

# The Application of SPSS in Statistical Analysis Project—A Study of the Inheritance of Chinese Traditional Shadow Play in Schools

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**Abstract:** Chinese traditional shadow play has been selected into the List of Intangible Cultural Heritage in 2011. Yet, reflecting abundant national cultural values, such traditional art form is degenerating and fading out from people's sight. As the earliest statistical analysis software, Statistical Package for the Social Science (SPSS) is comprehensive in analyzing and managing statistical data. This study explores the application of SPSS in minimizing the workload of researchers while raising the validity of data in supporting the analysis of the survey data which reflected the inheritance and development of Chinese traditional shadow play in schools.

**Keywords:** Statistical Package for the Social Science (SPSS); Statistical Analysis; Shadow Play; Intangible Cultural Heritage, Schools; Inheritance and Development

**Publication date:** July, 2020

**Publication online:** 31 July, 2020

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## 1 Shadow Play Research Background

Shadow play is an ancient folk art in China. Since the puppets are usually made from animal skins and cardboard, old Beijing folks call it “donkey shadow play.” When performing, artists stand behind a white curtain and manipulate the puppets while telling stories in popular folk song with percussion and string instruments playing as background music, bringing shadow play a very traditional and local sense<sup>[1-3]</sup>. This art form is popular in a wide range because of various regional vocal arias enable shadow play developing into different subgenres. According to the historical records,

shadow play began in the Warring States period, rising in the Han Dynasty, the Tang and the Song dynasty, flourishing in the Qing Dynasty; in the Yuan Dynasty, it has spread into South-west Asia and Europe.

During the early thirteenth century Jiading period in the Southern Song Dynasty, the art of shadow play was first spread to South-east Asia countries such as Indonesia, Thailand and Malaysia by sea through the Silk Road. In the latter thirteenth century, traveling with Mongolian army, shadow play has entered Central Asia region. In the mid to late fourteenth century, it has entered Persia, Egypt and Turkey<sup>[4]</sup>.

After a long period of development, shadow play adopted various contents and has formed new plays, such as historical tale plays, folk tale plays, martial arts plays, romance plays, mythology plays and modern fashion show plays. From the Revolutionary War to the post-liberation period, shadow play has developed fashion show plays, modern plays, and fairy tale and fables plays. Yet, traditional shadow play has inevitable limitations in adapting contemporary fast developing society. The delicate carving required in making the puppets makes its production difficult that only a few people can reach this standard. At the same time, the finished product is so complex in preserving that excessive exposing in the sunlight would fade the pigment on the puppet, and changes in humidity and temperature would also cause the puppet to deform. These factors are undoubtedly fatal weaknesses of shadow play adapting to an industrial society with emphasis on goods' mass production. In addition, shadow play artists' excellence depends on their skill of effectively manipulating the puppets and singing correspondingly. These performing skills were taught

by master's oral instruction generation by generation and enabled by apprentices' endeavor and effort day by day. Right now, we are facing the problem that there is no new generation to inherit this art form while old-generation artists are no longer performing on stage. Due to the decreasing number of people mastering the skills needed for this art, as well as the decline in inheritors caused by other restrictions in life, Chinese traditional shadow play faces the threat of failing to be handed down from past generations to new generations.

## 2 The Application of SPSS

Statistical Package for the Social Science (SPSS) is a software that has comprehensive and accurate capability in managing and analyzing statistical data. Its statistical functions include all the topics covered in *Educational Statistics*, such as the usual number of central tendency, measure of differences, correlation analysis, regression analysis, analysis of variance, t-test, etc., as well as the upgraded multivariate statistical techniques, such as multiple regression analysis, cluster analysis, discriminant analysis, principle component analysis, factor analysis, etc. According to its software characteristics, SPSS can be used to make various statistical description, test and table analysis from the original data provided, including but not limited to calculating percentile, mean, median, summation, standard deviation, variance, maximum and minimum, dispersion, span, and kurtosis.

The application of SPSS in the in-school survey research of inheriting shadow play could be divided into three parts below:

### 2.1 The Application of Descriptive Statistics

The application of descriptive statistics is to analyze, synthesize, summarize, itemize, and illustrate the sampling data collected from the questionnaire distributed in schools using SPSS such that the complete picture of the data could be described, and the general distribution and correlation could be shown. The application of descriptive analysis not only enables researchers to understand their topic more deeply, its statistic is also the basis of inferring research objects statistically.

### 2.2 The Application of Statistical Hypothesis Testing

The application of statistical hypothesis testing is a statistical inference method of using the difference

between two sets of data to determine whether there is a difference between the overall parameters. First, researcher makes assumptions about the overall distribution, then by calculating the sampling data collected from questionnaires, researcher makes decision on whether reject or not reject the hypothesis according to the test result<sup>[3]</sup>. In this study, the steps taken are:

(1)Take the null hypothesis, that is, there is no difference between attaining the knowledge for shadow play and the inheriting shadow play, denoted by Ho.

(2)By statistical calculation, determine the probability P for assuming Ho holds.

(3)Determine whether Ho holds (as shown in Table 1) based on the result of P.

**Table 1.** Relation of P and Ho

P	Probability of Ho Holds	Significance Level
$P \leq 0.01$	Ho not likely to hold	Very high
$P \leq 0.05$	Ho is less likely to hold	High
$P > 0.05$	Ho is most likely to hold	Not high

### 2.3 The Application of Scalogram Analysis

There are universal connections between things, and most of these connections can be showed quantitatively. The application of Guttman scale, also known as scalogram analysis, is used to analyze the result caused by the relationship, degree of closeness, and cause and effect of two or more variables using SPSS in survey study. After acquiring the original data from the survey, researcher could use SPSS to make factor analysis, reliability analysis, variance analysis, correlation and regression analysis, cluster analysis, and discriminant analysis.

## 3 Analyzing Data from Questionnaire

In this study, combining various statistical method of analysis, the utilization of SPSS in in-school survey research of inheriting shadow play will be presented below. In the questionnaire distributed to research objects, there are two multiple choice questions that allows students to choose more than one answer:

(1)What do you think is(are) the reason(s) for the declining attention in shadow play? (You can choose more than one answer)

A.Not aesthetically attracting to people

B.Weak social propaganda extent

C.Lack of the knowledge of intangible cultural heritage

- D. Difficulty in shadow play's production
- E. Others

(2) What do you think is(are) the possible way(s) of promoting inheritance of shadow play in schools? (You can choose more than one answer)

- A. Develop a school-based curriculum about shadow play and give lectures on this subject
- B. Create clubs for shadow play
- C. Propagate through schools' official websites and modern technology
- D. Promoting student to create shadow play related crafts during art classes
- E. Others

The statistical difficulty in these two questions is that the large amount of statistical data caused by respondents choosing more than one answer is complex and easy to have calculating errors<sup>[5]</sup>. Thus, analyzing the frequency, calculating the percentile or testing the data using traditional manual method or spreadsheet system like Excel would be quite cumbersome due to large number of research objects. The use of SPSS, however, is simpler, faster and more accurate in showing the results of statistical analysis.

According to the diversity of answer choices from the questionnaire respondents and the functional

analysis provided by SPSS, we could use Cochran's Q test to analyze the data acquired. Cochran's Q test can be used to analyze the frequency or proportion of k correlation samples while asking the test variables to be bivariate. If the values of the variables do not meet such requirement, they could be converted by recording. In the process of testing, we compare the difference of observed values of each variable by counting the frequency of two values of each variable. The problem mentioned above can be solved by transforming the unselected option to be marked as "0," and the selected option to be marked as "1." The result of the survey on the first of these questions are thus obtained. Due to the space restrictions, table 2 (see page 7) only represents individual answers from 14/225 of the respondents<sup>[6]</sup>. The first column in the table is the number of each respondent; the second to the fifth columns are the selected options of each respondent, and the notation of the unselected option is "0" while the selected one is "1." Now use the function of Cochran's Q test to count the data from Table 2, using steps as follows:

Open SPSS and create a new data table which defines five variables as A1, A2, A3, A4, A5, each correspond to the five options, A, B, C, D, E. Enter these five variables into the data file and save the file.

**Table 2.** What do you think is(are) the reason(s) for the declining attention in shadow play?

Answers Selected by Respondent	A	B	C	D	E
1	0	1	1	1	0
2	1	1	0	1	0
3	1	1	1	1	0
4	0	1	0	0	1
5	1	0	0	0	0
6	0	1	0	1	0
7	1	1	0	1	0
8	0	1	0	1	0
9	1	1	1	1	0
10	0	1	1	1	0
11	1	1	0	1	0
12	0	0	0	1	0
13	1	1	0	1	0
14	1	1	0	1	1

(2)Click [Analyze], [Nonparametric Tests], [K Related Sample] respectively to enter the non-parametric test of K related sample.

(3)Select the variables in the source variable box and place them in to the Test Variables box, indicating a non-parametric test for the first set of multiple related

samples.

(4)Specify the type of test to be “Cochran’s Q” in the Test Type option, then clear all the other check boxes.

(5)Click OK button to start the statistical process, and the result got is shown in Table 3 below.

**Table 3.** Statistic of Frequency

	Number of Unselected Respondents	Number of Selected Respondents
A1: Option A	8	6
A2: Option B	2	12
A3: Option C	6	8
A4: Option D	2	12
A5: Option E	11	3

As shown in table 2, the first column represents each option in the question; the second column displays the number of respondents who did not choose the corresponding option; and the last column shows the number of respondents who chose each option. For example, the second row in table 3 shows in 14 respondents, only 2 did not choose this option while other 12 all chose it, reflecting students’ common opinion of wishing a stronger propagating level of shadow play. Similarly, the data distribution other four options is also indicated in the table. In this way, we

can accurately describe the characteristic of the survey data distribution with the aid of SPSS, and this provides a clear statistical result for the study of the reasons causing the decline awareness of shadow play.

By the above operations, we get the general

characteristic of the survey data. We can get a more detailed statistical result of frequency by following the steps below:

(1)Click [Analyze], [Multiple Response], [Define Sets] respective to enter [Define Multiple Sets].

(2)Select the five variables, place them into the Test Variable box, and click on [Dichotomies Counted Value]. Enter dcsj 1 in [name], and click on [Add], placing dcsj 1 on the right side in order to set up for the multiple responses.

(3)Click [Analyze], [Multiple Response], [Frequencies] to enter the multiple response frequency box. In [Multiple Response Sets], place dcsj 1 in [Table(s) for:] and select one of the options in the Miss Value window to exclude missing values.

(4)Click [OK] to enter the statistical calculating process, the result obtained is in Table 4 below.

**Table 4.** Table of Variable’s Statistics Result

Multiple Response Group \$DCSJ1 n204 (Value tabulated=1)			
Name	Count	Pct of Responses	Pct of Cases
A1: Option A	6	19.4	42.9
A2: Option B	12	38.7	85.7
A3: Option C	8	25.8	57.1
A4: Option D	2	6.5	14.3
A5: Option E	3	9.7	21.4
	.....	.....	
Total responses	31	100.0	221.4
0 missing cases	14 valid cases		

As shown in table 4, the total number of times that 14 respondents selected each option in the question was 31; and the frequency of each option selected, as well as the percentage of each option with respect to the total, were given, as these results provide a more accurate measurement of the survey data<sup>[7]</sup>. For example, 12 out of 14 respondents chose option B, which is 85.7% of the cases and 38.7% of the responses, indicating that educational institutions and the government should promote a larger extent of propagating shadow play. And similarly, other options can obtain their corresponding results of statistical analysis. This demonstrates the convenience, quickness and accuracy of SPSS in performing statistical analysis.

Based on the case study of SPSS above, the general method of applying SPSS in the empirical research of multimedia teaching is as follows:

(1)Input and edit the survey data of multimedia teaching,

(2)Determine the use of SPSS according to the purpose of the problem,

(3)Use the menu of SPSS to get corresponding results and chart of the statistical analysis,

(4)Analyzing resulted data and chart, coming up with reliable resolution for promoting the inheritance of shadow play in schools.

This study provides an example of utilizing SPSS in minimizing the workload of statistical calculation, improving the accuracy of research results and credibility of one resolution<sup>[8]</sup>. Obviously, SPSS technology integrates its functions of data entry, data management, statistical analysis, report making and graph drawing, providing strong support and practical method for this study, serving as a powerful tool for empirical research of multimedia teaching.

## References

- [1] Grand View of National Intangible Cultural Heritages[M]. Peking University Press, 2006.
- [2] Hu F. The Application of SPSS in Empirical Statistical Analysis[J]. China Educational Technology, Aug 2004.
- [3] Li KD. Research Method of Educational Technology[M]. Peking University Press, 2003
- [4] Lin K. An Analysis on the Performance and Production of Yunmeng Shadow Play[J]. Design, June 2014.
- [5] Liu QF. Historical Data of Shadow Play[J]. Heilongjiang Institution of Art Press, 1986.
- [6] Sun LL. The Application of Statistical Test Method in Educational Information Processing[J]. China Educational Technology & Equipment, Dec 2009.
- [7] Wu QH. The Age of Creation[M]. CITIC Publication, 2015.
- [8] Zhou ZD, et al. The Analysis and Application of the Statistical Software SPSS[J]. Computer Knowledge and Technology, Jul 2019.