

Development of Psychological Suzhi Observer-rating Questionnaire for Grade 3~6 Pupils

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Abstract. Objective To develop an instrument to measure the pupils' psychological Suzhi. Methods Based on literature review, interviews data and expert evaluation, a three-dimensional theoretical concept was formed. 464 questionnaires from grade 3-6 were surveyed in the first test which contains 10 items, and the data was analyzed by reliability and validity. The formal scale was refined by employing item analysis, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Result Psychological Suzhi Observer-rating Questionnaire consists of 6 items and was composed of three dimensions including cognition, personality and adaptation. EFA showed that the scale had good fit index: $\chi^2 / df=2.337$, $GFI=0.987$, $TLI=0.959$, $CFI=0.984$, $NFI=0.972$, $IFI=0.984$, $RMSEA=0.027$. The internal consistency of Psychological Suzhi Observer-rating Questionnaire for Grade 3~6 Pupils was 0.829, and the re-test coefficients were 0.841, There were significant positive correlations between the total score and subscales ($r=0.79\sim 0.82$). The convergent validity with psychological suzhi self-rating scale was ranged from 0.59 to 0.782. Conclusion The questionnaire has good reliability and validity that could be an effective tool to assess Psychological Suzhi of pupils.

Keywords: pupils; psychological suzhi; questionnaires; observer-rating.

1. Introduction

The *suzhi* of human beings includes physiological quality, *psychological suzhi* and scientific cultural *suzhi* in which *psychological suzhi* is at the core, and it is the intermediary and internal basis for the development of other *suzhi* [1]. At present, the prevailing definition of *psychological suzhi* is "a mental quality that is stable, essential, and implicit, and affects individuals' adaptive, developmental, and creative behaviors [2]. As an intrinsic self-organizing system, *psychological suzhi* consists of three basic dimensions: cognition, personality and adaptation. The dominant method to develop pupils' *psychological suzhi* is training that proved to be effective in improving the mental health, fulfilling potential, cultivating good behaviors, and promoting academic performance of pupils.

The fundamental goal of *psychological suzhi-oriented education* is to cultivate the students' *psychological suzhi* which means that they possess intact mental structure, comprehensive content and positive attitude. *Guidelines for Mental Health Education in Primary and Secondary Schools (revised in 2012)* issued by the Ministry of Education, said that improving the psychological quality of all students is the primary goal of mental health education in primary and secondary schools. *Opinions on comprehensively deepening curriculum reform and implementing the fundamental task of cultivating talents* proposes that the construction and development of the *Core Competences* should be the key link to promote the deepening development of curriculum reform, and makes the evaluation of students' *psychological suzhi* be an indispensable component due to its root role.

Primary school stage is a crucial period for the formation and development of students' *psychological suzhi*. It is of great importance to develop valid assessment tools in line with the psychometric standards for pupils, which will actively promote the mechanism research focus on *psychological suzhi*. The exploitation of the *psychological suzhi* assessments for pupils has undergone three stages: initial formulating, revising and perfecting. Eventually, a self-rating scale of 36 items, and consist of three subscales-cognition, personality and adaptation- has been formed. The results of confirmatory factor analysis show that it's in line with the standards of psychometrics and it's a scientific tool for the evaluation of pupils' *psychological suzhi* [3]. After that, Lili Wu has used the two-factor model to compile and developed a 33-item *psychological suzhi* questionnaire for pupils which meet the psychometric standards [4].

The development and utilization of *psychological suzhi* questionnaire have played an important tool value for observing the characteristics, formulating norm, and exploring the formation and development mechanism of pupils' *psychological suzhi*. However, during the actual investigation, some problems were also found. First, the tool using is limited by the cognitive development such as reading comprehension ability, and we found that only those students who were above grade 3 could complete the self-rating in the test process. Secondly, there is ubiquitous common method biases in psychology test. Furthermore, evaluating the psychological characteristics of others is a necessary in daily life, [5] a significant amount of studies have shown that those who are very familiar with the target objects' evaluation can effectively compensate for the defects of self-report, and the results obtained by this method are more accurate than the self-reporting method in some cases. [6] Parents and teachers, as the very important person in daily life, can make a more reliable assessment of the physical and mental development of pupils when they have concise tools that meet the standards of psychometrics.

To develop observer-rating *psychological suzhi* questionnaire for pupils cannot only enrich the toolbox, but also provide experiments for the development of assessment tools for lower grade pupils, and generate positive effect.

2. Method

2.1 Source of Items

According to the construction of *psychological suzhi* and referring to the *psychological suzhi* self-rating scale of pupils [3], a semi-structured *psychological suzhi* assessment interview manual that mainly including the construction of *psychological suzhi* and its three dimensions for grade 3-6 was compiled. After understanding the relevant concepts, the interviewees put forward as many typical or recurrent events as possible to represent the concept based on their own teaching or family education experience. When interviewees are unable to recall the relevant experience of a specific concept, alternative items can be presented as hints, and the reported events and alternative items can be ranked. For example, learning adaptation from the adaptive dimension is defined as "student can continuously adjust their learning style according to changes in the learning environment, content and difficulty". Interview is asked to describe "What are the performance of the students who doing better at adapting than others in your class?" Alternative items such as "(student) to make a mark when reading", "probably ask the teacher or classmates questions that do not understand" and so on. 8 teachers and 8 parents of grade 3~6 of a primary school in Dazhou were interviewed separately. Removing the items that were difficult to understand and ambiguous from interviewers through context analyzing, and 18 items were retained which was submitted to an academic salon during in 1PHD tutor, 2 PHDs, 8 PHD candidates 12 graduates majoring in psychology. A 10 items observer-rating *psychological suzhi* questionnaire was formed in the end.

2.2 Participants

Using cluster sampling method, 485 pupils from grade 3 to 6 in a primary school in Dazhou were selected, and observer-rating *psychological suzhi* questionnaire for pupils (first edition) was distributed to conduct unified testing. A total of 485 questionnaires were gave out, all of which were returned (100% return rates) 0.957 of the returned questionnaires were valid (95.7%). There are 223 boys and 241 girls, aged between 7 and 13, and the numbers of grades 3-6 are 104, 125, 112 and 113 respectively. Collected data were used for exploratory factor analysis (EFA). For the second time, we test 380 pupils from grade 3-6 in Chengdu with *psychological suzhi* questionnaire(self-rating) for pupils, and surveyed their parents with observer-rating *psychological suzhi* questionnaire (formal edition) simultaneously. 354 paired valid samples were obtained. The age distribution of students was between 7 and 14 years old. The number of students in grades 3 to 6 was 70, 112, 83 and 89, respectively. Additionally, one and a half months later, the parents of 53 students from a class who participated in the second test were evaluated again, and 49 valid questionnaires were collected for

retest reliability analysis. One and a half months later, 53 parents of a class who participated in the second test were re-evaluated and 49 valid questionnaires were collected for retest reliability analysis.

2.3 Measure

Use the pupils' psychological *suzhi* questionnaire (self-rating) compiled by Wu Lili project as a proof of convergence validity.

2.4 Analytic Plans

Correlation analysis, exploratory factor analysis and reliability analysis were performed using SPSS24.0. Additionally, confirmatory factor analysis was performed on the structure of the scale using structural equation analysis software AMOS23.0 in order to test the structural validity of the scale. Confirmatory factor analysis was performed on Amos24.0.

3. Results

3.1 Items Analysis

The subjects were classified as high-score group and low-score group due to their score in test. Comparing the scores of the two groups in each dimension, the results show that there are significant differences. The correlation between the items and the dimension score was calculated, and the correlation values were above 0.60 all.

3.2 Structural Validity Analyses

An exploratory factor analysis was conducted with *Bartlett* and *KMO* tests on 464 sample data collected in Dazhou. The results showed that Bartlett test value is 413.17 ($P < 0.01$), which means that there is a possibility of sharing factors between variables, and $KMO = 0.778$ ($P < 0.01$) which indicated that the data was suitable for factor analysis.

By using principal component analysis, maximum orthogonal rotation and factor load matrix, the items with factor load less than 0.40 and multiple loads are deleted, and three common factors with eigenvalues greater than 1 are extracted by referring to gravel maps. These factors explained 69.10% of the total variance. The first factor reflects the quality of pupils' meta-cognition, the second factor reflects the quality of pupils' optimism and other personalities, and the third factor reflects the quality of pupils' adaptation to learning. 6 items were retained in the final version of the scale. See Table 1.

Table 1. Analysis on the Factors of the Assessment of Pupils' Psychological Quality

Dimension	Item	Loading	Contribution rate	Dimension	Item	Loading	Contribution rate
Cognition	T1	.825	22.46%	Adaptability	T4	.704	22.13%
	T2	.766			T5	.822	
Personality	T3	.765	22.50%				
	T6	.822					

3.3 Confirmatory Factor Analyses

Using Amos 24.0, the valid data of 354 primary schools in Chengdu were analyzed by confirmatory factor analysis. From Table 2 it can be seen that the factor analysis fit indices in the *Psychological Suzhi* Observer-rating Questionnaire for Grade 3~6 Pupils, $X^2/df = 2.337$, $GFI = 0.987$, $TLI = 0.959$, $CFI = 0.984$, $NFI = 0.972$, $IFI = 0.984$, $RMSEA = 0.027$, and all met the psychometric.

Table 2. Correlation coefficient matrix

Dimension	Cognition	Personality	Adaptability
Personality	.464**		
Adaptability	.500**	.468**	
<i>Psychological suzhi</i>	.823**	.797**	.800**

Note. ** $p < .01$.

3.4 Convergence Validity

354 paired samples were obtained by self-rating and observer-rating. The results showed that the correlations between the two data from different methods were: cognitive($r=0.671$), personality($r=0.594$), adaptive($r=0.685$), and *psychological suzhi* ($r=0.782$). All P values were less than 0.001, indicating that there was a good correlation between the *Psychological Suzhi* Observer-rating Questionnaire for Grade 3~6 and *Psychological Suzhi* Self-rating Questionnaire.

3.5 Reliability Analysis

Internal consistency coefficient Cronbach α coefficient and test-retest reliability were used as reliable indicators. Cronbach α coefficients of the cognitive, personality, and adaptive of the average and better pupils. The Cronbach α coefficient of cognitive, personality and adaptability dimensions and the total score of the total scale were 0.754, 0.720, 0.702 and 0.829, and the test-retest reliability was 0.693, 0.755, 0.631 and 0.841.

4. Discussion

Psychological Suzhi is becoming a rising prosperity of the research field in psychology Chinization. The relevant research results provide an important decision-making basis for the education administrative department [7], which has formed a positive influence abroad and gained international acceptance [8].

However, the self-rating scale has higher requirements on the cognitive development level of the subjects. The existing measuring tools for pupils' *psychological Suzhi* are only suitable for the middle and senior age groups. In addition, since the common method bias is prevalent in the questionnaire research, it may lead to the co-variation of the research results. The questionnaires for the pupils' *psychological suzhi* will not only enrich the existing evaluation toolkit, but also provide reference for the further development of assessment for the *psychological suzhi* of children. Concise, easy-to-use, psychometric-based questionnaires could active awareness of parents in educating their children, and enhance the cooperation and educational benefits of co-education in home and school.

Based on the theory and structure of *psychological suzhi*, combined with the *psychological suzhi* (self-rating) questionnaire and semi-structured interviews, 18 items were formed. After the expert group's argumentation, the preliminary questionnaires of 10 items were formed, which ensured the content validity of the scale and reduced the workload of the scale users. Combined with the results of exploratory factor analysis, the final questionnaire contains 6 items. The results of confirmatory factor analysis show that the fitting indicators meet the requirements of psychometrics [9], and have good structural validity. The study attempts to evaluate the *psychological suzhi* of the same subjects by means of self-rating and observer-rating. The results show that there is a good convergence validity between the two methods, and the assessment method has a greater impact on test scores. It is suggested that in addition to self-rating and observer-rating questionnaires, we can further consider projective test, situational decision-making, and some relatively objective physiological indicators in *psychological suzhi* measurement.

One deficiencies of this study are that the interviewees and the participants of the questionnaire are all concentrated on teachers, parents or pupils in grades 3 to 6, which may reduce representativeness in the measurement of pupils in lower grades. However, it is a necessary and meaningful experimental work to pave the way for the development of other evaluation tools for the *psychological suzhi* of the whole primary school section in the future.

The internal consistency coefficient and re-retest reliability were used to test the reliability of the pupils' *psychological suzhi* rating scale. The correlation coefficients between the sub-dimensions are between 0.46 and 0.50, and the correlation coefficients between the dimensions and the total score are between 0.79 and 0.82, which indicates that there are both internal correlation and differences among the dimensions. There is a high degree of consistency between the dimensions and the upper concept of *psychological suzhi*. In addition, the retest reliability has reached the commonly accepted standard.

5. Summary

In short, overall, the preparation process and reliability and validity test of the *psychological suzhi* questionnaire for grade 3-6 pupils are in line with the requirements of the psychometrics, and it can be used as one of the new and effective assessment tools besides self-rating of pupils' *psychological suzhi*.

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