Research on the Influencing Factors of Teachers' Psychological Pressure in the Stage of Compulsory Education

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Abstract: This paper uses the micro survey data to study the degree of teachers' psychological pressure in the stage of compulsory education in China, and constructs a hierarchical ordered dependent variable logistic regression model to explore the influencing factors, by introducing the control variables at school level to further explore the influencing factors of inter school differences on teachers' psychological pressure.

The results show that the heterogeneity of teachers' psychological pressure at the school level is much higher than that at the provincial level, and it accounts for about 13% of the total variance; school environmental factors and teachers' own factors, have a significant impact on teachers' psychological pressure.

KEY WORDS: Teachers' psychological pressure, Hierarchical ordered dependent variable logistic regression model, Regional heterogeneity

1. Introduction

1.1 Research background

Teachers are a profession that requires a high degree of responsibility to society, students, and parents, and has always been widely regarded as one of the professions with high pressure in society. Excessive pressure on teachers not only has a negative impact on themselves, but also leads to a decrease in teaching quality.

1.2 Significance

1.2.1 Theoretical significance

Predecessors are mainly based on descriptive statistical methods, analysis of variance and other basic statistical methods, while few quantitative research results using modern statistical methods. Therefore, a quantitative study on the degree of psychological stress of teachers has certain theoretical significance.

1.2.2 Practical significance

Few researchers have studied the psychological stress of teachers in compulsory education in a wide range, but the data used in this paper come from different provinces in China, which not only improves the representativeness of sample selection, but also helps to compare and analyze the differences in the degree of psychological stress of teachers in different regions.

2. Data and variables

2.1 Data source and sample characteristics

The data include the degree of psychological stress, personal and family conditions, work conditions, subjective feelings, school environment and other aspects of 3401 primary and secondary school teachers in China.

2.2 Study variables

2.2.1 Explained variable

This paper focuses on the factors affecting the degree of psychological stress of teachers in compulsory education, and selects the answer to the question "Do you think you have lot of psychological pressure at present?" as an indicator to measure the degree of psychological stress of teachers. There are five options in this question: ① No pressure; ② Less pressure; ③ In general; ④ High pressure; ⑤ Very high pressure.

Taking 1/3 and 2/3 of the average monthly take-home pay of all teachers in the valid sample as the segmentation points, the data of the effective sample teachers were divided into "low salary group", "medium salary group" and "high salary group".

2.2.2 Explanatory variables

The series of explanatory variables selected in this paper mainly involve three aspects: (1) Objective factors of teachers; (2) Subjective feelings of teachers; (3) School environment factors.

3. Research methods and model setting

3.1 Hierarchical ordered dependent variable logistic regression model

China is a vast country with heterogeneity among provinces and within provinces. If an ordinary linear regression model is used, the degree of psychological stress is expressed as a single-layer mathematical function of individual socioeconomic attributes, even if control variables such as teachers and schools are included, and the degree of psychological feeling is assumed to be the same in all regions. This denies the reality that the public will migrate due to the differences in psychological feelings between different regions, or that the public will have changes in psychological feelings due to regional differences.

Based on the three levels of "province - school - teacher", this paper constructs a hierarchical ordered dependent variable logistic

regression model, or a multi-level logistic regression model of ordered dependent variables:

γ [7] represents the sum of probabilities; i represents the level of response variables, and j、k l respectively represents the level of teachers, schools and provinces; π_{ijkl} represents the probability that teachers in k school in l province choose the i degree of psychological stress; v_{kl} and f_l respectively represents the random effects of constant terms at the school and province levels respectively; X_{jkl} , S_{kl} and P_l correspond to explanatory variables at the teacher, school, and province levels, respectively; σ_v^2 and σ_l^2 respectively represents the difference degree of psychological stress at school level and province level respectively, and $cons$ are constant terms.

3.2 Intraclass correlation coefficient

The Intraclass correlation coefficient of the model is the proportion of the difference of the result variable. The explanatory power of the differences in the level of psychological pressure on teachers between provinces and school levels for the overall difference in psychological pressure levels is shown below.

4. Empirical analysis and results discussion

4.1 Spatial differentiation of teachers' psychological stress at provincial and school levels

According to the software output results, σ_v^2 and σ_l^2 are 0.257 and 0.231, respectively. The table 1 shows the variance estimation results of two empty models for Model I (introducing 2 levels of teachers and schools) and Model II (introducing 3 levels of teachers, schools and provinces). In Model II, the variance of provincial level is small (5.76%), and the proportion of variance of school is large (12.17%).

Considering that the variance at the provincial level is small, which suggests that the difference in the degree of psychological stress of teachers at the provincial level is not obvious, this paper focuses on the two-level model of schools and individual teachers.

The table 2 shows the estimated results of the "teacher-school" two-layer orderly classification variable model. In Model I, the probability of teachers choosing "No pressure" "Less pressure" "In general" "High pressure" and "Very high pressure" is 1.25%, 4.70%, 26.33%, 51.24% and 16.48%, respectively.

4.2 Interpretation of the model estimation results

4.2.1 The influence of teacher level variables on the degree of individual psychological stress

The table 3 shows that the variance of school level in multi-level ordered categorical variable model III decreases from 0.489 to 0.253 after controlling the teacher level variable, which indicates that Model III has a better explanatory power than Model II on the degree of teachers' psychological stress. The probability of teachers choosing the different degree of psychological stress is 0.05%, 0.18%, 3.64%, 25.24% and 72.37%, respectively, which is very different from the predicted probability distribution of Model II, indicating that the variable controlling teacher level has a very obvious influence on the evaluation of the degree of psychological stress of teachers. In general, the probability of teacher selection pressure is increased.

The results of Model III show that the variables that have a significant impact on the selection of teachers' psychological stress degree include whether they have teacher establishment, whether they have participated in teacher vocational training in the last three years, average weekly teaching hours, self-rated health status, self-comparison with the average income of teachers in the same grade and with the same professional title in the local area, and self-evaluation of their local social status.

According to the results of screening variables, school environment factors and teachers' own factors, including teachers' objective factors and subjective feelings, have a significant impact on teachers' psychological stress.

Table 1. Model estimated results contrast.

Variable	Model III		Model IV	
	β	S.E.	β	S.E.
Constant amount (less pressure)	-7.609***	0.337	-7.380***	0.329
Constant (general)	-6.075***	0.307	-5.831***	0.295
Constant amount (high pressure)	-3.711***	0.290	-3.450***	0.274
Constant amount (very high pressure)	-0.963***	0.279	-0.697***	0.063
Individual hierarchical variables				
Teacher establishment (Reference group: No)	0.309**	0.134	0.287**	0.136
Training (Reference group: No)	-0.355***	0.137	-	-
Average weekly teaching hours	0.034***	0.010	0.035***	0.011
Self-rated health status	-0.942***	0.054	-0.945***	0.055

Self-comparison with the average income of teachers in the same grade and with the same professional title in the local area	-0.298***	0.056	-0.300***	0.057
Self-evaluation of their local social status	-0.564***	0.062	-0.570***	0.063
School level variables				
Staff dormitory (Reference group: No)			0.041***	0.165
The children are helped to study in a better school (Reference group: No)			0.116***	0.164
Rural subsidies (Reference group: No)			0.063***	0.182
School variance	0.253	0.075	0.223	0.112

Note: * * *, * *, * indicates that this variable is significant at the 1%, 5%, and 10% levels, respectively, S.E. is the robust standard error, the same as below.

4.2.2 The influence of school-level variables on the degree of individual psychological stress

After introducing the variable of school level into Model IV (Table 3), the variance of school level is reduced from 0.253 to 0.223, indicating that model IV has a better explanatory power than model III on the degree of teachers' psychological stress. After controlling the variables of individual level and school level, the probability of teachers choosing the different degree of psychological stress is 0.06%, 0.16%, 2.78%, 30.18% and 66.74%, respectively.

5. Summary and discussion

Based on the questionnaire data of a large sample, this paper uses a multi-level model to analyze the factors affecting the degree of psychological stress of teachers, and mainly draws the following conclusions and suggestions:

Teachers in compulsory education have a high degree of psychological pressure.

There are significant inter-school differences in the degree of teachers' psychological stress.

The difference of teachers' psychological stress at school level is significantly higher than that at province level.

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