Time Use and Dynamics of Myopia of Middle School Students in China

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Abstract

This paper uses the nationally representative data of CEPS, verifying there exists significant gender difference on myopia prevalence. Using two main risking behaviors of myopia as the mediator variable, it reveals that the near work has positive effect and outdoor activity has negative effect on myopia; the near work time of female students is significantly more than that of male students, while the outdoor activity time of female students is significantly less than that of male students. This result discloses a mechanism of producing the gender difference on myopia prevalence: there is significant difference on the two main myopia risk behaviors between male and female students, which directly leads to the wide gender difference on myopia prevalence. Furthermore, this paper has explained the reason of gender difference on myopia risk behaviors via the theory of gender role, which implies that gender difference on myopia prevalence is actually social-constructed.

Keywords: myopia; disparity; cluster effect

Introduction

Myopia, also known as nearsightedness, is a kind of high incidence of human function damage, and its principle is because of the eye refractive error, the image formed after the external light goes through the refractive system of the eye is not just focused on the retina, but on the vitreous body in front of the retina, so that people cannot see distant objects. Myopia can cause very bad consequences. In terms of health, myopia may lead to Myopic macular lesions, retinal detachment, cataract, glaucoma and other eye diseases (Rabea,2018). Among them, myopic macular lesions have become one of the important causes of blindness. Given the consequence of myopia, the high occurrence and prevalence of myopia in adolescents has attracted the attention of the central government in China. Thus, it is urgent

to find the actual factors that causes the high proportion of myopia in Chinese students in order to tackle this problem.

The prevalence of myopia increases with ages before 30, and both the numbers and percentage of myopia increase with years (Holden, 2016). Since most people's myopia occurs in adolescence and rarely occurs after adolescence, the research on the causes of myopia is mainly focused on the problem of teenage myopia. The rapid transition of myopia in East Asia, who experienced a rapid development of economy since 1980s, is especially of concern, given the fact that the prevalence of myopia in that area is nearly the highest in the world. For example, the prevalence of myopia ranges from 14.9% for those aged 5 years old to 91.7% for those aged 18 years old in 2005; while the prevalence of myopia of the Whites aged 18 years old is only 22.8% in 2005 (Rudnicka,2016). As for China, the prevalence of myopia has increased from 81.1% in 2001 to 90.8% in 2015 for girls and from 78.3% to 84.1% for boys, according to a study of the senior high school students (grade 12) of a county in Zhejiang Province (Chen, 2018).

Based on the previous research, we ask three questions in this passage: Firstly, what is the dynamic process of myopia among Chinese junior high school students? Secondly, is myopia clustered or even distribution across different geography regions? Thirdly, how myopia is affected by the time utilization considering the cluster effect in China context. Based on CEPS data, this study investigated the characteristics and influencing mechanism of myopia changes in junior high school students in China.

Mechanism of the Myopia Onset

2.1 Intergenerational transmission of myopia

In terms of pregnancy risk and birth parity factors, studies have shown that maternal smoking during pregnancy increases the risk of myopia in children (Rahi,2011), nicotine will affect the formation of myopia by affecting the nervous system (Stone,2001). Children born to first-born fetuses are at greater risk of developing myopia than children born to non-first-born fetuses (Rudnicka,2008; Guggenheim,2013), probably because first-born babies are more likely to experience intrauterine growth restriction, which will compensate for growth in the first two years after birth. The consequence

is an increase in insulin levels that leads to the development of myopia (Ong,2004). Although studies have shown that myopia usually begins at 6-14 years of age and continues to develop until the end of the puberty stage of physical growth (Hyman,2005), there are also follow-up studies showing that body growth (including height and weight) has nothing to do with changes in myopia (Huang,2014).

Another method is to examine whether parents affect the myopia of offspring. By comparing the influence of father's myopia, mother's myopia and both parents' myopia, it is found that children's myopia increased with the increase of the number of parents' myopia (Jenny,2007). However, the influence of parental myopia on offspring myopia does not necessarily mean the influence of biological inheritance, it may also be an environmental impact. As they grow together in the same environment, siblings will accept similar cultures and education, and the results in myopia will tend to be consistent.

2.2 Social background and myopia

The acquired environmental factors is determined by one's own social class. As for adolescents, it's the social class of his or her family's class in the society. This kind of research looks for the myopia rate inequality of different social groups, and near work behavior was the most commonly used mediator.

(1) Social stratification and myopia

Some studies have analyzed the effect of urban-rural differences on myopia, and the conclusion is that the myopia rate of urban teenagers is higher than that of rural areas (Li,2015). Behind the urban-rural differences lies the difference in social and economic status, because the social and economic status of urban families is more likely higher than that of rural families on the whole. From the perspective of social stratification, social groups can be divided into different social strata depending on their economic capital and their positions in the social network, and groups in different social strata have different opportunities to access certain resources. In general, groups at higher social levels are more likely to utilize some scarce resources. As a result, students in families with more economic resources are more likely to have access to computers, mobile phones, televisions and other electronic devices that will harm their eyesight.

(2) Economic capital, cultural capital and myopia

Previous studies divided schools into public schools and private schools, and analyzed their impact on the myopia of teenagers. The study found that children who attended public and private schools had similar academic burdens at school, but not at home. Children in private schools are more likely to be short-sighted because they have to read books for longer times after school and attend several extracurricular classes. From the relationship between economic capital and cultural capital, economic capital can be transformed into cultural capital under certain conditions. Families with more economic capital can have the economic strength to raise more education for their children, so that they can get more cultural capital, which will affect the occurrence of children's myopia. Private school children belong to families that represent more economic capital, who are more likely to provide more after-school opportunities for children, which in turn affects teenagers' eyesight.

(3) Cultural capital and myopia

Myopia studies about China have divided schools into two types, namely key schools and ordinary schools, to analyze their impact on the myopia of teenagers. By contrast, the myopia rate of students in key schools is higher than that in ordinary schools. The reason is that the quality of students and teaching in key schools is higher, and the competition is more intense, so the burden of schoolwork is heavier, and the work related to vision will rise. The increase of schoolwork pressure means the decrease of other time, such as the time of physical activity and sleep (Li,2015). From the perspective of cultural capital, different families carry different cultural capital, leading to differences in the reproduction of cultural capital. In order to maintain the reproduction of cultural capital, parents with a higher level of culture education place higher expectations on their children and make more and better investments, which in turn bring greater learning burden to children, such as homework assignment and extracurricular tutorial classes (Holden,2014; Saxena,2015). In the same way, schools with higher teaching level will make higher demands on students and increase their pressure.

2.3 Environmental factors

Because the genetic factors of myopia are difficult to be effectively separated, and the growth of myopia in the world is difficult to be classified as hereditary, and can only be regarded as the influence

of acquired environmental changes (Ashby,2009), recent research has focused more on analyzing the effects of acquired environmental factors on myopia. In general, acquired environmental factors include myopia risk behavior factors, nutrition and development factors, birth parity factors, and risk behavior factors during pregnancy. Among them, the risk behavior factor of myopia is the most important explanation, and currently there are two major models in this interpretation factor: the near-work model and the outdoor activity model.

Near-work behavior refers to the act of using the eye to perform certain vision activities at close range. Long-lasting, close-up use of the eyes can increase the fatigue of the eyes, causing the ciliary muscles to lose their elasticity, thus forming myopia. These near-work behaviors include writing homework, reading books, playing games online with a mobile phone or computer, and watching TV at close range. Studies have shown that doing homework, reading books, playing games on the phone or computer, and watching TV at close range increase the risk of myopia (Jenny ,2007; Scheiman,2014; Saxena,2015; Li,2015).

There are roughly several types of research methods about the physiological factors affecting myopia. One is to perform a genome association study. Some studies have found that there are genes associated with high myopia in the Chinese Han population (Yu,2014), and studies have confirmed that there are genes associated with myopia in both European countries and Japanese populations (Hysi,2010; Hayasbi,2009). In terms of nutrition and developmental factors, studies have shown that diet plays an important role in myopia. Children who eat fast food may lack certain trace elements, which may lead to myopia (Gao,2013). Related studies in China have found that the myopia rates of different ethnic groups are also different, which shows that the myopia rate of ethnic minorities is lower than that of the Han nationality. This may be related to the unique lifestyle habits of ethnic minorities, such as dietary differences (Hao,2013).

Outdoor activity models have emerged in recent years. The model believes that the length of time for young people's outdoor activities affects the occurrence of myopia. Some researchers compared the difference in outdoor activity time between myopic and non-nearsighted people, and found that the time

of outdoor activities of myopia is less than that of non-myopia (Sun,2012). Panel studies have also confirmed that outdoor activities can reduce the likelihood of myopia (Jones,2007). Different scholars have different explanations about the mechanism by which outdoor sports reduce the probability of myopia. One explanation is that outdoor activities can increase visual flow, making light changes on the retina faster, and rapid changes in illumination can suppress vision loss (Schwahn,1997).

Another explanation is that outdoor light can stimulate the secretion of dopamine, thereby inhibiting the occurrence of myopia. Some researchers have experimented with chickens to prove that light can stimulate the release of dopamine and inhibit the decline of vision, indicating that exposure to strong light can protect vision (Ashby,209). However, a study of Norway about the sunlight has refuted this point of view (Hagen,2018).

Both congenital physiological factors and acquired environmental factors are considered as the factors that influence myopia in adolescents, so it is difficult to say which factor plays a decisive role alone.

Data and Method

1 Sample

The data used in this paper is the China Education Panel Survey (CEPS) 2013-2014 survey data (wave1) and 2014-2015 survey data (wave2). The survey was designed and implemented by the National Survey and Research Center (NSRC) at Renmin University of China. Through random sampling, 112 schools, 438 classes, and 19,487 students (including 10279 first-year students and 9208 third-year students) in 28 counties (cities, districts) were surveyed nationwide. The CEPS data is nationally representative.

2 Measures

Our outcome variable is myopia, a binary variable. CEPS asked the students to report whether themselves has myopia or not. On average, 59.06% junior high school students reported myopia in 2013-2014.

Explanatory variables: Time utilization at weekends. Figure 1 demonstrates the time utilization of junior high school students. As can been seen from figure 1, only 8.4% students do not necessarily finish homework assigned by his or her school teachers at weekend, while 37.4% need to spend up to 2 hours each day on homework, and more than half of students have to use at least 2 hours each day on homework at weekend. About 70% students don't have to attend tutorial classes hosted by educational facilities at weekends, and there are 14.8% and 15.5% students have to attend tutorial classes for up to 2 hours and at least 2 hours each day at weekends. More than half of the students (54.8%) watch TV for up to 2 hours each day at weekends, and 20.5% don't watch TV at all, while nearly 1 quarter watch TV for at least 2 hours each day at weekends. 38.2% of the students do not paly electronic games at weekends, while 43.3% and 18.5% of the students play electronic games for up to 2hours and at least 2 hours each day at weekends.
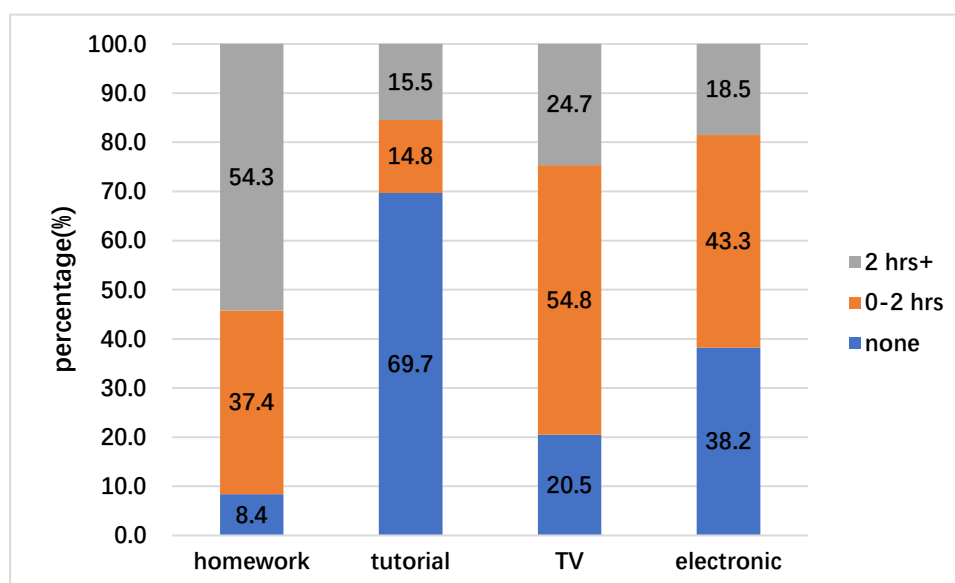

Figure 1 Time utilization percentage of junior high school students

Covariates: Depicted in Table 1 is the description of these variables in CEPS 2013-2014.

(1) Sex. The proportion of boys and girls are 51.53% and 48.47%, coherent with the unbalanced sex ratio in China.

(2) Grade. Two cohorts of junior school students are selected, grade 7 and grade 9, accounting for 52.75% and 47.25%.

(3) Rural-urban registration. About half of the students hold the rural registration (51.44%), and the others hold urban one (48.56%), which is also consistent with the urbanization rate in China.

(4) Friend hard-working. CEPS asked the students name his or her 5 best friends and evaluate how many of them are hard-working in studying. Only 9.17% of students answered there is none of them hard-working in studying, while 45.98% and 44.85% answered 1 or 2, and many.

(5) Education expectation. Only 6.12% of junior school students want to finish their study career at junior high school, and 79.21% want to go to college, while the other 14.67% want to finish their study career at senior high school.

(6) Books at home. 26.15% of junior school students has fewer books at home, while 34.74% and 39.11% reported average and more books at home.

(7) Family economy. 20.98% of students rated his or her family economy as poor, and 73.03% rated average, only 5.99% rated his or her family economy as rich.

(8) Parents' occupation. CEPS surveyed the education degree of the students' parents. Through comparation, we get the higher education degree of his or her parents. More than half of the parents hold a junior high school and lower degree (53.51%), and parents with senior high school or college education degree account for 27.945 and 18.56% respectively.

Table 1 Description of variables

Variables	Values	Frequency	Percent (%)	Cumulative (%)
Sex	girl	9,445	48.47	48.47
	boy	10,042	51.53	100.00
Grade	grade 7	10,279	52.75	52.75
	grade 9	9,208	47.25	100.00
Registration	urban	9,462	48.56	48.56
	rural	10,025	51.44	100.00
Friend hard-working	none	1,753	9.17	9.17

	1 or 2	8,790	45.98	55.15
	many	8,573	44.85	100.00
Education expectation	junior and lower	1,183	6.12	6.12
	senior	2,835	14.67	20.79
	college	15,305	79.21	100.00
Books at home	fewer	5,082	26.15	26.15
	average	6,750	34.74	60.89
	more	7,600	39.11	100.00
Family economy	poor	4,076	20.98	20.98
	average	14,188	73.03	94.01
	rich	1,164	5.99	100.00
Parents' education	junior and lower	10,402	53.51	53.51
	senior	5,431	27.94	81.44
	college	3,608	18.56	100.00

3.3 Analytic strategies

To explore the rising phenomenon of myopia, cross tabulation is used for analyzing the change and trend of myopia among junior high school students. Then, Single level binary logistic model, and Multilevel binary logistic model are performed, with the myopia as the outcome variable.

Model specification: Model 1-Model7 is specified to the cluster effect of myopia.

Model 1, 2 and 3 only considers two levels, with level two being city, school and class respectively.

Model 4, 5 and 6 only considers three levels. Model 4 considers school and city as level 2 and 3; Model 5 considers class and city as level 2 and 3; Model 5 considers class and school as level 2 and 3.

Model 7 considers four levels, with level 2, level 3 and level 4 being class, school and city.

4 Results

4.1 Dynamic change of myopia in China

Table 2 shows the change of myopia from 2013-2014 to 2014-2015, using the panel data of CEPS.

Table 2 Change of myopia between 2013-2014 and 2014-2015 (%)

myopia wave1	myopia wave2		
	no	yes	Total
no	77.35	22.65	100.00
yes	9.05	90.95	100.00
Total	40.41	59.59	100.00

The result indicates that the myopia of the student in China changed dramatically. 35.52% students remain no myopia from 2013-2014 school years to 2014-2015 school years, and nearly half of the students (49.19%) remain myopia. The other 15% or so changed their myopia status.

Table 2 shows that 9.05% students who were subjected to myopia at wave 1 (2013-2014) changed into no myopia at wave 2 (2014-2015). However, 22.65% students who were no myopia at wave 1(2013-2014) changed into subjected of myopia at wave 2 (2014-2015). This change has made the myopia rate of this cohort increased more than 6 points, from 53.06% at wave 1 to 59.31% at wave 2.

4.2 Cluster effect of myopia

This paper uses logistic model respectively to estimates the effect of doing homework, attending tutorial after school, watching TV, and playing electronic games on the occurrence of myopia among junior high school students in China.

To validate whether there exists city effect, school effect or class effect in the prevalence of myopia, we conduct 7 models without any explanatory variables first. Table list the variance of the average myopia prevalence at city, school and class level. All these 7 models are significantly different from the single level model without any explanatory variables, which proves that city effect, school effect or class effect in the prevalence of myopia do exist, and it is more appropriate to estimate the prevalence of myopia using the multilevel model.

Table 3 Likelihood-ratio test of the Null models

	model1	model2	model3	model4	model5	model6	model7
_cons	0.42	0.40	0.42	0.41	0.43	0.42	0.43

city	var(_cons)	0.21		0.19	0.22		0.22
school	var(_cons)		0.27	0.08		0.25	0.03
class	var(_cons)		0.45		0.22	0.19	0.19

Likelihood-ratio test is conducted to test whether the model with less levels is nested in the model with more levels. We compared model 4 with model 1 and 2; model 5 with model 1 and 3; model 6 with model 2 and 3; model 7 with model 4, 5 and 6. Listed in table are the LR chi2 results.

All the tests are significant (Prob > chi2 = 0.0000) , except model 7 with model 5 (Prob > chi2 = 0.0588). to elaborate the cluster effects of city, school and class level, we use the four-level binary logistic regression model in our analysis.

Table 4 Likelihood-ratio test of the 7 Models

	model1	model2	model3	model4	model5	model6
model4	136.26	58.79				
model5	392.47		160.92			
model6		256.59	102.51			
model7				259.79	3.57	61.98

Demonstrated in figure 2 are the predicted city effect, school effect and class effect. As can be seen from the figure, 9 out of the 28 cities is significantly lower than 0, which means the prevalence of myopia in these 9 countries are lower than the average level. The top right graph tells that there is no school cluster effect within each city, because no school within each city is significantly different from 0. And, the bottom left graph shows that the class cluster effect within school exists, which may be caused by the difference of myopia between grade 9 and grade 7.
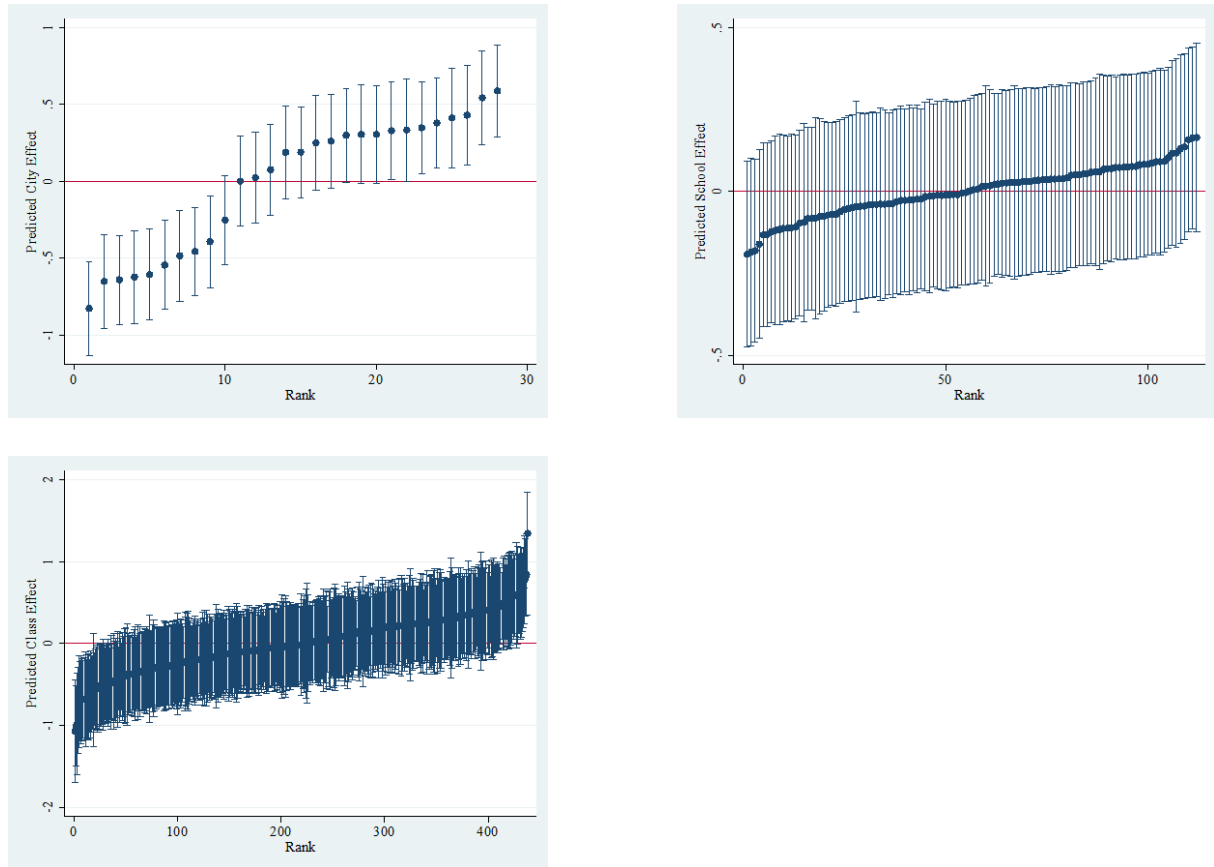
Figure 2 Cluster effect of myopia in Model 7

4.3 Time utilization and myopia

To analyze the effect of time utilization on myopia, two models of multilevel binary logistic regression are conducted, with background variables controlled in the second model and the first not. These background variables including sex, grade urban-rural registration, the number of hard-working friends, education expectancy, and books at home, family economy and the education level of parents, which have been proved correlation with myopia in cross- tabulation part. We also run two models of single binary logistic regression as comparation. Table 7 shows the results of Single and Multilevel binary logistic regression models. For simplicity, the odds ratios of background variables are not presented in the table.

When controlling other variables, the impact of time utilization on myopia has changed. Specifically, in the single-level model, when the background variable is not controlled, students who write homework for 0-2 hours every weekend have 1.237 times more myopia than those who do not

write homework on weekends; For students who are more than an hour old, the incidence of myopia is 1.560 times that of students who do not write homework on weekends. When the background variable is controlled, the difference is reduced. On weekends, students who write homework for 0-2 hours each day have a myopia rate of 1.163 times that of students who do not write homework on weekends. Students who write homework for more than 2 hours every weekend on weekends. The incidence of myopia is 1.340 times that of students who do not write homework on weekends. The above differences are statistically significant. In a multi-level model, this effect is further reduced. In the multi-level model, regardless of whether or not the background variable is controlled, students who write 0-2 hours per day on weekends and students who do not write homework on weekends no longer have differences in the incidence of myopia; when they do not control the background, they write homework every weekend. For students who are more than 2 hours, the incidence of myopia is 1.252 times that of students who do not write homework on weekends. When the background variable is controlled, students who write homework for more than 2 hours every weekend have a myopia incidence compared to those who do not write homework on weekends. 1.153 times.

In the single-level model, when the background variable is not controlled, the students who participate in the extracurricular tutoring class for 0-2 hours on weekends have a 1.07 times higher myopia than those who do not participate in the tutoring class on weekends. For students who are more than 2 hours old, the incidence of myopia is 1.560 times that of students who do not participate in the tutoring class on weekends. This difference is statistically significant. When the background variable is controlled, the difference is reduced. Students who participate in the 0-2 hours tutoring class on weekends and those who do not participate in the tutoring class on weekends are no longer significantly different in the incidence of myopia. For students above the hour, the incidence of myopia is 1.223 times lower than that of students who do not participate in the tutoring class on weekends. In the multi-level model, when the background variable is not controlled, the situation is similar to the single-level model that controls the background variable; when the background variable is controlled, the impact of attending the tutoring class on myopia is no longer significant.

Regardless of the model, the relationship between watching TV and myopia is similar. Explain that watching TV is not affected by the personal and family background. Considering the universality of TV sets, almost everyone can touch TV. Specifically, the more students watching TV, the lower the incidence of myopia. For example, in a multi-level model that controls background variables, students who watch TV for 0-2 hours have a 12% lower incidence of myopia than students who do not watch TV. Students who watch TV for more than 2 hours have a higher incidence than myopia. The student is 22% lower. This result seems illogical, but this may reflect another reality, that is, students with poor vision actively or passively reduce the time spent watching TV.

Unlike watching TV, playing video games can increase the incidence of myopia. Specifically, in the single-level model, when the background variable is not controlled, students who play video games for 0-2 hours every weekend on weekends have a myopia ratio of 1.321 times that of those who do not play video games; For students who are more than 2 hours old, their myopia is 1.284 times higher than that of students who do not play video games. After controlling the background variables, this result becomes easy to understand. The longer the video game is played, the higher the incidence of myopia. Similarly, in a multi-level model, when no background variables are controlled, the effect of playing video games on myopia is not easy to understand; after controlling this background information, students who play video games for 0-2 hours every day on weekends The incidence of myopia is 1.122 times that of students who do not play video games; students who play video games for more than 2 hours every weekend have a myopia rate of 1.205 times that of students who do not play video games. It can be seen that although the single-level model will overestimate the impact of playing video games on myopia, in multi-level models, the impact of playing video games on myopia is still significant.

Besides, the effect of grade and rural-urban registration on myopia in 3 level binary logistic regression model has increased compared to the single level binary logistic regression model; while the effect of other controlled variables on myopia has decreased. These changes have not been showed in the table for simplicity.

Table 5 Single and Multilevel binary logistic regression model

VARIABLES	Single (1) odds ratio	Single (2) odds ratio	Multilevel (1) odds ratio	Multilevel (2) odds ratio
Homework (none=0)				
0-2 hours	1.237***	1.163**	1.087	1.050
	(0.0706)	(0.0711)	(0.0671)	(0.0676)
2 hours+	1.560***	1.340***	1.252***	1.153**
	(0.0869)	(0.0804)	(0.0765)	(0.0736)
Tutorial (none=0)				
0-2 hours	1.207***	1.014	1.037	0.987
	(0.0522)	(0.0465)	(0.0494)	(0.0480)
2 hours+	1.510***	1.123**	1.178***	1.068
	(0.0661)	(0.0533)	(0.0588)	(0.0546)
TV (none=0)				
0-2 hours	0.813***	0.852***	0.885***	0.884***
	(0.0328)	(0.0360)	(0.0380)	(0.0389)
2 hours+	0.652***	0.739***	0.771***	0.785***
	(0.0296)	(0.0353)	(0.0377)	(0.0393)
Electronic (none=0)				
0-2 hours	1.321***	1.213***	1.120***	1.122***
	(0.0450)	(0.0437)	(0.0417)	(0.0427)
2 hours+	1.284***	1.344***	1.077	1.205***
	(0.0545)	(0.0609)	(0.0502)	(0.0583)
Controlled variables	NO	YES	NO	YES
Constant	1.014	0.679***	1.366***	1.124
	(0.0574)	(0.0677)	(0.143)	(0.149)

| Observations | 19,299 | 18,783 | 19,299 | 18,783 |

seEform in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5 Discussion and Conclusions

The health of children and adolescents is the future and hope of the country. In recent years, the rate of myopia in children and adolescents is very high, and the proportion is rising continuously, due to the aggravation of the burden of primary and secondary school students' use of eyes. In China, the problem of juvenile myopia, which is becoming more and more serious, has become an important issue concerning the future of our country and nation. In August 30, 2018, the Ministry of Education, together with the National Health Commission and eight other departments, formulated the Implementation Plan for Comprehensive Prevention and Control of Myopia in Children and Adolescents. According to this plan, the rate of new-onset myopia among children and adolescents nationwide will be significantly reduced, and the overall level of vision health of children and adolescents will be significantly improved by 2030. Specifically, the rate of myopia among 6-year-old children will be controlled at about 3%, that of primary school students at 38% or below, that of junior high school students at 60% or below, and that of senior high school students at 70% or below.[1] To achieve this goal, appropriate measures should be taken.

The study found that the myopia rate of the students in grade 7 in the 2013-2014 school year increased rapidly in one year. Among the students who did not have myopia in the first round (2013-2014 school year), 22.65% had myopia in the second round (2014-2015 school year). Such high incidence of myopia indicates that the use of eye hygiene in middle school is worthy of attention. Moreover, the myopia of junior high school students has the phenomenon of aggregation at the city level and class level, but there is no aggregation at the school level. This shows that students from different cities and classes use their eyes differently. In order to avoid biased and inconsistent estimation of

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[1] http://www.moe.gov.cn/jyb_xwfb/gzdt_gzdt/s5987/201808/t20180830_346673.html

aggregation effect, this study adopted a multi-level model to analyze the influence of weekend time allocation on myopia of junior high school students in China. The results showed that increased time spent doing homework and playing video games increased the risk of myopia in teenagers. However, increased time spent in after-school classes and watching TV did not increase the risk of myopia.

This conclusion has important implications for coping with the phenomenon of increasing myopia in Chinese adolescents.

Firstly, education is of great significance in the social stratification and mobility of Chinese families. For this reason, countless families spare no effort to enroll their children in key schools, so as to obtain better education resources and increase the chances of entering key universities. Key schools tend to gather in some provincial capitals and big cities, which results in the uneven distribution of education resources in space. Children who enter key schools will not be relaxed because of this. Their competitive environment makes them work harder and harder than children in ordinary schools. Even after class, they have to attend various forms and contents of tutoring classes, which increases the burden on the eyes. This is exactly one of the important reasons for the increasing myopia of teenagers.

Secondly, in the late 1990s, China joined the world wide web and countless teenagers entered Internet cafes. On August 1, 2010, the interim measures of online game management officially implemented announced that "online game business units should take technical measures in accordance with the provisions of the state to prohibit teenagers from accessing inappropriate games or game functions, limit their playing time and prevent teenagers from indulging in the Internet". Nowadays, with the increasing popularity of smart phones and tablet computers, parents are busy with their work and have no energy to take care of their minor children, which leads them to be addicted to online games, which is also the field that the law is difficult to monitor, because they no longer enter the Internet bar, but play video games at home. This is also the reason why myopia is increasing among teenagers.

However, whether children are willing to participate in extracurricular tutoring classes and whether they are willing to do so much homework is a question worth pondering by parents, the society and the school. Whether it is worth exchanging children's health for future social mobility also needs parents to

reflect deeply. In order to curb the rising trend of myopia among teenagers, the government needs to adjust the education policy, instead of taking academic performance as the only criterion for the transfer of education among students, for example, indexes such as art and sports should be included as assessment criteria. Relevant education measures should also be taken to restrict students from being forced to participate in various extracurricular tutoring classes that do not conform to their will, such as limiting extracurricular tutoring classes to less than 2 hours. As parents, they should spare more time to accompany their children to grow up healthily, so as to avoid their children killing time with video games on weekends and indulging themselves in them.

In a word, the prevention and cure myopia of children and teenagers needs the joint efforts of the government, schools, medical and health institutions, families, students and other aspects, and the whole society needs to act together to care for children's eyes.

Funding

Reference

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