

Assessment of Academic Achievement among Minority Migrant Children in China

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Abstract

Low academic achievement stands as a major challenge for migrant children from ethnic minorities in China. This social problem can cause other problems, such as dropping out and poor future outcomes. However, current approach in evaluating academic performance among migrant children from ethnic minorities is solely based on the student's grades. This evaluation system seems do not meet the requirements of China's compulsory education quality indicators. Therefore, this study proposed a new approach in measuring academic achievement in minority migrant children by considering four dimensions, namely academic, moral, physical-mental, as well as overall personal development (including two parts of aesthetic quality and labor and practice). A total of 538 minority migrant adolescents in China aged 13 to 15 years old participated. We conducted item and factor analyses on sample 1 (n= 147) and a version with 17-item measurement was formed. We ran correlation, reliability test, and factor analysis on sample 2 (n = 391) to access the reliability and validity of the measure. The results showed a good reliability and validity to assess the academic achievement in migrant children of ethnic minorities in China.

Keywords: Academic Achievement, Minority Migrant, Assessment, Factor Analysis, Asia

Introduction

In recent years, a great deal of attention has been given to the increase in global population mobility. This is mainly due to changes in economic models and dynamic shifts worldwide. Minority migrant children refers to children from ethnic minorities who are frequently migrates due to family background, employment needs, or other factors (Portes & Zhou, 2012). These children face many educational challenges, such as adapting to new environments, dealing with cultural differences, and the unequal distribution of educational resources (Suárez-Orozco et al., 2015). As a result, scholars and policymakers have shown

increasing interest to address issues related to academic achievement among minority migrant children (Umansky & Reardon, 2014).

The Program for International Student Assessment (PISA), organized and implemented by the Organization for Economic Co-operation and Development (OECD), is a research project that evaluates the quality of education. The goal of the PISA is to test students' mastery of a specific subject and assess students' ability to meet the changing challenges of the modern world (OECD, 2019). According to PISA data, in most participating countries, the academic performance of migrant children is generally lower than that of non-migrant children (Byrne et al., 2018).

In China, migrant children have lower education levels than non-migrant children, regardless of school quality (Fan, 2005). Indeed, extensive research has pointed out that minority migrant children generally perform poorly academically, as manifested by low enrollment rates, poor academic performance, and high dropout rates (Deng, 2019; Rumberger, 2011; Xia, 2014). These circumstances have further contributed to the trend of younger delinquents and a higher proportion of school dropouts among the criminal population (Chen et al., 2019). In China, the enrollment and dropout rates of migrant children of ethnic minorities are at a disadvantage compared with those of Han children (Xia, 2014). Based on these issues, it is of great practical and theoretical significance to develop a set of scales specifically for assessing the academic achievement of minority migrant children.

Currently, measurement that specifically designed to evaluate academic performance of minority migrant children in China has yet to be developed. In different countries and regions, diverse assessment methods and tools such as standardized tests, educational assessment reports, and academic progress tracking are employed to assess the academic progress of minority students (Cummins, 2000; Ladson-Billings, 1995). Thus, it is important to note that while tools for understanding student performance are helpful, they must be adapted to fit specific educational systems and cultural contexts (Abedi, 2004).

Also, the approach in evaluating academic performance must align with the Theory of Positive Youth Development (Benson et al., 2007). The theory takes a unique approach to adolescents' growth by emphasizing the nurturing and cultivation of their positive qualities, which includes academic achievement (Benson et al., 2011). Acknowledging that the development encompasses various aspects including physical, cognitive, social, and emotional domains, it focuses on fostering the holistic development of adolescents as well (Benson et al., 2007). Thus, by considering the gaps and opportunities, we explored a new approach to measure academic achievement, particularly on minority migrant children.

Present Study

The present study aimed to verify the specific academic achievement performance of Chinese ethnic minority migrant children through a self-compiled academic achievement questionnaire. We compiled a list of items based on a theoretical framework that we developed. Both literature review and expert consultation were used to gather the items (Creswell & Clark, 2017; Haynes et al., 1995). Also, we referred to the "Evaluation Standards for the Quality of Student Development in Compulsory Education in China" as the main reference that consider cultural context (Chinese Academy of Education Sciences, 2021). These standards provide explicit content and guidance for the scale's items, ensuring that the questionnaire can accurately measure the academic achievement of children of ethnic minority immigrants in China.

Method***Participants and Procedures***

A total of 538 junior high school students aged between 13 to 15 years old participated in this study. All participants were gathered from four administrative regions of Lanzhou City, namely Chengguan District, Qilihe District, Anning District, and Xigu District. By using a multistage cluster sampling, the participants were recruited from 12 different schools in the selected districts. Sample 1 were consisted of 147 participants (mean age =14, 50.7% of male, 49.3% of female). Meanwhile, sample 2 were consisted of 391 participants (mean age =14, 53.2% of male, 46.7% of female). All participants were selected randomly at their respective schools.

Self-report Measures

The academic achievement questionnaire comprises of 17 items, which are mainly divided into four parts: moral development, academic development, physical and mental development, and overall personal development (including two parts of aesthetic quality and labor and practice). For instance, items such as “*Ability to complete learning tasks independently*” and “*Ability to respect teachers and classmates, treat others politely, and get along harmoniously with others*” are included. Participants are asked to rate their performance of each behavior using a five-level scale, ranging from 1 (*never*) to 5 (*always*). The higher the score, the higher the degree of completion.

Also, a section that measures the frequency of participants’ active appreciation of literary and artistic works or watching cultural performances (musical dramas or dramas) was also included. Participants were asked to rate how often they perform this behavior using a five-point scale ranging from 1 (*Never active appreciation, no relevant literary appreciation ability*) to 5 (*Frequent active appreciation, high literary appreciation ability*). Higher score depicts high degree of completion.

Statistical Analyses

The SPSS 26.0 statistical software package was used to analyze the quantitative data (Field, 2009). The item composition of the final ranking was determined by evaluating the structure and reliability of the scale, ensuring that it had high reliability and validity (Nunnally, 1978). We applied the KMO test measure and Bartlett’s sphere test to determine whether factor analysis can be used for construct validity testing. Inter-item analysis was used to assess individual items’ quality, discrimination, and differentiation on a scale. This study applied discriminant analysis as the method of item analysis, aiming to determine whether the items in the hierarchy can effectively distinguish the differences between high-ability and low-ability subjects. This study adopted the criterion that the decision value (t value) is greater than 3, the criterion that the Cronbach’s alpha coefficient after deleting the item is more significant than .80, and the criterion that the correlation coefficient is more critical than 0.40.

Results***Inter-item Analysis***

Based on the inter-item analyses, the results showed that five items showed lower correlation values to their respective dimensions. For instance, the inter-item correlation values for an item in moral development was .38, an item on academic development was .39, and three items on physical and mental development were .36, .39, and .39. According to the set criteria, all these items were not conformed to the criteria. Therefore, five items were deleted due to the low values.

Factor Analysis

The analysis with KMO test found that the KMO index value of the minority migrant children's academic achievement scale was .80, and the significance value of Bartlett's sphere test was .00 (the standard is $p < 0.05$), indicating that factor analysis can be used for construct validity testing. Thus, the 29 items were retained after screening and conducts principal component analysis and maximum variance orthogonal rotation analysis.

From the perspective of the rotated component matrix, the moral development was mainly concentrated on the first factor and the third factor. Academic development, physical development and mental development were loaded on the fifth factor, while overall personal development (including two parts of aesthetic quality and labor and practice) was scattered in the second, fourth, and seventh factors. Compiling the scale's first draft, the measure was divided it into four dimensions: moral development, academic development, physical and mental development, and overall personal development (including two parts of aesthetic quality and labor and practice), according to the "China Compulsory Education Quality Evaluation Index." To retain the original dimensions, some items were deleted. The principle was to limit the retention of the highest factor loading. The primary method was to conduct a factor analysis whenever a question was deleted. According to these principles, the steep slope diagram formed is shown in Figure 1.

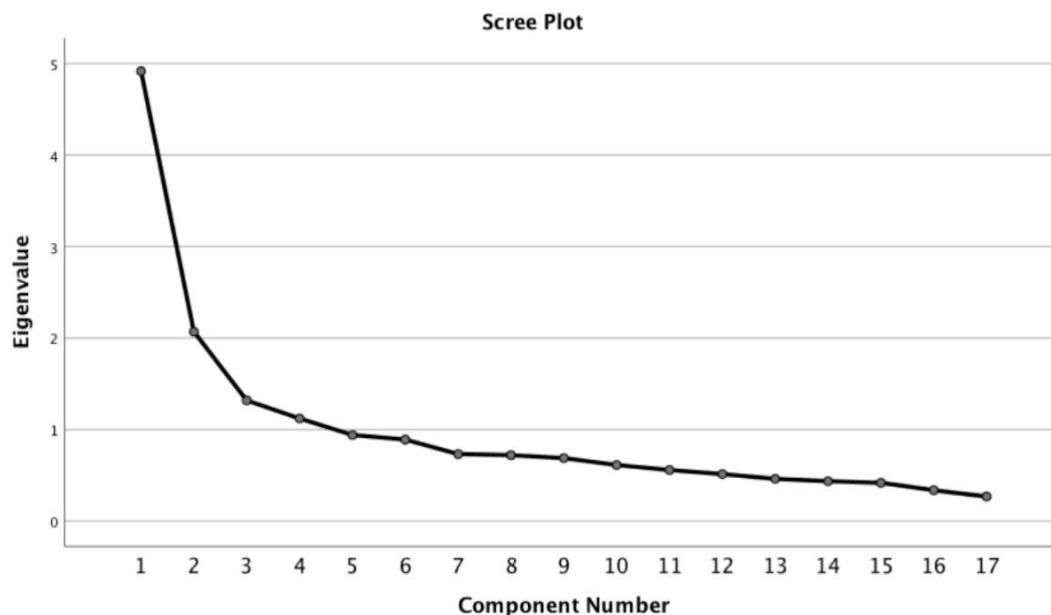


Figure 1. Factor steep slope

Figure 1 depicted four factors with eigenvalues greater than 1. At the same time, according to the analysis, it concluded that the factor loading of the last 17 questions of the factor analysis of the minority migrant children's academic achievement scale is between .48 to .82. The final factor analysis results are shown in

Table 2:

Table 2

Eigenvalues of common factors in the scale of academic achievement of migrant children of ethnic minorities

		Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalues	after rotation	4.92	2.06	1.32	1.12
Explained variance		15.48%	14.33%	14.25%	11.38%
Total Variation		55.44%			

Table 2 showed that four factors were extracted. The eigenvalue of the first factor was 4.92, and the explained variation after rotation was 15.48%. The eigenvalue of the second factor was 2.06, and the explained variation was 14.33%. The eigenvalue of the third factor was 1.32 and the explained the variation was 14.25%. The eigenvalue of the fourth factor was 1.12 with the explained variation was 11.38%. The total explained quantity (55.43%) met the standard, i.e., above 50%. This also showed that the 17 questions could explain 55.43% of the academic achievements of minority migrant children, which an indicator of a good validity.

Reliability Test in Sample 1

In terms of reliability testing, this study mainly analyzes consistent reliability. Calculating each factor and Cronbach's α coefficient. In terms of reliability, the overall Cronbach's α coefficient was .84, with each dimension's coefficient value was above .83. The results showed that the new measurement had a good consistency.

The predictability of the scale on academic achievement and its reliability and validity test

The "School Achievement Scale for Minority Migrant Children in China" was used to conduct an empirical investigation to evaluate the reliability and validity of the scale developed in this study. This study randomly selected five junior high schools with migrant children from ethnic minorities. Four hundred questionnaires were distributed, and 391 valid questionnaires were recovered, with an effective recovery rate of 97.8%.

Evaluation of predictive ability: correlation analysis and regression analysis

The second study used correlation analysis and regression analysis to evaluate whether the scale can represent the academic achievement of minority migrant children. Correlation analysis calculates explicitly the correlation coefficient between scale scores and academic achievement and aims to measure the linear correlation between the two. Meanwhile, regression analysis explores the predictive ability of the scale scores on the academic achievement of migrant children of ethnic minorities through the adjusted R^2 value.

Correlation analysis results (Table 3) showed that among minority migrant children, there was a significant positive correlation between scale scores and academic achievement

($r = .84$, $p < .01$). It showed that the scale was substantial in terms of representativeness and had some validity in predicting academic achievement.

Table 3

Correlation analysis coefficient and regression analysis coefficient

	Correlation Coefficient (r)	Correlation Significance (p)
Correlation analysis	.08	<.01

Reliability analysis in Sample 2

In terms of reliability testing, the result showed that the Cronbach's alpha coefficients of all elements were range from .82 to .88, showing good internal consistency. The Cronbach's α coefficient of the full scale was .81, indicating that the scale had higher consistency (Table 4).

Table 4

Cronbach's a coefficient index of the academic achievement scale of minority migrant children

Factor	Cronbach's α coefficient
F1	.82
F2	.86
F3	.86
F4	.88
Total	.81

Validity analysis in Sample 2

In this study, the scale's validity was tested for construct validity, and the factor analysis method was used to explore the scale's construct validity. The analysis focused on the correlation between each factor, element, and overall ranking. The results showed that the correlation range among the various factors was between .72 - .81, indicated a high correlation coefficient. This might stem from the high internal consistency exhibited by each element in the internal consistency test, which explained the high correlation among factors. These results indicated that the scale had a good consistency in its internal structure (Table 5).

Table 5

Correlation between the various factors of the scale and the correlation between the factors and the total scale (n=391)

	F1	F2	F3	F4
F1	.751 **	-	-	-
F2	.670 **	.721 **	-	-
F3	.665 **	.736 **	.805 **	-
F4	.682 **	.741 **	.782 **	.795 **

Note** $p < 0.01$

Discussion

The present study constructs a compiled scale to assess the academic achievement of migrant children of ethnic minorities in China. It could provide an essential tool for research and improvement of their educational status. The scale combines the actual domestic situation and the theoretical and practical basis of foreign experience and has a good structure and reliability. In the context of the theory of positive youth development, academic achievement is indeed an essential component of a young person's overall well-being and growth (Benson et al., 2007). More importantly, the theory recognizes the importance of developmental assets, which include internal factors that contribute to better understanding on academic achievement (Benson, 2007; Benson et al., 2011). In this study, we suggested four developmental aspects that can act as the internal factors.

Yet, further efforts can be done to improve the scale. For instance, a limitation of this study is that it was conducted cross-sectionally. Therefore, utilizing longitudinal study design can significantly deepen our understanding of changed viewpoints, particularly on the stability and consistency of the measurement. This has the potential to greatly enhance our overall comprehension on it. Also, future research can increase the sample size and conduct cross-cultural comparative studies to gain a deeper understanding of the factors that affect the academic achievement of minority migrant children. In addition, further research can also focus on evaluating the effects of educational measures to provide more targeted educational intervention strategies to promote the academic development and educational equity of migrant children of ethnic minorities.

Conclusion

To conclude, this study presents a comprehensive scale aimed at evaluating the academic success of migrant children from ethnic minorities in China. Drawing inspiration from the current domestic landscape and incorporating insights from international experiences, this scale is a valuable resource for researching and improving the educational outcomes of this unique population. Within the framework of positive youth development theory, the study underscores the importance of academic achievement as a pivotal element in a young individual's overall well-being and development. The proposed scale boasts a good reliability, positioning it as a tool for future research endeavors in gaining insight and enhancing academic success. Moreover, this study delves into four key internal factors that play a crucial role in fostering a profound comprehension of academic success, in line with the overarching objectives of promoting positive youth development. Taken together, the results of this research offer a multi-dimensional perspective on evaluating and enhancing the academic welfare of ethnic minority migrant children, offering valuable insights for both scholarly analysis and practical strategies.

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