effect on the ranking of students, while the off-campus training on weekends has no effect on the relative ranking of students. So H2-1 is valid.

5.6. Off-campus training burden has a positive impact on educational expectations

The regression coefficients of off-campus training burden on students' educational expectation in midweek and weekend are 0.049 and 0.054, respectively. Every unit increase in off-campus training time of students will increase their expected years of education by 0.49 and 0.54 years respectively, which is significant at the 5% level. Students with higher educational expectations are more committed to their studies, and spend more time in off-campus training courses. They are more likely to persist when encountering difficulties, and tend to have higher academic achievements and educational levels in the future. So H2-2 is valid.

5.7. Off-campus training burden has a positive impact on educational expectations

The regression coefficients of off-campus training burden on students' educational expectation in midweek and weekend are 0.049 and 0.054, respectively. Every unit increase in off-campus training time of students will increase their expected years of education by 0.49 and 0.54 years respectively, which is significant at the 5% level. Students with higher educational expectations are more committed to their studies, and spend more time in off-campus training courses. They are more likely to persist when encountering difficulties, and tend to have higher academic achievements and educational levels in the future. So H2-2 is valid.

5.8. Off-campus training burden has a negative impact on physical health and a positive impact on mental health

First of all, the regression coefficients of off-campus training burden on students' physical health in midweek and weekend are -0.028 and -0.035, respectively. When students' off-campus training burden (time) increases by one unit, their physical health status will decrease by 2.8% and 3.5%, respectively, which is significant at the 1% level. Secondly, the regression coefficients of out-of-school training burden on students' mental health at midweek and weekend were 0.364, 0.054, 0.064, 0.053 and 0.034, 0.040, 0.034, 0.036, respectively, all of which were significant at the 5% level. It can be seen that excessive off-campus training burden will affect students' physical and mental health. Therefore, H 2-3 and H2-4 are valid.

6. Conclusions and suggestions

6.1. Main conclusions

Using the data of China Education Tracking Survey (CEPS 2015), this paper discusses the influence of academic burden on students' academic achievement, uses the mediating effect model to analyze the mediating effect of academic self-efficacy on academic burden and academic achievement, and conducts heterogeneity and robustness test. The main research conclusions are as follows:

Conclusion 1: Homework burden can significantly affect students' academic achievement. Specifically, with the increase of homework burden, the relative ranking of students presents an inverted U-shaped relationship, which rises first and then falls. It can make students have a positive expectation of education, but it is not conducive to the healthy development of students' body and mind.

Conclusion 2: Off-campus training burden can

significantly affect students' academic achievement. Specifically, with the increase of the burden of off-campus training in the middle of the week, the relative ranking of students presents an upward trend, but attending off-campus training on weekends has no effect on the ranking of students. Off-campus training can have a positive impact on students' educational expectations and a negative impact on students' physical and mental health.

6.2. Countermeasures and suggestions

To effectively implement the "double reduction" policy, effectively reduce the academic burden, relieve psychological pressure, avoid the internal examination of education, truly promote learning by reducing, promote excellence by reducing, promote newness by reducing, improve students' academic achievement, and achieve high-quality development of education, need the government, schools, parents and society and other multi-linkages, multi-dimensional comprehensive promotion.

First, the government should deepen the comprehensive reform of education. Strengthen off-campus training industry governance; Improve the examination and enrollment system; We will implement the policy of diverting employees from the general work force.

Secondly, the school should fully implement the five - education integration. Edify sentiment with ideology and politics; Work to enlighten wisdom; Exercise to strengthen the body; Expand quality with art; Cultivate beauty through labor.

Moreover, parents should establish a scientific view of education. Proactively respond to national policies. Emancipate the mind, cooperate with "double reduction", improve the efficiency of children's independent learning; Correct education behavior, abandon the utilitarian view of talent; Attach importance to parent-child relationship, pay attention to children's mental health, and cultivate children's sound personality.

Finally, the society should give full play to the supervisory function. Social subject to strengthen the consciousness of supervision; Social organizations should play a supervisory role; Mainstream media play a leading role.

References

- [1] Information on <https://edu.gmw.cn>.
- [2] G.M .Chen: Homework burden of junior high school students in three provinces and cities, *Global Education Outlook*.46 (2017) No.6, p.100-115.
- [3] X.Li: A study on the relationship between homework and Academic achievement of junior high school students—An empirical analysis based on China Education Tracking Survey data(2014-2015 school year),*Curriculum Teaching Research*. 81 (2018) No.9, p.51-55.
- [4] H.Cooper, J.C.Robinson and E.A. Patall: Does Homework Improve Academic Achievement? A Synthesis of Research (1987-2003), *Review of Educational Research*.76 (2006) No.1, p.1-62.
- [5] J.S.Ma, J.N.Wu: Why is the policy of reducing the burden of students difficult to achieve effects?--On the essence and mechanism of time allocation of academic burden, *Journal of Beijing Normal University (Social Sciences Edition)*. 242 (2014) No.2, p.5-14.

- [6] H.P.Xue, D.C.Xu: A study on the theatrical effect of shadow Education--Based on China Education Tracking Survey data analysis, *Educational Economic Review*. 7 (2022) No.1, p.75-98.
- [7] M.Gao, M.Zhu: Better be the head of a chicken than the tail of a phoenix?--The impact of relative rank on students' educational outcomes, *Journal of Education*. 17 (2021) No.4, p.166-182.