

Non-Intelligence Influencing Factors on Academic Performance of Primary School Students

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Abstract: After entering the elementary school, children begin to conduct purposive and systematic learning activities under the guidance of teachers. The objective evaluation standard of learning activities, that is, the academic performance, is also receiving more and more attention. This research explores the non-intelligence factors that affect the academic performance of primary school students, mainly focusing on their personal factors and family factors. Among the personal factors, self-regulation, motivation, personality and fitness all have significant impacts on academic achievement. In terms of family factors, parental involvement, family emotional environment and socioeconomic status are all related to the academic performance of primary school students.

1. Introduction

As we all know, preschool children's learning is mainly in games. But in primary schools, there is a complete learning system. They need to follow a specific knowledge system for curriculum learning, and there is an objective method to evaluate students' learning results. So, the family, school and students themselves began to pay attention to the academic performance. The excellent academic performance of primary school students can lay a solid foundation and provide a good beginning for their secondary education and higher education in the future. Therefore, a large number of teachers and scholars have paid more attention to the factors that affect primary school academic performance and conducted numerous researches. Previous studies have found the close relationship between primary school students' intelligence and academic performance, proposing that intelligence is the most important factor to predict their school performance [1]. This paper will have a discussion from the perspective of non-intelligence factors, especially the personal factors and family environment factors.

2. Personal factors

2.1. Self-Regulation

To a large extent, the academic performance of primary school students is closely related to their own characteristics. A large number of studies have proved that children's IQ has a very close relationship with their academic performance [1]. But in addition to IQ, in the field of academic performance

research, child's another trait that draws wide attention can be called self-regulation. In the past decade, researchers have conducted a lot of research on the relationship between self-regulation and academic achievement. Different research involves different disciplines, for example, psychology, pedagogy, and social behavior, etc. In different fields, the definition of self-regulation is not completely consistent. However, it is certain that self-regulation is a complex composed of cognition, emotion and behavior. Individuals can control their motivation, emotions, behaviors and other aspects through self-regulation. From the most relevant perspective to academic performance, self-regulation of primary school students usually includes three factors including flexible attention, working memory and inhibitory control [2]. Flexible attention refers to the ability to focus on doing one thing and shield surrounding interference factors, as well as the to quickly shift attention in time. It is the basis of self-regulation. Working memory refers to the ability to memorize instructions and rules. When students encounter difficulties in their studies, they often need working memory to help solve problems. Pupils with problems in working memory often have difficulties in reading and mathematics [3]. Inhibitory control is to make students stop their existing reactions and react more adaptively. Primary school students with stronger inhibitory control have better performance in mathematics and writing [4]. All three can independently and comprehensively help primary school students to improve their academic performance. In addition, Day and Connor used the Remembering Rules and Regulation Picture Task (RRRP) to measure 282 third-grade primary school students in the United States, and believed that primary school students with strong self-regulation ability tended to have better academic performance than those with weak self-regulation. In addition, many studies have found that self-regulation and reading and mathematics is positively correlated [5], and self-regulation is negatively correlated with the risk of future learning difficulties [6].

2.2. Motivation

A large number of studies have explored the impact of motivation on primary school students' academic performance, and some believe that the impact of motivation on performance can even exceed that of cognitive ability. Motivation can be divided into intrinsic motivation and extrinsic motivation and the connection in between is independent. For example, Lemos and Veríssimo (2014) found that intrinsic motivation and extrinsic motivation were two relatively independent dimensions [7]. Bateman and Crant (2003) found that there was no significant negative correlation between intrinsic motivation and extrinsic motivation [8]. Intrinsic motivation generally refers to the emotional satisfaction that students get in learning activities. It does not give students external rewards or pressure. For example, students are also willing to read their favorite extracurricular books without the requirements and rewards from parents and teachers. Extrinsic motivation generally refers to a kind of motivation produced by students in order to get rewards and avoid punishment. For example, students will actively speak in class in order to get praise from the teacher, and finish homework in time in order not to be punished.

During primary school, the influence of intrinsic motivation on performance is stable, and it has been proved to consistently improve student performance [7]. Potential motivational factors (including self-cognition ability and intrinsic value) have a significant impact on performance [9]. Compared with intrinsic motivation, extrinsic motivation has a more complicated relationship with pupil's performance. Lemos and Veríssimo (2014) conducted horizontal and vertical studies with 200 students from third, fourth, fifth and sixth grades as samples, and found that for younger students, there was not much connection between external motivation and performance. But as they grow older, by the fourth grade, there will be a negative correlation between external motivation and academic performance [7].

Although it has been clarified that intrinsic motivation and extrinsic motivation are two independent dimensions and there is no contradiction between the two, their compatibility will

decrease as the aging of primary school students [7]. This may be because primary school students have a strong teacher-oriented nature in the lower grades, so they are willing to follow the teacher's arrangement and to finish their homework. Their internal and external motivations are consistent to a certain extent. In higher grades, students begin to have their own ideas, and the internal motivations generated by these ideas may be incompatible with external motivational factors, which may lead to a negative impact on their academic performance.

2.3. Personality

In addition to the above-mentioned personal factors, personality is also considered to be a personal factor closely related to academic performance. According to the five-factor model of personality, personality traits can be divided into conscientiousness, extraversion, agreeableness, openness to experience, and emotionality [10]. There are age and gender differences in the relationship between personality characteristics and children's academic performance.

In terms of age differences, Laidra et al (2007) found that conscientiousness, openness to experience, and agreeableness could all continuously promote primary school students' academic performance at the elementary level, but the impact of openness and agreeableness on performance will decrease as the grade increases [11]. Extraversion is a predictor of high scores in middle school, but it predicts lower scores in college [12].

In terms of gender, the personality factors related to academic performance of boys and girls are also different. For example, in the five-factor model of personality, only openness to experience has been proved to not affect girls' academic performance [13], and the relationship between conscientiousness and academic performance is significantly stronger in girls than in boys [14]. Therefore, the reason why girls have higher academic performance in primary school may be because the dominant concept of their female role matches the attitude required to achieve good performance, while boys do the opposite [15].

2.4. Physical Activity and Fitness

The above-mentioned personal factors are very classic in related research on academic performance. In recent years, more and more researchers have gradually paid attention to the impact of physical activity or physical health on students' performance. Fitness refers to a healthy physiological state that can reduce the risk of disease. It is the basis for a healthy body and for participating in sports activities. It includes cardiorespiratory endurance, muscle strength and endurance, flexibility, and body composition [16]. Physical activity refers to the activities that require energy produced by muscle movement.

In the past two decades, there has been a lot of research on the relationship among physical activity, fitness and academic achievement. For example, Donnelly et al (2016) believed that there was a positive relationship between physical activity, fitness, cognition, and academic achievement (especially on math) [16]. Fisher et al (2011) found that aerobic fitness was associated with better executive function and mathematical performance [17]. After controlling for factors such as race, parents' education levels, and baseline scores, children who participated in daily exercise had more significant improvements in math than children who did not [18]. Although there needs more exploration on the impact of the type, frequency, and time of practice activity on academic achievement, there is no evidence that an increase in physical activity will have a negative influence on cognition or academic achievement. Therefore, more research is needed to explore the causal relationship between them.

3. Family factors

3.1. Parental involvement

Research on the relationship between parents' involvement in children's learning achievement is getting more and more attention from researchers and educators. Parental involvement indicates parents' participation in children's learning-related activities in family and in school. Therefore, this study divides parental involvement into two main types: family-oriented parental involvement and school-based parental involvement.

Family-oriented parental involvement refers to parents' behavior to promote children's learning at home, such as communication about school affairs, guiding children's family learning activities, parents' learning expectations for their children, and so on. School-based parental involvement refers to parents' participation in school activities, such as participating in parents' meetings and school volunteer activities.

In primary school, there is a significant relationship between parental involvement and children's academic performance [19], and different types of involvement also have different relationships with academic achievement. In terms of expectations, parents' expectations of their children are positively correlated with their children's academic achievement, and it is the most closely related type of involvement [20]. In the aspect of homework, the results are not completely consistent. For example, some studies think parental involvement in homework will negatively affect children's academic performance [21]. But some scholars believe that for children who do not need their homework to be checked, there is no obvious relationship between checking and performance, which may be otherwise useful for children who need their work to be checked. In fact, there are many kinds of homework involvement, including autonomous support, control, interference and cognitive participation. When the involvement is autonomous support, it can positively affect academic performance, but when the involvement means control, it often negatively affects academic performance [22]. In addition, reading at home can also positively affect children's learning, especially in children's reading and writing ability [20]. In addition to the type of involvement, there are other variables that can affect students' academic performance. For example, mothers with higher education tend to participate more effectively, because they are more skilled in participation and can better control the intensity and timing. However, it is worth noting that as long as the degree of parental involvement is high enough, there is little difference in the impact of parents' educational level on children's performance [23].

The impact of school-based parental involvement on primary school students' academic achievement is still not clear. The influence of parents' voluntary service in school has different results in different studies. For example, some studies believe that parents' participation in children's school activities can positively affect students' academic performance to a large extent [24]. But some scholars have found that parents' participation in school volunteer activities is not closely related to students' academic performance [25].

Obviously, most studies tend to conclude that parental involvement has a positive impact on students' academic performance. Some inconsistent conclusions may be because they forget to take factors such as race, personality and socio-economic status into account. But generally speaking, the influence of parental involvement on primary school students' performance can largely cover the differences caused by socio-economic status, race and other factors. Therefore, parental involvement is of great significance to students' academic performance.

3.2. Family environment (emotional and financial)

For primary school students' academic achievement, family environment is also an important factor in addition to parental involvement. Understanding how children's education is affected by family environment is of great significance to improve the quality of education. Family environment is divided into family soft environment, such as the emotion and atmosphere, and family hard environment, such as economic situation.

In terms of family emotional environment, Bodovski and Youn (2010) analyzed a large number of American families (including white families, black families and Asian families) of their family emotional environment with kindergarten kids from the three dimensions of parental depression, parental warmth, and use of physical discipline [26]. They found that parents with low family status, single parents and black parents were more likely to be depressed, and that parental depression was associated with children's lower reading and math scores. Thus, it reflects the significance of the family emotional atmosphere on primary school students' academic performance.

In terms of family socio-economic status, family income has a significant impact on childhood academic achievement [27]. Sanbonmatsu et al (2006) found that low-income families often encountered violent neighbors, which were associated with children's poor performance [28]. Moreover, with the growth of age, the gap between children with low family income and those with high family income is widening, because they lack of economic resources and face more challenges.

4. Conclusion

Primary school children are in the stage of starting to establish social relations. In primary school, the influence on academic performance comes more from personal factors and family factors, but it is undeniable that in addition to the factors discussed above, there are other factors that can affect pupils' academic performance, for example, teacher-student relationship [29], peer relationship [30] and so on. All the factors discussed above do not affect primary school students' performance alone. There may be interaction between them. For example, low family income may lead to parents not having too much time to participate in primary school students' learning, so as to reduce children's self-expectation or motivation. Low parental expectation may lead to weak external motivation of primary school students. The lack of physical activity may lead to the decline of primary school students' physiological function, so that their flexible attention, working memory and inhibitory control can be reduced. Poor teacher-student relationship may lead to the earlier incompatibility between the internal motivation and external motivation of lower grade pupils. The relevant research conclusions on the influencing factors of children's academic performance are of great significance to the education of primary school students. When analyzing the influencing factors of primary school students' performance, researchers should focus on many aspects, and more importantly, pay more attention to the interaction between various influencing factors.

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