

Randomised Controlled Trial of Self-Affirmation Intervention on Students' Academic Performance: Promising Impacts on Students from Migrant Hukou Status

Jilong Yang ^{1,*}, Yue Zhao ^{2,*}, Yuexin Ji², Jiaxin Ma², Lanyu Li², Xiaoyong Hu ²

¹The Open University of Guangdong, Guangdong Polytechnic Institute, Guangzhou, Guangdong, 510091, People's Republic of China; ²Faculty of Psychology, Southwest University, Chongqing, 400715, People's Republic of China

*These authors contributed equally to this work

Correspondence: Xiaoyong Hu, Faculty of Psychology, Southwest University, 2 Tiansheng Road, Chongqing, 400715, People's Republic of China, Tel +86 177 8472 7339, Email huxiaoyong@swu.edu.cn

Purpose: Drawing from the sociocultural-self model, this study aims to examine the influence of self-affirmation on the academic outcomes of lower-class migrant students, as well as the psychological mechanism underlying this phenomenon.

Patients and Methods: A field experiment was conducted at a comprehensive secondary school in the southern region of China. Our study sample comprised 1534 immigrant students from diverse regions across the country, with an average proportion of 59.6% of students registered with a rural hukou. The hukou system plays a pivotal role in measuring social class in China, thus it was used as a proxy for lower and higher social class, with rural hukou students considered to be lower-class and urban hukou students considered to be higher-class. Prior to the English test, students in the self-affirmed group were engaged in a brief writing exercise that focused on their core values, whereas the control group wrote about a neutral topic.

Results: The primary outcome of interest was the effect of self-affirmation on English test scores, whereas the secondary outcome was the students' survey stereotype threat. The results exhibit that self-affirmation more significantly improved the English test performance of lower-class students compared to higher-class students, and this positive effect was mediated by reducing stereotype threat.

Conclusion: Our findings unravel the impact of self-affirmation on the academic performance of migrant students from different social classes and signify the mediating role of stereotype threat in this process. The present study extends previous findings to students from immigrant families in the Chinese cultural context, and these findings demonstrate that self-affirmation can constitute a promising intervention for stereotype threat and achievement gaps due to social class differences in immigrant family groups. Considering that this intervention takes only about 15 minutes of time, entails almost zero cost, does no harm, and that it focuses on disadvantaged immigrant students, it may provide valuable insights for educational policies to be implemented in a new type of migrant city such as Shenzhen.

Keywords: social class, self-affirmation, stereotype threat, academic performance

Introduction

The number of immigrant families in China is on the rise, in tandem with the rapid development of the economy. Due to the reforms and opening up policies implemented, individuals have migrated from rural areas to urban centers and small towns to metropolitan areas. The Seventh Census of China accounted for a staggering 376 million immigrants in 2020, surpassing the total population of the United States (331 million). Notably, 71.09 million of these immigrants are children, amounting to about 23.86% of the entire child population in China. However, migrant children that follow their parents tend to suffer from neglect and rejection. Empirical findings reveal that migrant children notably experience competitive exam setbacks in areas such as Mathematics, Science, and language proficiency, displaying a performance

deficit when put in comparison with their urban counterparts.¹ According to human capital theory, a student's academic proficiency level considerably impacts their employability prospects and subsequent earning potential.² Notably, academic excellence is a crucial indicator for individuals in achieving their long-term developmental targets and higher educational attainments. Higher academic performance levels predict greater scholastic accomplishments and enhanced employability in the labor market. Hence, the critical inquiry here is, what factors account for migrant children's academic performance deficits?

Research findings suggest diverse factors that impact migrant workers' children's academic achievements, such as living conditions, parental counseling, education expectations, school input, school type, and family social class. Significantly, social class serves as the most prognostic factor for the academic performance of migrant workers' children.³⁻⁸ A general trend indicates that children from higher social class tend to perform better in academics. Migrant workers constitute a unique demographic group that experiences a class leap when they migrate from rural to urban centers. However, they occupy relatively low social positions in urban communities. Thus, we question the impact of social class on the academic performance of migrant children and explore solutions that could alleviate the negative effects of social status. Addressing these queries could considerably enhance the academic performance of migrant workers' children, bolster their human capital accumulation, and increase their competitiveness and returns on education.

Social Class and Academic Achievement

Social class refers to a conglomerate of groups that have been established for a variety of reasons, encompassing economic and political factors, and are stratified into distinct positions in the social hierarchy, exhibiting objective disparities in social resources such as income, education, and occupation, as well as subjective perceptions of the resulting differences in social status between these groups.⁹ Social class, according to this definition, encompasses both objective and subjective aspects. Objective class is typically quantified by educational attainment, occupation, or income, while subjective class is assessed by a 10-runged ladder that symbolizes ascending levels of social class.

Research on general population groups has shown that social class has a broad and lasting impact on an individual's educational outcomes. Social class holds a pervasive and long-lasting effect on an individual's education. Irrespective of the metrics used to measure social class (eg, education, income, or occupation), it impacts not only the educational opportunities available to students (such as the quality of accessible schools) but also their chances of achieving success in their studies.¹⁰⁻¹³ Despite the fact that there have been countless occurrences of offsprings of humble origins rising to nobility, it is now a widespread occurrence that students from lower social classes do not perform as well academically as their peers from higher social classes. For instance, results from a nationwide follow-up study in the United States overseeing 81,000 high school students in the 9-12 grades over 11 years revealed that social class was a far more powerful predictor of academic accomplishment than individual factors such as personality traits (openness, extraversion, conscientiousness, etc.) and intelligence.¹⁴ Adolescents from higher social classes attain higher levels of education as adults. Even among students with equivalent prior grades and examination scores, research has demonstrated that those from disadvantaged social class backgrounds are much less likely to complete high school, attend a four-year college, or graduate from a four-year college or university.¹⁵ Correspondingly, research conducted in Pakistan has returned comparable findings, with substantially fewer students from lower social classes graduating from universities compared to those from higher social classes.¹⁶ A meta-analysis of 215,649 students from 78 basic education levels in mainland China evaluated social class and academic achievement, further validation of the above conclusions.⁴

Based on previous research, migrant students are defined in this study as students who temporarily reside in the city of migration with their parents or other guardians and attend local schools.¹⁷ For migrant students, previous studies in Western contexts have found that migrant students are relatively underperforming by comparing the academic performance of migrant and non-migrant students.¹⁸ Studies in the Chinese context have similarly found that migrant students are less academically engaged and perform less well than local children.¹⁹ Notably, migrant students tend to be socioeconomically disadvantaged compared to local students. Researchers have pointed out that the achievement gap between migrant and non-migrant students is largely due to the social class differences between them.²⁰ However, while empirical research tends to treat migrant students as a homogeneous group, there is still little research on social class differences within the migrant student population. Although the number of migrant students is growing rapidly, their

educational problems and their underlying mechanisms (eg, from social class to academic achievement) have not yet been fully identified. To fill these research gaps, there is a need to explore the link between social class and academic achievement within the migrant student population. The significant link between social class and academic achievement may also apply to migrant children. It has been shown that within migrant students, achievement gaps emerge from an early age and are related to socioeconomic status (SES).²¹ In China, however, hukou status plays an important role in measuring social class. The hukou system was introduced in the early 1960s to regulate labour mobility and population growth in large cities. Every resident is registered and classified as urban or rural based on the registration status of his or her household. Under this system, residents' employment and social welfare benefits, such as education, health care and social security, are traditionally linked to their hukou classification. The urban and rural hukou divisions are fundamental, with urban hukou benefiting more than rural hukou. According to China's National Bureau of Statistics, the per capita disposable income of urban residents in 2022 will be about three times that of rural residents. As a result, students registered with a rural hukou are considered to be of a lower class, while those registered with an urban hukou are considered to be of a higher class. Rural students constitute a distinct demographic group who follow their parents in relocating to a new city and use the general urban population as well as their surroundings (eg, schools) as references in the process of self-orientation. Evidence suggests that lower relative status, for example when a person from a low-income background maintains the same income and wealth but relocates from a low-income area to a high-income area, may have additional negative effects.²² This may predict poorer academic outcomes for lower-class migrant students with a rural hukou, who find themselves surrounded by people with more privileged status and resources as they move from low-income areas (rural) to high-income areas (urban).

Stereotype Threat

Why do significant disparities exist concerning academic achievement between students from different social classes? According to the sociocultural-self model, individual characteristics (eg, traits, skills, abilities, etc.) and environmental factors (eg, money, healthy food, safe neighborhoods, high-quality schools, teachers, etc.) do not directly cause lower-class individuals' poor academic achievements. Instead, these factors are interdependent, influencing and structuring one another, ultimately shaping the individual's self. It is the self that creates the educational achievement gaps between higher and lower classes.^{11,23–26} This means that the self is the core mechanism behind academic achievement gaps between higher and lower classes.

Self-concept is an important part of the self, and threats to self-concept have been implicated in explaining social class inequality in academic achievement.^{26,27} One type of self-concept threat is stereotype threat, which refers to the process of validating negative stereotypes of oneself or one's group due to fear and anxiety when the individual or group perceives the presence of negative stereotypes about the group in the situation.²⁸ Stereotype threat perceptions cause individuals to feel anxiety and stress when completing tasks and seem to take the risk of confirming negative group stereotypes, thus leading to a decrease in their performance.^{29,30} Lower-class individuals are more likely to experience threats from society or school since there is a general belief that they are less competent than higher-class individuals.^{31,32} Stereotype threat significantly affects the academic experiences of lower-class individuals; for instance, when lower-class students are informed that the test is designed to assess their abilities, they feel stereotype threat, leading to lower grades, a situation that does not occur among higher-class individuals who do not experience stereotype threat.^{33–36} Generally, lower-class students feel pressured and are at risk of confirming negative group stereotypes when completing tasks, which contributes to lower academic performance. In contrast, higher-class students do not struggle with stereotype threat when taking tests and thus perform better.^{28,37–39} After moving to live in the city with their parents, rural students will become disadvantaged in the city due to their lower social class, and they may find themselves surrounded by peers with more socioeconomic resources, which may negatively affect their general self-perception relative to other students, who face negative stereotypes. This has also raised many concerns among researchers. Previous research conducted in the Chinese context found that rural children are vulnerable to stereotype threat and that stereotype threat has a negative impact on their psychological development.⁴⁰ Ultimately, stereotype threat may become an additional cognitive demand that undermines their ability in the curriculum.

Self-Affirmation

Self-affirmation, as backed by empirical studies,^{27,41,42} is deemed as one of the most effective psychological intervention strategies in reducing stereotyping threats. Self-affirmation refers to an act of confirming one's self-worth, often through the reflection of core values, resulting in a broader perspective of oneself.^{43–46} According to self-affirmation theory, individuals motivated to uphold perceived self-value and self-integrity, so one way to reduce stereotype threat is to draw self-worth from another aspect of the self.^{46–48} The self-affirmation intervention allows individuals to affirm their strengths of other aspects in response to threatening information, without eliciting negative defensive reactions that could prove harmful.^{43,49} Shortly, self-affirmation allows people to overcome weaknesses by using their strengths, thereby enabling them to feel that their self is valuable and well adjusted, which in turn eliminates the negative effects of stereotype threats.^{46,49,50} Consequently, self-affirmation proves as an effective approach to curbing the negative impact of stereotype threats.

Lower-class students may further benefit from self-affirmation as it contributes to reducing stereotypes. Hadden's study (2020) demonstrated that students from lower social classes experience more stereotype threats and achieve less academically than their counterparts from higher social classes.²⁷ Self-affirmation led to a 62% decrease in the social class achievement gap for low socioeconomic class students, while having no significant effect on higher socioeconomic class students. In another study,⁵¹ the use of self-affirmation techniques resulted in a notable increase in academic achievement among students from lower social class backgrounds in United Kingdom elementary schools. Given these findings and the sociocultural-self model, we hypothesize the self-affirmation strategy to significantly reduce or eliminate stereotype threat in lower-class students, enhancing their academic performance.

A number of scholars have studied the relationship between social class and individual academic achievement in the past, but there are still some gaps in the literature. Most of the studies on the effect of social class on individuals' academic achievement have been conducted in the context of Western culture, and only a few studies have been conducted in the context of Chinese culture. Previous research suggests that those in Western cultures are more likely to experience positive self-affirmation effects than those in Eastern cultures.⁵² However, recent theoretical perspectives seem to suggest that self-affirmation may be just as effective for students who are collectivistic and interdependent. Thus, further research is needed to determine whether self-affirmation is a useful psychological intervention strategy for lower-class Chinese students. In addition, few studies have examined the potential mechanisms of stereotype threat and self-affirmation effects in children of immigrants. However, in China, where the number of migrant families is rapidly increasing due to the implementation of the reform and opening-up policy, children of migrant workers constitute a distinct demographic group. A review of previous literature suggests that their educational achievement is poorer than that of children from urban, native areas.¹ Thus, further research is needed to determine whether the lower social status that migrant students occupy in urban communities is responsible for their poor academic performance. Third, we investigated the psychological processes that may underpin the effect of self-affirmation, namely stereotype threat, based on the sociocultural-self model. Our study demonstrated that, despite significant differences in self-concept between Eastern and Western cultures, similarly, lower-class students in both cultures experienced threat from stereotypes. Finally, some researchers have also found that social identity threat is a chronic condition in real-world academic environments rather than an acute situation as in laboratory experiments.^{53–55} In order to gain a better understanding of real-world conditions, it is necessary to employ field experiments in further research. Therefore, the present study aimed to investigate the effects of self-affirmation on the academic performance of lower-class immigrant students and its psychological mechanisms in the context of the Chinese English classroom.

Overview

In order to assess the effects of a self-affirmation intervention among Chinese immigrant students, we asked the following research questions: Firstly, are there significant differences in academic achievement between high and low social class students in immigrant schools in China? Secondly, does a self-affirmation intervention significantly increase the academic achievement of low-social class immigrant students? Additionally, does a self-affirmation intervention significantly attenuate perceived stereotype threat among low social class immigrant students? Finally, are the positive effects of self-affirmation interventions on the academic achievement of low social class students mediated through stereotype threat? In order to answer the above questions,

this study was carried out in a comprehensive secondary school in southern China, which was established specifically to address the education of children of the migrant population, so that all students in the school were migrants from all regions of the country, with an average proportion of 59.6% of students being of rural origin. In this study, the hukou system was used as a proxy for lower and higher social class, with students registered in rural hukou considered to be lower-class, and those in urban hukou considered higher-class. Before taking a real English test, students from different social classes were randomly assigned to self-affirmation or control group. Students in the self-affirmed group completed a brief writing exercise about their core values, while the control group wrote about a neutral topic. The primary outcome measure was the effect of self-affirmation on English test scores, and the secondary outcome measure was the students' survey on stereotype threat to explain the improvement in academic performance.

Materials and Methods

Participants

The present study was conducted in a real English classroom setting at a comprehensive secondary school located in southern China. This school is located in a large first-tier city with a large migrant population and includes both middle and high school grades. Importantly, the school is a migrant children's school, established specifically to address the educational concerns of the children of the migrant workers, so all students in the school are migrants from all regions of the country, with 59.6% of the students being of rural hukou. The study was approved by the Southwestern University Institutional Review Board and followed the Declaration of Helsinki (IRB No. H19070). Written consent was obtained from all participating teachers, students, and their parents, and all participants were informed that they had the right to withdraw from the assessment at any time. No significant ethical issues were raised during the study.

A total of 1600 secondary school students participated in this experiment and we randomly assigned all students to two experimental conditions: self-affirmation group and control group. In the end 1534 (95.88%) were included in the analysis. The main reasons for exclusion were not completing the stereotype threat survey questions ($N=32$) and not completing the writing exercise ($N=34$). Participant ages ranged from 11 to 19 years, with a mean age of 14.22 years ($SD=1.65$), and 745 (48.57%) students were female. Of these, 732 were in the affirmed group (369 males and 363 females) and 802 were in the control group (420 males and 382 females). A detailed account of demographic information is available in Table 1.

Table 1 Characteristics and Prior and Current English Performance of the Sample

	Mean (Overall)	Mean (Affirmed)	Mean (Control)	p-value (Affirmed-Control)
All students (N = 1534)				
Rural hukou	0.60	0.58	0.61	0.246
Female	0.49	0.50	0.48	0.443
Grade 7	0.46	0.48	0.44	0.110
Grade 8	0.34	0.31	0.37	0.030*
Grade 10	0.11	0.11	0.11	0.849
Grade 11	0.09	0.10	0.08	0.313
Standardised prior performance	0.01	0.02	-0.00	0.619
Standardised current performance	0.00	0.33	-0.30	0.000***
Rural hukou students (N = 914)				
Female	0.49	0.49	0.48	0.683
Grade 7	0.54	0.54	0.53	0.767
Grade 8	0.31	0.31	0.32	0.622
Grade 10	0.09	0.08	0.09	0.378
Grade 11	0.06	0.07	0.05	0.170
Standardised prior performance	0.02	0.01	0.02	0.845
Standardised current performance	-0.12	0.34	-0.52	0.000***

Notes: Binary variables tested with two-sample proportion test and scale variables tested with two-sample t-test. * $p<0.05$, *** $p<0.001$.

Procedure

Employing a field method experiment, the research was carried out within a genuine English classroom setting. Teachers and classmates participated within a double-blind design. Specifically, each participating teacher, having undergone standardized training procedures, administered the assessment. Prior to the experiment, students were told that the 45-minute class would serve as an English skills test preceded by a writing exercise and a questionnaire. The study tried to avoid teacher bias in assigning tasks as much as possible through standardised experimental procedures. The treatment and control exercises used in the study were very similar in visual appearance in terms of format, structure, and length, and were packaged in identical closed envelopes. The two writing practices were randomly mixed together. During the formal experiment, the English teacher assigned sealed envelopes containing either the self-affirming or non-self-affirming writing exercises to each student, and when the students received the exercise materials, they were randomly assigned to the corresponding condition, and they were asked to return the exercises to the envelopes after completing them. The teacher retrieved the envelopes after 15 minutes. Students then completed the same social class and stereotype threat questionnaires. Finally, they were asked to complete a standardised reading comprehension English test within 20 minutes. The test questions were identical for all grade levels and designed by a team of three skilled English teachers with more than 10 years of teaching experience.

The present study employed established self-affirmation practices, requiring the participants to reflect on their highly ranked personal values.^{53,56,57} Self-affirmation task participants were to write about a core value, which they had previously identified via a values questionnaire. This task aimed to foster the identification and reflection of their most critical personal values. Conversely, participants in the control group wrote about a topic outside of their values.^{56,58} To operationalize self-affirmation in the present study, participants ranked eight values, which included character and self-discipline, talent and pragmatism, public interest, human emotions, fame and achievement, family orientation, law-abiding obedience, and money and power. Participants were then instructed to write about why the first-ranked value was the most important to them and providing supporting examples. In comparison, the control group ranked eight laptop characteristics and wrote about why the first-rated attribute was most important for a typical college student.

Measurements

Social Class

We used immigrant students' hukou registration as an indicator of social class. In China, the hukou system plays a vital role in measuring social class. The hukou system was introduced in the early 1960s to regulate labor mobility and population growth in large cities. Each resident is registered and classified as either urban or rural based on their family's registration. Under this system, residents' employment and social benefits, such as education, healthcare, and social security, are traditionally tied to their hukou classification. The urban and rural hukou divide is fundamental, with urban hukou benefitting more than rural hukou. Although the hukou reform in 1978 allowed migrants to move out of their ancestral local hukou, many with lower levels of education were unable to obtain local hukou status, leading to income inequality. According to the data from the National Bureau of Statistics of China, the per capita disposable income of urban residents is about three times that of rural residents in 2022. As a proxy for lower social class, we used students officially registered in rural hukou, and for higher social class, we used students officially registered in urban hukou.

Stereotype Threat

The Stereotype Threat Scale developed by Spencer was employed to quantify participants' experiences of stereotype threat.⁵⁹ This 8-items questionnaire is particularly appropriate for investigating the persistent effects of stereotype threat and includes items rated on a 5-point Likert scale, ranging from "very unthreatening" (1) to "very threatening" (5). An example item from the scale is "If I perform poorly on a test, people attribute it to my social class." Calculate the total score for all items. In this study, a higher score indicates a greater stereotype threat, with scores ranging from 8 to 40. The Cronbach's alpha coefficient for the sample in this study is 0.858.

Academic Performance

Academic performance was assessed through students' scores on an English test. The test was designed to measure their proficiency in English and consisted of two reading comprehension sections, each with five multiple-choice questions. The test questions were developed by a team of three experienced English teachers and were appropriate for the cognitive ability of students at each grade level. Raw scores on the test ranged from 0 to 10, and were standardized by grade level for comparison across different grade levels. Higher standardized scores indicated better performance on the English test and a higher level of academic achievement. The standardized academic performance scores in this study ranged from –2.508 to 2.590, with higher scores indicating better academic performance.

Data Analysis

We conducted a 2 (social class: rural vs urban hukou) \times 2 (affirmation condition: affirmed vs control group) ANCOVA analysis on the standardized English test scores. Subsequently, we conducted a similar 2 (social class: rural vs urban hukou) \times 2 (affirmation condition: affirmed vs control group) ANCOVA analysis on stereotype threats. Finally, we utilized the PROCESS V2.16.3 SPSS macro program, Model 7 to perform robust regression analyses (bootstrapped with 5000 samples) examining the processes of stereotype threat mediated the interaction between social class and affirmation condition on academic performance.⁵³

Results

Descriptive Statistics

Descriptive statistics results of stereotype threat and academic performance are reported in Table 2.

Primary Outcome: Academic Performance

We subjected the standardized English test scores to a 2 (social class: rural vs urban hukou) \times 2 (affirmation condition: affirmed vs control group) ANCOVA.

This analysis yielded a significant main effect of social class on academic performance, $F(1, 1527) = 31.456$, $p < 0.001$, $\eta^2_p = 0.020$. The academic performance of rural hukou students ($M = -0.091$, $SE = 0.031$, $CI [-0.152, -0.031]$) was significantly lower than those of urban hukou ($M = 0.180$, $SE = 0.037$, $CI [0.107, 0.253]$), with a mean difference of $M_{diff} = -0.271$ ($SE = 0.048$, $CI [-0.366, -0.176]$), suggesting a significant educational gap between rural and urban students. There was also a significant main effect of affirmation condition on academic performance, $F(1, 1527) = 142.749$, $p < 0.001$, $\eta^2_p = 0.085$. The academic performance of students in the affirmed condition ($M = 0.333$, $SE = 0.035$, $CI [0.265, 0.401]$) was significantly higher than those that those in the control condition ($M = -0.244$, $SE = 0.034$, $CI [-0.310, -0.178]$), with a mean difference of $M_{diff} = 0.577$ ($SE = 0.048$, $CI [0.483, 0.672]$), indicating that the self-affirmation intervention significantly improved students' academic performance.

In line with our hypothesis, the significant main effect of affirmation condition was qualified by a significant two-way interaction between social class and affirmation condition, $F(1, 1527) = 32.530$, $p < 0.001$, $\eta^2_p = 0.021$. A decomposition of this interaction showed a significant larger simple main effect of self-affirmation manipulation for rural hukou students, $F(1, 1527) = 192.167$, $p < 0.001$, $\eta^2_p = 0.112$, and a smaller simple main effect of self-affirmation manipulation for urban hukou students, $F(1, 1527) = 16.392$, $p < 0.001$, $\eta^2_p = 0.011$. For students from rural households, academic performance

Table 2 Means and Standard Deviations of Stereotype Threat and Academic Performance for the Self-Affirmation Group and Control Group

	Self-Affirmation				Control			
	Rural Hukou		Urban Hukou		Rural Hukou		Urban Hukou	
	M	SD	M	SD	M	SD	M	SD
Stereotype Threat	18.324	5.310	16.145	5.021	20.549	5.681	17.129	5.271
Standardised Academic Performance	0.335	1.032	0.331	0.836	-0.518	0.903	0.029	0.903

was higher in the affirmation condition ($M = 0.335$, $SE = 0.045$, $CI [0.247, 0.424]$) than in the control condition ($M = -0.518$, $SE = 0.042$, $CI [-0.600, -0.435]$), with a mean difference of $M_{diff} = 0.853$ ($SE = 0.062$, $CI [0.732, 0.974]$). The results indicated that the self-affirmation intervention significantly improved the academic performance of rural students. Similarly, for urban students, students' academic achievement was higher in the affirmation condition ($M = 0.331$, $SE = 0.053$, $CI [0.227, 0.435]$) than in the control condition ($M = 0.029$, $SE = 0.052$, $CI [-0.074, 0.132]$), with a mean difference of $M_{diff} = 0.302$ ($SE = 0.075$, $CI [0.156, 0.448]$). The results suggest that the self-affirmation intervention similarly significantly improved the academic performance of urban students. These results are also shown in Figure 1.

Thus, the gap of 0.547 (0.606 SD) between rural hukou students and urban hukou students in the control condition was reduced by 100.731% in the affirmation condition. This result suggests that the social class gap in the control condition is reversed in the affirmation condition. This is also shown in Table 3.

Secondary Outcome: Stereotype Threat

We subjected stereotype threat to a 2 (social class: rural vs urban hukou) \times 2 (affirmation condition: affirmed vs control group) ANCOVA. We also performed robust (bootstrapped with 5000 samples) regression analyses using the PROCESS V2.16.3 SPSS macro program PROCESS, Model 7 to investigate the processes of stereotype threat mediated the interaction between social class and affirmation condition on academic performance.⁵³

Our analysis yielded a main effect of social class for reported stereotype threat, $F(1, 1527) = 100.249$, $p < 0.001$, $\eta_p^2 = 0.061$. Rural students reported that they experienced significantly higher levels of stereotype threat ($M = 19.436$, $SE = 0.178$, $CI [19.087, 19.785]$) than urban students ($M = 16.637$, $SE = 0.216$, $CI [16.214, 17.060]$), with a mean difference of $M_{diff} = 2.799$ ($SE = 0.280$, $CI [2.251, 3.348]$), suggesting that rural students are more likely to feel threatened by stereotypes relative to urban students. There was a significant main effect of affirmation condition on stereotype threat, $F(1, 1527) = 32.927$, $p < 0.001$, $\eta_p^2 = 0.021$. The stereotype threat of students in the affirmed condition ($M = 17.235$, $SE = 0.201$, $CI [16.840, 17.629]$) was significantly lower than those that in the control condition ($M = 18.839$, $SE = 0.194$, $CI [18.458, 19.220]$), with a mean difference of $M_{diff} = -1.604$ ($SE = 0.280$, $CI [-2.153, -1.056]$), suggesting that self-affirmation interventions can significantly reduce stereotype threat.

There was a significant two-way interaction between social class and affirmation condition for stereotype threat, $F(1, 1527) = 4.925$, $p = 0.027$, $\eta_p^2 = 0.003$. A decomposition of this interaction showed a significant larger simple main effect of self-affirmation manipulation for rural hukou students, $F(1, 1527) = 39.054$, $p < 0.001$, $\eta_p^2 = 0.025$, and a significant

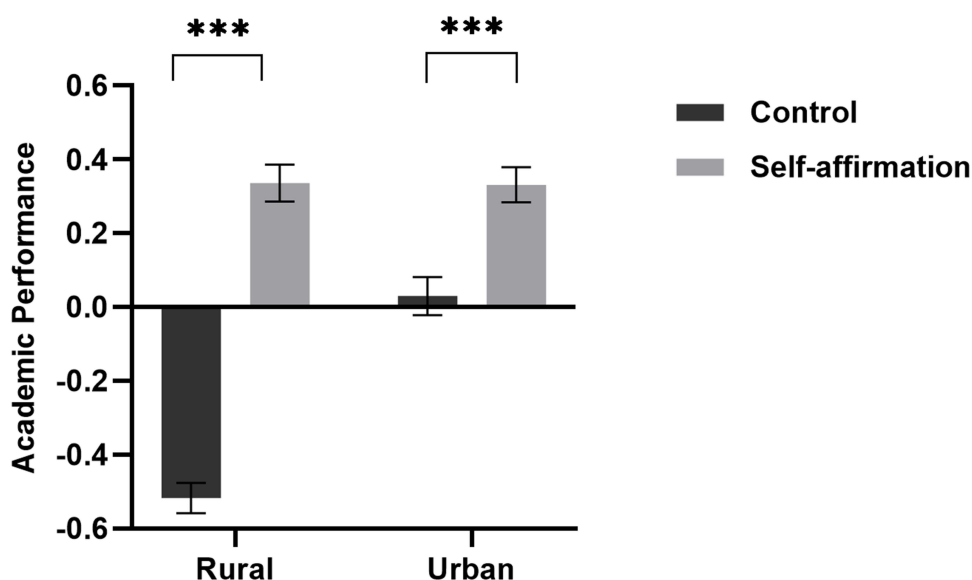


Figure 1 Self-affirmation as a moderator of the relationship between social class and standardised academic performance.

Note: *** $p < 0.001$.

Table 3 Summary of Analyses of the Primary Outcomes

	Social Class × Affirmation	Rural Students			Urban Students			Rural Vs Urban Gap			% Reduction in Gap (I/G)
		Control (A)	Affirmed (B)	Difference (C=B-A)	Control (D)	Affirmed (E)	Difference (F=E-D)	Control (G=D-A)	Affirmed (H=E-B)	Difference (I=G-H)	
Sample (N= 1534)	p< 0.001	−0.518 [−0.600, −0.435]	0.335 [0.247, 0.424]	0.853 [0.732, 0.974] p< 0.001	0.029 [−0.074, 0.132]	0.331 [0.227, 0.435]	0.302 [0.156, 0.448] p< 0.001	0.547	−0.004	0.551	100.73%

Notes: The figures in the table show the mean of the primary outcome (standardised current English scores), along with 95% bias-corrected confidence intervals and p-values.

smaller simple main effect of self-affirmation manipulation for urban hukou students, $F(1, 1527) = 5.206, p = 0.023, \eta^2_p = 0.003$.

For rural students, the level of stereotype threat reported in the affirmation condition ($M = 18.324, SE = 0.260, CI [17.813, 18.835]$) was lower than that in the control condition ($M = 20.549, SE = 0.243, CI [20.072, 21.025]$), with a mean difference of $M_{diff} = -2.225 (SE = 0.356, CI [-2.923, -1.526])$. The results suggest that the self-affirmation intervention significantly reduced stereotype threat among rural students. Similarly, for urban students, stereotype threat was reported to be lower in the affirmation condition ($M = 16.145, SE = 0.306, CI [15.544, 16.746]$) than in the control condition ($M = 17.129, SE = 0.303, CI [16.534, 17.724]$), with a mean difference of $M_{diff} = -0.984 (SE = 0.431, CI [-1.830, -0.138])$. The results suggest that the self-affirmation intervention significantly reduced stereotype threat among urban students. This is shown in Figure 2.

Stereotype threat significantly mediated the interaction between social class and affirmation condition on academic performance. The results of the mediated moderation model indicated that self-affirmation \times social class significantly predicted stereotype threat ($\beta = 1.241, p = 0.027, 95\% CI = [0.144, 2.338]$), and stereotype threat negatively predicted academic performance ($\beta = -0.025, p < 0.001, 95\% CI = [-0.034, -0.016]$). This is shown in Table 4. A decomposition of this mediated moderation showed that the mediation effect of stereotype threat between social class and academic achievement was larger for control group ($\beta = 0.086, SE = 0.019; 95\% CI = [0.052, 0.126]$); however, the mediation effect of stereotype threat between social class and academic achievement was smaller for affirmed group subjects ($\beta = 0.055, SE = 0.013; 95\% CI = [0.032, 0.082]$), and there was a significant difference in the indirect effect between control group and affirmed group, with a difference of 0.031 ($SE = 0.016, 95\% CI = [0.004, 0.066]$). This result suggests that self-affirmation significantly decreased the level of stereotype threat, which boost English test score.

Discussion

The present study was designed to explore the mediating role of stereotype threat in the relationship between social class and academic achievement, and the moderating effect of self-affirmation on this relationship. First, we observed a significant gap in academic achievement between lower- and higher-class students in our immigrant student sample, with a gap of 0.547 standard deviations in the control group; we also found that lower-class students reported significantly higher stereotype threat than higher-class students. As predicted, the intervention significantly improved the academic performance of lower-class immigrant students, but we also found a significant effect of the intervention on the academic performance of higher-class students; however, the intervention still had a significantly larger effect on

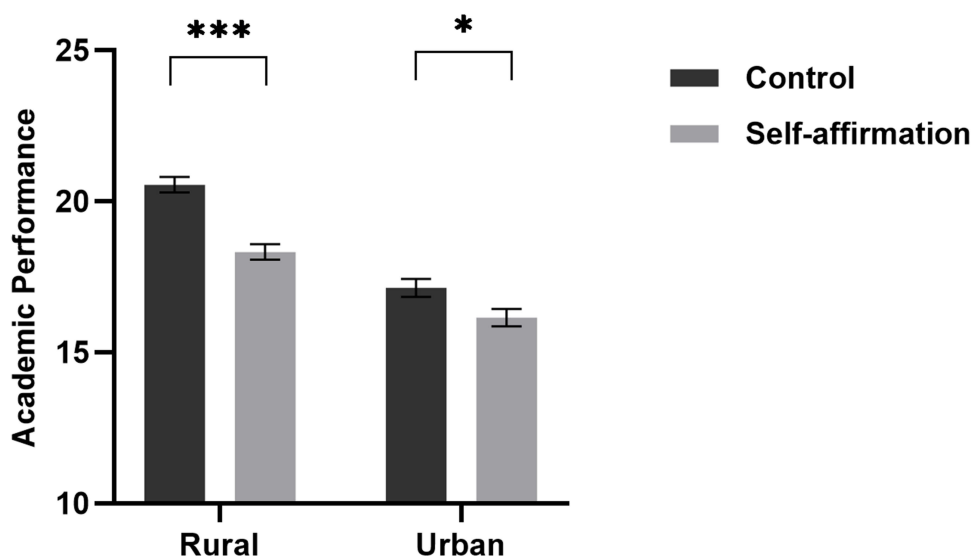


Figure 2 Self-affirmation as a moderator of the relationship between social class and stereotype threat.
Note: * $p < 0.05$, *** $p < 0.001$.

Table 4 Testing for Mediated Moderation Model

Variable	Model 1: Stereotype Threat	Model 2: Academic Performance
Intercept		
Main effects		
Social class	−3.420***	0.227***
Self-affirmation	−2.225***	
Interaction		
Self-affirmation × Social class	1.241*	
Mediator		
Stereotype threat		−0.025***

Note: * $p < 0.05$, *** $p < 0.001$.

lower-class students than on higher-class students. Specifically, the intervention improved the academic performance of lower-class immigrant students by 0.945 standard deviations, improved the academic performance of higher-class immigrant students by 0.334 standard deviations, and narrowed the achievement gap between lower- and higher-class students by 100.73% (Figure 1); furthermore, the intervention significantly attenuated stereotype threat for lower-class immigrant students, but we also found a significant effect of the intervention on the academic performance of higher-class students' stereotype threat, however, affirmation interventions still produced significantly larger effects on lower-class students than on higher-class students (Figure 2); finally, we found in the mediated moderation model that stereotype threat played an important mediating role in the interaction between social class and affirmation conditions on academic achievement.

This study advances a few theoretical concerns. First, this study expands the understanding of self-affirmation theory. The number of immigrant families in China is growing rapidly, and this study is the first to examine the validity of a self-affirmation intervention in a Chinese immigrant school for improving the achievement of lower-class Chinese immigrant students. Whether self-affirmation interventions are working among Chinese immigrant lower-class students poses an important empirical and conceptual question. The effectiveness of self-affirmation has been widely supported in Western cultural contexts. However researchers have argued that different national cultural contexts may lead to different “threats in the air” between countries.²⁷ For example, in the United States, race has historically been a highly salient cultural divide⁶⁰ and race has been shown to pose a threat to academic performance.⁶¹ In contrast, in the UK, the significant disparities between classes over time may mean that social discourses around the educational performance of different social classes are more entrenched.²⁷ In China, where the number of migrant families is increasing rapidly as a result of the reform and opening-up policy, migrant workers constitute a distinct demographic group that experiences a class leap when they migrate from the countryside to urban centres. However, they occupy a relatively low social class in urban communities and may experience psychological threats as a result. There are equally theoretical reasons to question whether the effects of self-affirmation extend to Eastern cultural contexts. The reason for this is that individuals with Eastern cultural backgrounds tend to hold an interdependent self-concept.⁶² Previous views have suggested that the self-affirmation approach, with its emphasis on writing about one's self-defined values, may therefore be less effective for those from collectivist cultural backgrounds.⁶³ However, recent research points to the fact that self-affirming writing exercises can connect people to causes greater than the self.⁵⁷ This view seems to suggest that self-affirmation may be equally effective for students who are collectivist and interdependent.

Second, based on the sociocultural-self model, we also investigated the psychological processes that may underpin the effects of self-affirmation. Despite significant differences in self-concept between Eastern and Western cultures, lower-class students in both cultures are similar in one respect; they are stereotyped as being limited in their academic achievement.⁵⁷ Our findings suggest that values affirmation similarly significantly compensates for the stereotype-threatening experiences of Chinese lower-class immigrant students; furthermore, the attenuation of stereotype threat constitutes an intrinsic mechanism by which self-affirmation interventions enhance the academic performance of lower-class students.

A particular finding in this study was that the effect of self-affirmation was equally significant for high social class immigrant students, although still smaller than the effect among low social class students. However, previous research has not found a significant effect of affirmations on high class students, and this non-significant effect could equally be explained by the role of threat, where high social class students are not experiencing a constant threat, whereas affirmations can only act as a buffer for those who do.²⁷ The effect of self-affirmation depends on the details of the context that influence who is experiencing threat and who is not. It is possible, then, that the reason why affirmations were equally effective for high-class immigrant students in the present study is that the majority of students (approximately 60%) in the immigrant school held rural hukou, which resulted in urban students being in the minority in that school, and thus they may have experienced threats because of their minority status and therefore benefited equally from self-affirmation, a possibility that awaits future research.

Finally, the present study expands upon previous research by providing additional ecological validity through a field experiment design. By conducting the study in a real learning environment, where the research task was a real exam question and involved class teachers and classmates, the findings are more representative of daily life experiences and can be generalized to a larger population.

In terms of practical implications, this study successfully replicated earlier research in a Western context using a randomised controlled trial and a large sample size, providing confidence for those wishing to apply this intervention approach in a Chinese context, particularly among lower class migrant student populations. Funders and governments need such studies to replicate conclusions drawn in Western cultures to inform policy and practice. For most teachers, this task is not considered an undue burden as it only takes about 15 minutes, the task is simple, quick, easy to implement and well suited to the curriculum. For funders and governments, the intervention can help close the educational gap with no side effects and at little cost.

In future intervention practice, four points are worth noting to make self-affirmation interventions more beneficial to students' academic achievement. First, the covert nature of the intervention may be one of the keys to its effectiveness.⁶⁴ Thus, schools need to be mindful of making these interventions part of the normal activities that take place in students' classes, and endeavour to ensure that these exercises take place as naturally as possible, rather than as performance-enhancing activities. Secondly, the timing of the intervention may be equally important. Transition periods into middle school, high school, or college may be particularly effective times to implement interventions, where the standards of achievement that students are expected to meet are rising and issues of identity become increasingly important.⁶⁵ Early intervention during these transitions can have relatively large benefits, as intervention can interrupt recursive cycles that can place students on downward trajectories. In addition, care needs to be taken in deciding which groups to intervene with. The evidence in this study suggests that interventions may be more beneficial to groups that are negatively stereotyped for psychological or social reasons. Finally, there are many different forces acting on children in real schools. It is important for practitioners to consider the whole psychological and social context in which pupils are educated in the classroom and to recognise that the effects of self-affirmation may be moderated by environmental factors. In truly disadvantaged schools, such as the immigrant schools in this study, the effect of threat on achievement may be small relative to structural barriers, and therefore the role of affirmation interventions may be limited. For affirmation to favour achievement, other positive forces need to be present.⁵⁵ Affirmation is not about raising achievement in isolation, but about making effective the efforts that teachers and schools are already making.

Limitations

The present study has some limitations that deserve attention in future research. Firstly, while this study has demonstrated the mediating role of stereotype threat in the relationship between social class and academic achievement, the underlying mechanisms by which self-affirmation promotes academic performance in lower classes remain unclear. Three potential pathways have been proposed, including an increase in positive self-worth, reflection on core values and rewarding experiences, and an improvement in coping with threats. However, existing studies have only considered each pathway individually, and it is not known whether these pathways interact. Future research should examine the interplay of these pathways to gain a more comprehensive understanding of self-affirmation's effects. Secondly, the effects of self-affirmation interventions often occur unconsciously,⁴⁴ making it challenging for individuals to reflect on their

experiences and for researchers to examine the specific mechanisms that lead to behavior change. To better understand the process of self-affirmation, future studies should examine the underlying neural mechanisms, such as activity in the medial prefrontal cortex, precuneus, and posterior cingulate gyrus, which are believed to be involved in processing self-relevant information during self-affirmation. This deeper understanding of self-affirmation will contribute to the development of more effective interventions.

Conclusion

This study examined the effect of self-affirmation on the academic performance of lower class rural migrant students and the psychological mechanisms behind this effect. The results showed that the effect size of self-affirmation on the English test scores of lower class rural household students was 0.945 standard deviations compared to the control group. In addition, another important finding of this study is that, contrary to studies in Western cultural contexts, immigrant students from relatively higher social class urban households also experienced the benefits of self-affirmation. The effect size of self-affirmation on the English test scores of students from higher class urban households was 0.334 standard deviations compared to the control group. This positive effect was mediated by a reduction in stereotype threat. More research is needed in the future to clarify the pathways of operation of self-affirmation and to examine the underlying neural mechanisms, such as activity in the medial prefrontal cortex, precuneus, and posterior cingulate gyrus, which are involved in the processing of self-relevant information during self-affirmation. Excitingly, this study demonstrates that a psychosocial intervention with no side effects and virtually zero cost may make a significant difference in the achievement gap for lower-class immigrant students in China, which provides confidence to policy makers wishing to apply such an intervention in China's emerging immigrant cities. The task is simple and easy, and frontline educators are equally encouraged to integrate self-affirmation into their curriculum.

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Disclosure

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