

Development of Junior High School Students to Secondary Vocational Students Stigma Scale

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Background and Aim: It is particularly obvious that vocational and technical education (VTE) has been stigmatized for a long time in the field of secondary vocational education. The severe stigma that secondary vocational students suffer from may negatively affect junior high school students' choice to attend secondary vocational schools and become such students. This study aims to develop the junior high school students to Secondary Vocational Students Stigma Scale (SVSSS) and to test its reliability and validity.

Methods: The initial questionnaire was formed following an open-ended questionnaire and expert review based on the conceptual model of stigma as a theoretical framework. A total of 316 junior high school students (sample 1) were administered with the resulting data subjected to item analysis and exploratory factor analysis (EFA). And a total of 416 junior high school students (sample 2) were administered with the data applied for validity, reliability, and cross-group invariance test.

Results: It was revealed in the EFA that the SVSSS consists of 20 items in total, including three dimensions, namely negative labeling, social isolation, and devaluation and discrimination. Favorable structural validity of the questionnaire was demonstrated in confirmatory factor analysis (CFA) ($\chi^2/df=2.907$, RMSEA=0.068, RFI=0.925, CFI=0.956, NFI=0.934, IFI=0.956, PNFI=0.816, PCFI=0.835). The aggregate scores of the SVSSS, exhibiting cross-gender invariance, were significantly negatively associated with willingness to choose secondary vocational education and positively correlated with academic performance. Cronbach's α coefficient of the SVSSS and each dimension ranged from 0.815 to 0.963, with split-half reliability from 0.777 to 0.969.

Conclusion: Featuring favorable reliability and validity, the SVSSS was found to be an effective tool for the measurement of the secondary vocational education stigma among junior high school students, with its measurement invariance across genders.

Keywords: junior high school students, secondary vocational students, stigma, reliability, validity

Introduction

With the continuous acceleration of industrial upgrading and economic restructuring, the demand for skilled talents and high-quality workers in China has become increasingly prominent.¹ Considered as an essential way for the cultivation of great national craftsmen and skilled craftsmen, VTE plays a positive role in promoting the economic development of a country. To this end, VTE is being vigorously developed by the Chinese government to fulfill the goal of employment enhancement and industrial advancement.² Currently, the largest vocational education system in the world has been built in China.³ Although a total of 8,812 vocational colleges have been established in China with an enrollment of 29,148,400 students as of 2021,⁴ VTE is still considered by most to be "the bottom education" and "the inferior education", while students in such schools also suffer from serious stigma.^{5,6}

Stigma, negative labeling of derogatory or insulting nature by the public for specific populations or a certain group, can result in status loss, discrimination and unfair treatment of the labeled individuals.⁷ As it is prevalent in various fields, anyone is likely to be the target of stigma.⁸ It is a barrier to the advancement of VTE as the public's recognition of vocational education tends to be affected by stigma.⁹ There are two levels of VTE: secondary VTE and higher VTE,¹⁰ of which secondary vocational schools are open to junior high school graduates, while students in such schools with lower academic levels would fall under a particularly severe stigma.⁹

Given that usually only the worst-performing students are forced to enter secondary vocational schools,⁹ most junior high school students regard attending such schools as a “helpless”, “forced” and “last” option. As a matter of fact, however, students enrolled in secondary vocational schools are likewise often students not performing up to high school requirements. Although it has been proven wrong that examination performance is the only standard for measuring student level of competency and degree of effort, such a view is still shared by a number of people.¹¹ It is believed that students with poor academic performance are difficult to achieve much in the future, for which they are negatively labeled as “poor students”, “lazy”, “losers”, and “inferior”.⁵ The negative labels and prejudices of the public towards secondary vocational students are born due to their less-than-ideal academic performance in junior high schools.¹²

The formation and development of stigma are strongly connected to social culture.⁷ Stigma against vocational school students is widespread within different cultural backgrounds. The stigma attached to vocational school students in China, nevertheless, is probably even worse owing to the influence of Confucianism. Instead of learning technical skills, Confucianism emphasizes the cultivation of “junzi” (a man of noble character) while holding that one’s primary task is to strengthen moral cultivation and personality perfection. In addition, Confucianism places a strict concept of hierarchy, classifying occupations in descending order of “scholar, farmer, artisan, and merchant”.¹³ It was the absolute best option for an individual and his or her family to study and become an official governing the country. The artisan, on the other hand, being the underclass, was despised and disdained by people.¹⁴ As technique tends to be regarded as “diabolic tricks and wicked craft”, the technological industry is also called “moye” (industry and commerce) and “xiaodao” (inferior studies and employments). Moreover, influenced by the belief “valuing theoretical knowledge and devaluing craftsmanship”, people wanting to learn techniques would suffer ridicule, discrimination and depreciation.¹⁵ To date, this notion still weighs heavily on Chinese people, that is, both students and parents view entering high school and college as the primary choice, while attending vocational school is seen as a failure and a disgrace.^{16,17}

Stigma can be classified into public stigma and self-stigma.¹⁸ Stigma of junior high school students to secondary vocational students belongs to public stigma.¹⁶ The public stigma of secondary vocational students points to that such students are labeled as derogatory and insulting in terms of their personality characteristics, behavioral patterns, and social status, resulting in negative emotional reactions and behaviors.¹⁹ Now the nine-year-system compulsory education has been fully in force throughout China, which means that junior high school graduates face a choice of receiving further education or starting a career.^{12,20} Nevertheless, most of them are worried about being labeled as “losers” under the influence of stigma attached to secondary vocational students, thus preferring going to high school whereas relatively only a few of them will opt for secondary vocational schools actively.²¹ Inadequate attractiveness of secondary vocational schools to junior high school graduates adversely affects the high-quality development of secondary vocational education.²²

A policy of “insisting on a roughly equal ratio of vocational to ordinary school students” has been implemented by the Chinese Ministry of Education,²³ which implies that nearly half of all junior high school graduates will enter secondary vocational schools every year. Students with high stigma against secondary vocational students thus will possibly study in secondary vocational schools after graduation. Influencing the recognition of an individual towards a new identity, stigma is capable of even internalizing public stigma as part of self-evaluation, generating self-depreciation as well as self-stigma.⁹ Individuals with high stigma are inclined to perceive themselves as “inferior”, triggering a variety of adjustment difficulties as well as behavioral and emotional problems.^{24,25} It was previously investigated that self-stigma among secondary vocational students is remarkably positively associated with a sense of futility and fatalism,¹⁹ which could provoke negative pessimistic attitudes about the development of their future.²⁶

Stigmatization of secondary vocational students has become an overwhelming issue in the field of VTE. Ethnographic studies have discovered that although the Chinese government has endeavored to promote VTE, it is not well recognized by students themselves and their parents, with denigrating and demeaning remarks against secondary vocational students being prevalent.⁹ Even though the majority of students attend secondary vocational schools without paying tuition fees and are offered scholarships, still, under the influence of stigma, difficulties in enrollment and high dropout rates exist in these schools, which seriously hinder the advancement of VTE.²⁷ The main creators and spreaders of stigma for secondary vocational students are their parents. They negatively label those students as “unpromising”, “unmotivated to study”, “often fight with others”, and “abandoned by the upper classes”, thus resulting in their children fearing and refusing to become

secondary vocational students.²⁸ As a matter of fact, junior high school students may be considered inferior by those around them, once they are accepted into vocational schools.¹¹ For many people, secondary vocational students are perceived as low quality, and only “bad students” would study in secondary vocational schools. On the one hand, according to the results of interviews carried out with junior high school students, the majority of them preferred studying in high school believing that secondary vocational students were neither hardworking nor good at their academic performance.²¹ On the other hand, it was noticed from the interviews conducted with vocational school teachers that they held negative stereotypes about secondary vocational students, regarding them as young people who only did little work or had nothing to do.⁵

The achievements of qualitative research are influenced by the researchers’ own views and ideas, making it difficult to directly compare them among different studies, which is why some scholars have attempted to do quantitative research on the stigma of secondary vocational students. A survey of junior high school graduates in three Chinese provinces revealed that more than half of the students did not receive VTE even if they could not enter general high schools.²⁹ Furthermore, an investigation of remote and poor areas in China showed that only one-third of junior high school students identified with secondary vocational schools which they could only attend primarily due to their perceived poor academic performance.³⁰ Of the previous studies that have been conducted, all used researcher-administered questionnaires rather than standardized scales with more concentration on junior high school students’ willingness to make educational choices.

Two major shortcomings of previous studies are that, first, more attention has been paid to students’ parents, teachers and secondary vocational students, with relatively few studies on junior high school students. Second, there is a lack of good evaluation tools with surveying standards. Both can affect the accurate assessment and intervention practices for the stigma of secondary vocational students. To the best of our knowledge, there has been no specific scale for measuring the public stigma of junior high school students toward secondary vocational students. Accordingly, it is aimed at developing the junior high school students to Secondary Vocational Students Stigma Scale (SVSSS) for the purpose of providing a tool to support the development of relevant empirical studies.

The conceptual model of stigma is extensively utilized to explain its formation and development. Link and Phelan defined stigma as labeling, stereotyping, separation, status loss, and discrimination.⁸ It was proposed in this theory that the formation of stigma is roughly divided into four stages: labeling differences, associating human differences with negative attributes, social isolation, as well as status loss, and discrimination experienced by the labeled people.⁸ During the process of stigmatization, the public can identify differences between specific groups and the majority, connecting these differences to undesirable traits, which is a stereotype in nature, that is, to associate an individual with a set of negative traits to constitute a negative stereotype. Undesirable traits can lead to public attitudes of avoidance and alienation, resulting in stigmatized people suffering from status loss, discrimination, and devaluation.⁸ The conceptual model of stigma is used as a theoretical framework in the development of the SVSSS for the study.

The stigma can create social isolation, exclusion, and a sense of alienation. Besides, junior high school students with high stigma present low identification towards secondary vocational students, inclining to consider secondary vocational schools as the last choice when seeking further education.^{9,11} Therefore, stigma may be negatively correlated with willingness to choose secondary vocational education. Additionally, it is a vital basis for students to make educational choices based on academic performance. Attending high school and then getting into college is currently still viewed as the “ideal” choice. Meanwhile, academic performance serves as the primary criterion for whether a student qualifies for high school. Stigma against secondary vocational students is higher for students with favorable academic performance, hence they have the lower intention of studying in secondary vocational schools.³¹ Consequently, the willingness to choose secondary vocational education and academic performance were selected in this study to examine the criterion validity. On this basis, it was hypothesized that junior high school students to secondary vocational students stigma is negatively related to willingness to choose secondary vocational education and positively correlated with academic performance.

Materials and Methods

Research Design

Following the basic requirements of scale development and validation, this study was completed in three parts.³² Firstly, the initial items of the scale were developed in light of the literature review and open-ended interviews, with revisions

and deletions of partial items after expert review, thus forming the initial scale. Secondly, with the initial scale administered to junior high school students, the ineligible items were removed after item analysis and exploratory factor analysis so as to form the formal scale. Finally, the formal scale was re-tested among junior high school students to examine the validity, reliability, and cross-gender invariance of the scale.

Participants

Sample testing was completed in two phases from February 2022 to March 2022, with an online survey taken for the study. Participants were asked to read a text that included the purpose, process, matters needing attention, confidentiality, and anonymity of the survey before the beginning of the test. Only after the participants checked the button “voluntarily agree to participate in this survey” could they begin to answer. Participants came from a total of 13 provinces and cities in China, including the eastern region (Beijing, Jiangsu Province, Fujian Province, and Zhejiang Province), the central region (Shanxi Province and Henan Province), the western region (Qinghai Province, Gansu Province, Shaanxi Province, Inner Mongolia Autonomous Region, and Xinjiang Uygur Autonomous Region), and the northeastern region (Jilin Province and Liaoning Province). All data were reviewed by the experimenters upon completion of the survey, removing questionnaires with too short of response time (less than 120 seconds) and consistent responses of positive and negative options. A total of 316 valid questionnaires were collected in the first stage and 416 in the second stage. The study was approved by the Ethical Committee of Jilin International Studies University (Project Number: JY202104012).

Scale Development

The initial questionnaire was prepared based on an open-ended questionnaire survey. There were four survey questions, including “How strongly do you choose to accept secondary vocational education?”, “What do you think are the common negative labels for secondary vocational students?”, “How would you feel when in contact with secondary vocational students?” and “What kinds of discrimination might you suffer if you become a secondary vocational student?”.

After the investigation, the results of the survey were compiled and analyzed by five psychology postgraduates separately and independently, with the elimination of words that did not match the theme, had unclear meanings, or had ambiguities. Subsequently, the valid words were combined and simplified, in which the extracted high-frequency words included: “inferior student”, “lazy”, “game”, “problem juvenile”, “dawdling punk”, “no prospects for development”, “goof around”, “low quality”, “like to fight”, and “like to smoke”. The extracted high-frequency words were used to develop the questionnaire items by one associate professor of psychology and two postgraduates of psychology. Afterward, two psychology professors were invited to evaluate and discuss the content of the items, removing, merging, and modifying those items with unclear expressions, ambiguities, similar contents and repetitions. The final 26 items were retained to constitute the initial questionnaire.

Research Tools

Self-Prepared SVSSS

There are 26 items in the initial scale and 20 items in the formal scale, which consists of three dimensions: labeling, social isolation, and devaluation and discrimination. An example of item of labeling dimension is “I believe that secondary vocational students are synonymous with inferior students”; In the social isolation dimension, for example, “I feel embarrassed when I am with secondary vocational students”; As to the devaluation and discrimination dimension, one example is “I believe that secondary vocational students do not have a big future”. A Likert five-point scoring method was used for the SVSSS, in which participants scored according to how well the descriptive statements matched their own from “1” (not at all) to “5” (perfectly). As the aggregate score is the sum of each item, the higher the score, the higher the degree of junior high school students towards secondary vocational students stigma.

Criterion

Willingness to Choose Secondary Vocational Education

The question “How willing are you to go to secondary vocational school?” was used as a criterion measuring the willingness to choose secondary vocational education. Participants were required to judge their willingness to choose secondary vocational education on a scale from 0 to 100, with 0 being “strongly unwilling” and 100 being “strongly willing”. The higher the score, the stronger the willingness to choose secondary vocational education.

Academic Performance

The question “What is the ranking of your grades in the class?” was used as a measurement of students’ academic performance. A 4-point scoring method was used, with 4 options and their values respectively being 4 points for “Top 25%”, 3 points for “26%-50%”, 2 points for “51%-75%”, and 1 point for “76%-100%”. The higher the score, the higher the academic performance of participants.

Statistical Analysis

Item analysis was performed making use of the data from sample 1. An independent sample *t*-test was conducted to examine the discrimination ability of the items. The data were divided into high and low groups according to the initial SVSSS total score (27%), with the significant level of critical ratio (C.R.) value less than 0.05 as the criterion for good item discrimination ability. The Pearson correlation analysis was run to calculate the total correlation of the questions, employing a correlation coefficient greater than 0.4 as the criterion for good correlation.³³ The data were subjected to KMO and Bartlett’s sphericity test,³⁴ in which the KMO was greater than 0.7, indicating that the scale was suitable for exploratory factor analysis. Principal component analysis was used in EFA for factor extraction, adopting equamax for rotation. Items were removed according to the following criteria: factor loading is less than 0.4;³⁵ communality is less than 0.3; and the difference between factor loading on two factors is less than 0.2.³⁶

Data from sample 2 were used for CFA, reliability, and validity test of the scale, and cross-gender invariance test. CFA was performed using software AMOS 24.0, with the assessment criteria of good model fitting being that χ^2/df is less than 3, RMSEA is less than 0.08, RFI, CFI, NFI, and IFI are all greater than 0.90, as well as PNFI and PCFI both are greater than 0.50.³⁷ SPSS 25.0 software was utilized to test internal consistency reliability and split-half reliability. If the reliability coefficient is greater than 0.7, it indicates that the reliability of the scale is high.³⁸

AMOS 24.0 software was used to examine the cross-gender invariance of the SVSSS. Configural invariance model (M1) with equal factor paths and numbers between male and female groups was established in turn; weak invariance model (M2) was established by adding equal factor loading; strong invariance model (M3) was established by continuously adding equal intercept; and strict invariance model (M4) was established by adding equal residual variance. The change of model fitting index ($\Delta CFI < 0.01$, $\Delta RMSEA < 0.015$) was used as the test criterion for model invariance.³⁹

Results

Descriptive Statistics

The total valid questionnaires for both stages of the sample are 732, with 316 valid data for the first stage (sample 1) and 416 valid data for the second stage (sample 2). The average age in sample 1 is 13.96 (standard deviation of 1.00); the average age in sample 2 is 13.90 (standard deviation of 0.88). Detailed demographic information is presented in Table 1.

Item Analysis

The critical ratio value (C. R. Value) for each item of the SVSSS ranged from 9.41 to 22.40 with $p < 0.001$, which means that there were considerable differences between the scores of all items in the high and low groups. The correlation coefficients between each item and its total score ranged from 0.56 to 0.85 with $p < 0.01$, indicating that the item was significantly correlated with the total score. No item was removed at this stage, with the results of item analysis shown in Table 2.

Table 1 Demographic Characteristics Information of the Two Samples (N=732)

Variables	Sample 1 N=316	Sample 2 N=416
Gender		
Male	156 (49.4%)	183 (44%)
Female	160 (50.6%)	233 (56%)
Nationality		
The Han Nationality	287 (90.8%)	403 (96.9%)
Others	29 (9.2%)	13 (3.1%)
Area		
City	223 (70.6%)	227 (54.6%)
Rural	93 (29.4%)	189 (45.4%)
Grade		
Junior One	201 (63.6%)	189 (45.4%)
Junior Two	104 (32.9%)	162 (38.9%)
Junior Three	11 (3.5%)	65 (15.6%)

Table 2 Item Analysis of Junior High School Students to Secondary Vocational Students Stigma Scale (N=316)

Item	HG (N=85, M±SD)	LG (N=85, M±SD)	C. R. Value	I-TCC (N=316)
1	3.61±0.79	1.40±0.82	17.94***	0.76**
2	3.39±0.85	1.34±0.75	16.70***	0.73**
3	3.60±0.82	1.24±0.68	20.43***	0.79**
4	3.95±0.75	1.61±0.99	17.35***	0.77**
5	3.84±0.91	1.39±0.87	17.87***	0.76**
6	3.48±0.95	1.20±0.57	19.02***	0.77**
7	3.49±1.01	1.31±0.79	15.78***	0.78**
8	3.68±0.82	1.35±0.65	20.54***	0.81**
9	3.60±0.86	1.21±0.51	21.94***	0.82**
10	3.48±0.96	1.07±0.26	22.40***	0.85**
11	3.75±0.87	1.28±0.70	20.37***	0.79**
12	3.58±0.92	1.33±0.66	18.31***	0.78**
13	3.34±1.00	1.60±0.90	11.95***	0.64**
14	3.27±1.01	1.34±0.68	14.65***	0.71**
15	3.25±1.00	1.35±0.74	14.08***	0.72**

(Continued)

Table 2 (Continued).

Item	HG (N=85, M±SD)	LG (N=85, M±SD)	C. R. Value	I-TCC (N=316)
16	3.40±0.98	1.21±0.58	17.74***	0.78**
17	3.22±1.14	1.21±0.64	14.22***	0.74**
18	3.53±1.12	1.18±0.44	18.04***	0.77**
19	3.31±0.94	1.25±0.63	16.75***	0.72**
20	3.38±0.90	1.19±0.65	18.22***	0.77**
21	3.72±1.00	2.11±1.23	9.41***	0.56**
22	4.34±0.87	2.59±1.37	9.95***	0.56**
23	3.47±1.12	1.14±0.49	17.57***	0.78**
24	3.99±0.92	1.56±0.98	16.62***	0.74**
25	3.71±0.96	1.82±1.22	11.19***	0.62**
26	3.88±0.87	1.81±1.03	14.20***	0.69**

Notes: ** $p < 0.01$, *** $p < 0.001$.

Abbreviations: C.R. Value, critical ratio value; M, mean; SD, standard deviation; HG, high-score group; LG, low-score group; I-TCC, Item-Total Correlation Coefficient.

Exploratory Factor Analysis (EFA)

The KMO value for the initial questionnaire is 0.959 with $\chi^2=6970.164$, $df=325$, $p < 0.001$, suggesting that the scale is suitable for EFA. As shown in the results of EFA, there are three factors with eigenvalue greater than 1, explaining 67.205% of the total variance. Items 23, 7, 24, 18, 10 and 3 were deleted in turn owing to the cross-loadings. EFA was performed on the 20 retained items again, with the results demonstrating (see Table 3) that there were three common

Table 3 Items and Factor Loading of the SVSSS (N=316)

Content of Items	L	SI	DD	C
1. I think secondary vocational students do not like learning.	0.679	0.288	0.335	0.656
2. I think secondary vocational students like to drink.	0.620	0.366	0.236	0.574
4. I think there are a lot of punks among secondary vocational students.	0.705	0.217	0.388	0.694
5. I think secondary vocational students are synonymous with "inferior students".	0.662	0.293	0.325	0.630
6. I think secondary vocational students are short of good family education.	0.744	0.346	0.207	0.717
8. I think secondary vocational students are lazy.	0.818	0.216	0.330	0.825
9. I think secondary vocational students are problem juveniles.	0.802	0.321	0.229	0.798
11. I think secondary vocational students are short of good living habits.	0.816	0.228	0.270	0.791
12. I think secondary vocational students are addicted to games all day long.	0.833	0.234	0.239	0.805
13. I feel awkward when getting along with secondary vocational students.	0.133	0.765	0.237	0.660
14. I feel nervous when getting along with secondary vocational students.	0.198	0.831	0.217	0.777
15. I feel impatient when getting along with secondary vocational students.	0.286	0.688	0.282	0.635

(Continued)

Table 3 (Continued).

Content of Items	L	SI	DD	C
16. I feel stressed when getting along with secondary vocational students.	0.333	0.776	0.228	0.766
17. I feel scared when getting along with secondary vocational students.	0.308	0.758	0.160	0.695
19. I do not want to make friends with secondary vocational students.	0.263	0.735	0.253	0.673
20. I will avoid contact with secondary vocational students.	0.300	0.648	0.410	0.678
21. Secondary vocational students are often regarded as negative cases by teachers or parents.	0.086	0.335	0.654	0.546
22. I will not choose to go to a secondary vocational school.	0.268	0.031	0.751	0.637
25. Most people in society look down on secondary vocational students.	0.191	0.237	0.717	0.607
26. I do not think secondary vocational students have a bright future.	0.351	0.298	0.602	0.575

Notes: The bold text marks the dimension to which this item belongs and the factor loading for this item.

Abbreviations: SVSSS, Secondary Vocational Students Stigma Scale; L, labeling; SI, social isolation; DD, devaluation and discrimination; C, communality.

factors with eigenvalue greater than 1, giving a cumulative explained variance of 68.694%. The factor loading of each item ranged from 0.602 to 0.833, with communality ranging from 0.546 to 0.825. The factors were named with reference to the theoretical framework and the content of the items included in each dimension. Thus factor 1 was named labeling, factor 2 was named social isolation, and factor 3 was named devaluation and discrimination.

Confirmatory Factor Analysis (CFA)

It is indicated in the results of CFA that the model fitting index is $\chi^2/df=2.907$, RMSEA=0.068, RFI=0.925, CFI=0.956, NFI=0.934, IFI=0.956, PNFI=0.816, PCFI=0.835, demonstrating that the three-factor model of the SVSSS fits well.

Test of Criterion-Related Validity

As shown in the results (see Table 4), both the total score of the SVSSS and each of its dimensions are significantly negatively correlated with the willingness to choose secondary vocational education. The total score of the SVSSS

Table 4 Correlation Analysis Between the SVSSS and the Criterion (N=416)

	1	2	3	4	5	6
(1) SVSSS	–					
(2) L	0.937**	–				
(3) SI	0.902**	0.727**	–			
(4) DD	0.855**	0.731**	0.709**	–		
(5) WCSVE	–0.202**	–0.199**	–0.119*	–0.260**	–	
(6) AP	0.137**	0.175**	0.056	0.132**	–0.197**	–
M	57.88	26.18	18.67	13.03	22.56	2.10
SD	17.26	8.55	6.68	3.77	31.01	0.95
R	20–100	9–45	7–35	4–20	0–100	1–4

Notes: * $p<0.05$, ** $p<0.01$.

Abbreviations: SVSSS, Secondary Vocational Students Stigma Scale; L, labeling; SI, Social Isolation; DD, devaluation and discrimination; WCSVE, Willingness to Choose Secondary Vocational Education; AP, academic performance; M, mean; SD, standard deviation; R, range.

Table 5 Reliability Coefficient of Junior High School Students to Secondary Vocational Students Stigma (N=416)

Factor	Cronbach's α Coefficient	Split-Half Reliability
SVSSS	0.963	0.969
Labeling	0.957	0.959
Social Isolation	0.936	0.927
Devaluation and Discrimination	0.815	0.777

Abbreviation: SVSSS, Secondary Vocational Students Stigma Scale.

Table 6 Cross-Gender Invariance Test for the SVSSS (N=416)

Model	S- $B\chi^2$	df	TLI	CFI	NFI	RMSEA (90% CI)	SRMR	ΔCFI	$\Delta RMSEA$
M1	764.539	332	0.932	0.941	0.901	0.056 (0.051–0.061)	0.0397		
M2	771.753	349	0.937	0.942	0.900	0.054 (0.049–0.059)	0.0394	0.001	0.002
M3	800.749	369	0.939	0.941	0.896	0.053 (0.048–0.058)	0.0395	0.001	0.001
M4	863.678	390	0.937	0.935	0.888	0.054 (0.049–0.059)	0.0438	0.006	0.001

Notes: M1 represents the configural invariance model; M2 represents the weak invariance model; M3 represents the strong invariance model; M4 represents the strict invariance model.

Abbreviations: SVSSS, Secondary Vocational Students Stigma Scale; df, degrees of freedom; TLI, Tucker-Lewis Index; CFI, Comparative Fit Index; NFI, Normed Fit Index; CI, Confidence Interval; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual.

and the dimensions of labeling and devaluation and discrimination are remarkably positively associated with academic performance, while the social isolation dimension is not significantly correlated with academic performance.

Reliability Test

It is observed in the results of the reliability test (see Table 5) that the Cronbach's α coefficient of the SVSSS total questionnaire and all dimensions ranged from 0.815 to 0.963, with split-half reliability ranging from 0.777 to 0.969. Therefore, it appears that the internal consistency reliability and split-half reliability of the scale are good.

Cross-Gender Consistency Test

The fitting indexes are good in each of the Configural invariance model (M1), weak invariance model (M2), strong invariance model (M3), and strict invariance model (M4) (see Table 6). With respect to the comparison between M2 and M1, M3 and M2, as well as M4 and M3, the ΔCFI is 0.001, 0.001, and 0.006 respectively, which is less than the criterion of 0.01; And the $\Delta RMSEA$ is 0.002, 0.001 and 0.001 respectively, which is less than the criterion of 0.015. It is shown that there is cross-gender invariance in the SVSSS.

Discussion

The initial questionnaire of 26 items was formed following an open-ended questionnaire and expert review based on the conceptual model of stigma as a theoretical framework. After item analysis and EFA, 6 items were removed. And then, reliability and validity analyses were conducted for the remaining 20 items of the formal scale, demonstrating that all indicators meet the requirements of psychometrics. The SVSSS was proved as a valid tool to evaluate junior high school students to secondary vocational students stigma.

As a result of item analysis, the items of the SVSSS had good discrimination. In addition, the item score is markedly positively correlated with the total scale score, with correlation coefficients ranging from 0.56 to 0.85, indicating a high homogeneity of the items. EFA was adopted to analyze the structure of the SVSSS, in which three dimensions were

extracted, namely, labeling, social isolation, and devaluation and discrimination. CFA was further conducted to verify the validity of the three-factor structure, resulting in a well-fitting three-factor model.

The dimension of “labeling”, consisting of 9 items, is a reflection of the negative stereotypes of junior high school students towards secondary vocational students by associating undesirable traits with them. The higher the score on this dimension, the deeper the degree of negative stereotypes individuals have about secondary vocational students. In this dimension, two main aspects are included: One is the stigma of behaviors for secondary vocational students. For example, it is believed that they are lazy, do not like to study, but prefer drinking and indulging in games. Secondly, it is the stigma of their moral characters, such as they regard those students as punks or troubled juveniles. Once such negative stereotypes are formed, it is easier to concentrate on the negative behaviors of those students and ignore the information contrary to the stereotypes, consequently contributing to the misunderstanding.⁵

The dimension of “social isolation”, consisting of 7 items, is that junior high school students consider secondary vocational students as a different group of people, reflecting their attitudes of avoidance and alienation toward them. The higher the score of this dimension, the stronger the individuals’ avoidance and alienation attitude toward secondary vocational students, and the more reluctant they are to engage with them. Similarly, it includes two aspects: First, they avoid interacting with secondary vocational students and are unwilling to establish interpersonal connections with them. For instance, junior high school students are inclined to avoid connection with secondary vocational students and reluctant to develop friendship relations. Second, they can perceive negative emotional reactivity, such as nervousness, fear, stress, embarrassment, and impatience, when junior high school students are getting along with them. The formation of social isolation largely stems from the negative stereotypes about of junior high school students towards secondary vocational students. Linking negative traits with secondary vocational students, junior high school students tend to avoid and resent interacting with them under the influence of negative labels.⁹

The dimension of “devaluation and discrimination”, consisting of 4 items, is the negative result of labeling and social isolation, in which stigmatized people will suffer from status loss and discrimination. The higher the score on this dimension, the more junior high school students despise secondary vocational students. It also includes two aspects: First, junior high school students identify with the status loss of secondary vocational students; by way of example, junior high school students believe that most people would look down on secondary vocational students, thus they are unwilling to attend secondary vocational schools. Second, secondary vocational students are discriminated against and derogated from by junior high school students. For instance, it is believed that secondary vocational students are often taken as negative cases by teachers or parents, or they do not have a promising future.

Concerning stigma, a complicated concept, agreement has not been absolutely reached the same place among different scholars in the aspect of its dimensions’ division. In the Attitudes about Mental Illness Associated Stigma Scale (AMIAS), stigma is divided into two dimensions: negative stereotypes, recovery and outcomes.⁴⁰ And then, in the COVID-19 Public Stigma Scale (COVID-PSS), stigma is divided into three dimensions: stereotype, prejudice, and fear.⁴¹ While in the Dementia Public Stigma Scale, stigma is regarded as including five dimensions of fear and discomfort, negative perceptions, positive perceptions, burden, and exclusion.⁴² In the Attribution Questionnaire-27 (AQ-27), the stigma is classified into nine dimensions, namely, responsibility, dangerousness, pity, anger, fear, help, coercion, segregation, and avoidance.⁴³ The SVSSS is divided into three dimensions in the present study, based on the conceptual model of stigma. Although the dimensions are not categorized in the same way across scales, all of them are related to negative evaluation, derogatory, and discrimination towards stigmatized people. The SVSSS likewise covers the main contents mentioned above.

It is found that the SVSSS total and all dimensions scores are notably negatively correlated with willingness to choose secondary vocational education, which is consistent with the research hypothesis. Junior high school students with a high stigma towards secondary vocational students tend to regard those students as “inferior students” or “academic failures”, rendering them strongly resistant to and disapprove of being those students.¹⁹ Therefore, lower willingness to choose secondary vocational schools exists in junior high school students influenced by the stigma. In addition, it has also been found that the SVSSS total score and the dimensions of labeling and devaluation and discrimination are substantially positively associated with academic performance, while social isolation is not significantly related to it. Academic performance is the key basis for students to make educational choices, whereas the top-ranked students frequently prefer

attending high school rather than vocational school.³¹ Both parents and teachers possess higher educational expectations for students with outstanding academic performance and try to persuade them to reach high school.¹⁷ Such students as a result are more likely to be influenced by the perceptions of those around them while holding a higher stigma toward secondary vocational students. What is of concern is that the correlation between social isolation and academic performance is not significant, which is probably attributed to less direct contact between junior high school students and secondary vocational students.

The reliability of the SVSSS was further examined in the study, in which the Cronbach's α coefficient for the total questionnaire and dimensions of the SVSSS ranged from 0.815 to 0.963, as well as the split-half reliability ranging from 0.777 to 0.969, implying that what the items of the scale measured were the same construct with high homogeneity.³⁸ The configural invariance model, the weak invariance model, the strong invariance model, and the strict invariance model of the SVSSS are all valid in the cross-gender invariance test. It indicates that there is cross-gender measurement invariance for this scale, that is, the difference in the scores of male and female students on the SVSSS reflects the true difference in the stigma of each group rather than being caused by measurement variance of the questionnaire.

The innovations of this study are mainly in three aspects: First, the exploration of the psychological structure of junior high school students to secondary vocational students stigma is a validation and extension of the conceptualization model of stigma, which demonstrates that the theory is applicable to interpreting public stigma against secondary vocational students. Theories related to stigma mainly include two kinds of psychological and sociological orientations. Among them, the psychological orientation focuses on the explanation of the psychological process of stigma formation from the perspective of individuals' cognition, emotion, and behavior. Representative theories include individual cognitive models, classifying stigma into three dimensions: stereotype, prejudice, and discrimination.⁴⁴ While the sociological orientation emphasizes the explanation of stigma in the social context of culture, politics, economy, and power. The conceptualization model of stigma, as a representative theory of sociological orientation, has been widely used to explain stigma in different populations.^{45–47} The study first employed the theory in the field of VTE.

Second, the SVSSS, developed in the study, is the first tool to assess junior high school students to secondary vocational students stigma within the Chinese social context. Stigmatization of secondary vocational students appears to be an essential factor hindering the growth of VTE. Studies on the stigma of secondary vocational students are mostly qualitative research lacking empirical research, especially the combination of qualitative and quantitative methods. The SVSSS helps to deliver a tool with good reliability and validity for future quantitative research. Third, it is of obvious practical significance for the study of public stigma against secondary vocational students. The reduction of stigma against secondary vocational students contributes to improving junior high school students' acceptance and recognition of VTE, thus facilitating its advancement. On top of that, as the only source of students in secondary VTE, identifying and intervening in the stigma that exists among the junior high school students population is helpful in the reduction of self-stigma among secondary vocational students.

Limitations

Some limitations remain in this study. Firstly, only willingness to choose secondary vocational education and academic performance are selected as criterion in this study. Other more standardized assessment tools need to be taken for future studies so as to further examine the criterion validity of the SVSSS. Secondly, the representativeness of the research objects is insufficient. Although there are 13 provinces in China covered in the sampling range of this study, it is neither a national sample nor does it strictly follow a random sampling process to determine the participants. Simultaneously, although the sample size satisfies the requirements of factor analysis, the sample size is still small compared to the large population of junior high school students. Continuous expansion of the sampling range and an increase in sample size are necessary for future studies. Finally, as stigma is a complex concept, there is no consensus about the division of its dimensions, in which more tests are expected on whether the three-dimensional SVSSS is the optimal structure.

Conclusion

The SVSSS, developed in the study, consists of 20 items with three dimensions extracted, namely labeling, social isolation and devaluation and discrimination. The study has discovered that the SVSSS of junior high school students is remarkably positively correlated with academic performance, while significantly negatively related to willingness to choose secondary vocational education. Besides, the findings indicate that the SVSSS, with its favorable reliability, validity, and cross-gender invariance, can be used as an effective tool to assess the stigma of junior high school students to secondary vocational students, as the measurement results can be compared cross-group between different genders.

Ethical Approval

The study protocol was reviewed and approved by the Ethics Committee of Jilin International Studies University (Project No. JY202104012). All procedures of the study were in accordance with the ethical guidelines outlined in the *Helsinki Declaration*. Written informed consent was obtained from all participants of junior high school students and their parents for the study.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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