

A Survey on the Basic Situation of the Dissemination and Transmission of Cantonese Opera and the Role of Cultural Ties in the Greater Bay Area of Guangdong, Hong Kong and Macao

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Abstract. Based on the "9+2" city cluster consisting of "nine cities" and "two regions" in the Guangdong-Hong Kong-Macao Greater Bay Area, this paper explores the propagation, heritage and cultural identity of Cantonese opera. On the basis of this study, we explore the willingness of Cantonese opera to spread, the current situation of intergenerational and school heritage, and the role of cultural ties in the Bay Area era, and offer suggestions for the synergy of Cantonese opera and the times. In order to investigate the current situation and effects of Cantonese opera dissemination and the willingness to transmit Cantonese opera, we use the method of constructing logistic regression models; based on the above analysis, we propose suggestions for the future development of Cantonese opera a.

Keywords: Cantonese opera; dissemination and transmission; traditional regional culture.

1. Introduction

To explore the current situation and effects of Cantonese opera dissemination, we used Ridit test and constructed logistic regression models[1]. The results show that: (1) in terms of dissemination preference, the form of Cantonese opera in schools is widely recognized, among which the support rates of all surveyed samples for watching Cantonese opera performances and participating in activities of Cantonese opera societies account for 60.31% and 56.45%, respectively; (2) in order to maintain the vitality of Cantonese opera, the government's investment in Cantonese opera should be more inclined to improving the quality of Cantonese opera, and practitioners related to Cantonese opera can seize the wind of the times and make use of (3) there is a decreasing trend in the degree of understanding and willingness to disseminate Cantonese opera from old[2], prospective and new Cantonese people; (4) the development and revival of Cantonese opera need to follow the trend of the new era, and the creation of related cultural products can promote the dissemination of Cantonese opera. In order to explore the current situation and willingness to transmit Cantonese opera, the we used Ridit test, logistic regression The results show that: (1) the Cantonese opera family atmosphere is still stronger among old Cantonese, but has weakened, while it is weaker among quasi-Cantonese and new Cantonese; (2) geographically, the sense of Cantonese opera family atmosphere is stronger in Macao SAR, while it is weakest in Zhuhai and Foshan. (3) residents in the Greater Bay Area do not interact optimistically with their parents related to Cantonese opera, reflecting that there are certain hidden dangers and obstacles to the intergenerational transmission of Cantonese opera in the Greater Bay Area at this stage[3]; (4) occupation, education and area of residence affect residents' awareness of Cantonese opera more significantly; (5) more than 50% of Cantonese opera students believe they are confused about their personal future development prospects, and only about 10% of students study Cantonese opera Only about 10% of students study Cantonese opera with the aim of becoming the inheritors of Cantonese opera culture, and 32.35% of students would choose to engage in jobs unrelated to Cantonese opera culture, while practitioners of Cantonese opera are also dissatisfied with the current development conditions of Cantonese opera to a certain extent, and the cultivation and protection of Cantonese opera talents is urgent[4]. (6) There are problems such as insufficient teachers and limited learning resources in Cantonese opera colleges, and the needs of students are not basically met, and there is more room for progress and improvement in Cantonese opera education[5].

2. Analysis of factors influencing willingness to disseminate Cantonese opera based on binary logistic regression model

In this section, we first clustered the samples into several distinct categories and then performed logistic regression analysis.

2.1 Cluster analysis from the perspective of willingness to communicate

The process of cultural transmission is the process of cultural exchange, in which people transmit knowledge, information, ideas, emotions and beliefs, as well as all social interaction activities related to them, in a certain way; the willingness to transmit culture is the intensity of sending information about that culture in consciousness as the sender of culture [6].

After having a general understanding of the data, we will next analyze the data in depth from the perspective of Cantonese opera transmission heritage, and we use K-means clustering method to classify the resident population from the perspective of willingness to transmit for subsequent in-depth analysis.

2.1.1 Outlier handling before clustering

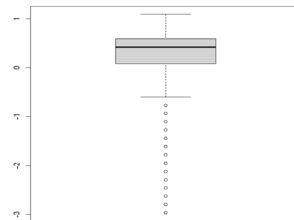


Figure 1 Dissemination and transmission willingness score box line chart

First, the permanent residents were clustered and classified from the perspective of propagation intention. Since K-means is sensitive to outliers, the outliers need to be identified and processed beforehand, so the standardized spread heritage awareness scores were plotted as a box-line plot as shown in Figure 1. Although the box line plot shows 14 outliers, all the outliers shown are in the range of $[-3, 3]$, and considering that the potential halo effect of the research topic and questionnaire setting would make respondents tend to choose the option with high scores, which in turn makes the data distribution more concentrated[7], resulting in a few lower data points being considered as outliers, we do not consider these lower values in the next data analysis as We do not consider these lower values as outliers in the next data analysis, and can proceed to the next analysis.

2.1.2 Determination of the number of clusters k

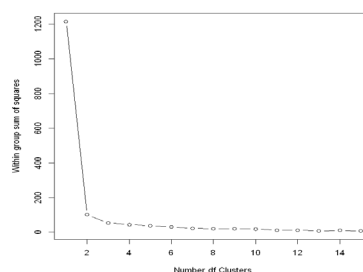


Figure 2 Propagation intention clustering analysis gravel plot

In order to confirm the optimal number of categories, systematic clustering diagrams and rubble diagrams were made separately. The rubble diagram is shown in Figure 2, where the horizontal coordinate is the number of categories and the vertical coordinate is the sum of squares within a class. From the systematic clustering diagram, the more appropriate number of classes is 2 or 3, but if divided into three classes one of them will be too few in number, which is neither conducive to subsequent analysis nor necessary. From the gravel diagram, the inflection point of the curve appears

when the number of classes $K=2$, at which time the intra-class sum of squares basically drops to a lower level, indicating that the more appropriate number of classes is 2. In summary, the number of classes for propagation willingness clustering is finally determined to be 2.

2.1.3 Results of Cluster Analysis

After determining the number of classification classes for clustering, we used SPSS to implement the K-means clustering method to divide the permanent residents into two categories, and obtained the cluster centers and score means for each category as shown in Table 1.

Table 1 K-means clustering results and percentages

Clustering categories	Y11 Clustering Center	Y11 mean	Frequency	Percentage
First category	-2.17	10.69	211	16.26%
Second category	0.42	26.04	1087	83.74%
Total			1298	100%

The greater distance between the centers of the clusters of the two classes indicates that the classification is better; in terms of the means, the greater difference between the means of the two classes indicates that the differentiation of the clustering classification is better.

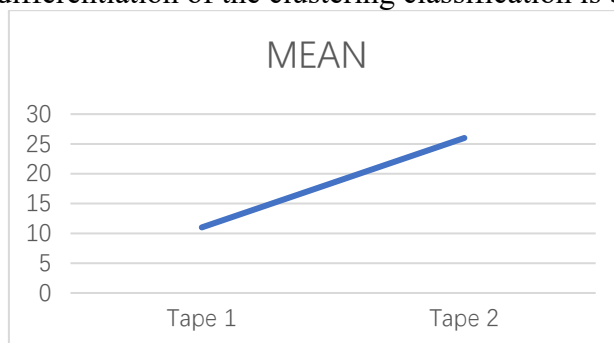


Figure 3 Line graph of the mean values of the two categories after clustering

The mean values of the scores of the two categories of permanent residents are plotted as shown in Figure 3. It can be seen that there is a clear distinction between the strong and weak willingness to communicate between the two categories of permanent residents, so the first category is next referred to as the group with weaker willingness and the second category as the group with stronger willingness.

2.2 Logistic regression analysis

With the results of the cluster analysis described above, all permanent residents were classified into two categories in all three dimensions, so the next step was to use the classification of these three dimensions to explore what are the effective influencing factors of propagation intention and to what extent using binary logistic regression analysis[8]. Among them, in order to screen out the effective variables and reduce the multicollinearity among variables, we used a stepwise method for regression, and the variables were screened by likelihood ratio test at each step.

2.2.1 The idea of the model

In this section, we will develop a logistic regression model for propagation intention. We set the willingness more P_i , because this variable are dichotomous variables, so the probability of weaker willingness is $1-P_i$, and the log ratio of the probability of stronger willingness and weaker willingness residents $\ln(\frac{P_i}{1-P_i})$ as the dependent variable, the factors that may affect the strength of willingness are included in the model for regression, and the basic form of the model is as follows.

$$\ln\left(\frac{P_i}{1-P_i}\right) = \alpha_0 + \alpha_1 \times X_1 + \dots + \alpha_n \times X_n + \mu \quad (1)$$

2.2.2 Establishment of binary logistic regression model and analysis of regression results

After converting all qualitative variables in the above variables to 0-1 dummy variables, all independent variables were introduced into the equation of the dependent variable, and the model results were used to observe which variables were the influencing factors of the dependent variable and also how much influence they had[9]. In order to screen and remove the variables that are not influencing factors, we used a stepwise forward regression method to gradually screen the variables.

2.2.3 Willingness to disseminate

Table 2 Likelihood ratio chi-square test for the overall propagation intention logistic regression model

Step	Nagelkerke R Square	-2Log likelihood	Chi-square	df	Sig.
6	0.088	1015.876	65.093	12	0.000

The likelihood ratio chi-square test for the overall propagation intention logistic regression model is shown in Table 2, which stops after 6 iterations of stepwise regression. It can be seen that the Nergolko R2 is 0.088, which is not high but should not be considered a bad fit considering that logistic regressions do not have a high goodness of fit. Next we calculate the -2 maximum likelihood value of the model and perform a likelihood ratio chi-square test, the results show that the overall significance of the model p-value is close to 0, much less than 0.05, so the final logistic equation is overall very significant.

Table 3 Propagation intention logistic regression confusion matrix

Observed		Predicted		
		Y1		Percentage Correct
		1.0	2.0	
Y1	1.0	14	197	6.6
	2.0	8	1079	99.3
Overall Percentage				84.2

At the same time, the logistic can reach 84.2% correct rate for judging the strength of propagation willingness, which indicates that the model has a good classification effect. Logistic regression coefficients of propagation intention are shown in Table 4.

Table 4 Table of Logistic Regression Coefficients of Propagation Intention

	B	Wald	df	Sig.	Exp(B)
[Strongly disagree with viewpoint 1. Cantonese opera will gradually lose its vitality as the number of interested people gradually decreases]		13.659	4	0.008	
[Disagree on viewpoint 1]	-0.498	1.073	1	0.300	0.608
[Neutral on viewpoint 1]	-0.602	1.159	1	0.282	0.548
[Agree with viewpoint 1]	-0.358	2.189	1	0.139	0.699
[Strongly agree with viewpoint 1]	0.498	6.392	1	0.011	1.645

[Strongly disagree with viewpoint 2: Cantonese opera needs to be combined with new technologies in order to spread better]	12.632	4	0.013		
[Disagree on viewpoint 2]	1.526	5.954	1	0.015	4.598
[Neutral on viewpoint 2]	0.983	2.821	1	0.093	2.673
[Agree with viewpoint 2]	-0.285	1.221	1	0.269	0.752
[Strongly agree with viewpoint 2]	0.204	1.198	1	0.274	1.226

The final model generated by the stepwise regression is[10],

$$\ln\left(\frac{P}{1-P}\right) = -3.679 + 0.498 * view_{15} + 1.526 * view_{22} - 0.385 * freq2 + 1.964 * ocp1 + 0.682 * ocp6 \quad (2)$$

Qualitatively, for viewpoint one, the coefficient of "strongly agree" is significant and positive, while the coefficients of the other views are not significant, indicating that those who strongly agree with viewpoint one are more willing to communicate under the "strongly disagree" benchmark; for viewpoint two, the coefficient of "less agree" is significant, positive and has the largest value, while the coefficients of the other views are not significant at the 0.05 level of significance. The coefficient of "less agree" is significant, positive and has the largest value, while all other coefficients are not significant at the 0.05 level of significance, indicating that those who disagree more with viewpoint two may be more willing to communicate. In terms of the most exposed forms of culture, those who are most exposed to Cantonese opera are less likely to spread it than those who are not. Regarding occupation, the coefficients of "school students" and "business managers" are both significant but positive and negative, indicating that the willingness of school students to disseminate is at a lower level compared to "other" occupations. The coefficients for both "school students" and "business managers" are significant, but one is positive and one is negative.

Quantitatively, in terms of opinion one and two, residents who strongly agree with opinion one are 0.645 times more likely to be more likely to communicate than those who strongly disagree, and residents who disagree with opinion two are 3.598 times more likely to be more likely to communicate than those who disagree. In terms of occupation, the probability of being more willing to transmit is reduced by 85.9% if one is a school student, while it is increased by 0.979 times if one is a business manager.

3. Analysis of the Heritage Status and Willingness to Pass on Cantonese Opera and Cantonese Opera Culture

3.1 Analysis of intergenerational transmission based on Redit test

In this section we analyze the various types of daily contact and communication between residents of the Greater Bay Area and their parents about Cantonese opera.

Table 5 Redit score table of various types of daily contact and communication between residents of the Greater Bay Area and their parents about Cantonese opera

Group	Average Redit score	95% CI	χ^2	p
We often watch Cantonese opera together and enjoy the culture of Cantonese opera	0.489	0.458 ~ 0.521	9.346	0.007

My parents like to watch Cantonese opera and appreciate Cantonese opera culture, but I have no interest in it	0.501	0.475 ~ 0.528
I like to watch Cantonese opera and appreciate Cantonese opera culture, but my parents are not interested in Cantonese opera culture	0.492	0.456 ~ 0.528
My parents and I are not interested in Cantonese opera culture	0.526	0.484 ~ 0.569

From Table 5, the p-value of the Ridit scores of the various categories of daily contact and communication between residents and their parents in the Greater Bay Area is $0.007 < 0.1$. Therefore, at a significance level of 10%, it is considered that there is a significant difference between the various categories of daily contact and communication between residents and their parents in the Greater Bay Area, which can be compared by the mean Ridit score.

Among the four categories listed, the highest Ridit score of 0.526 was for "Both my parents and I have no interest in Cantonese opera culture", followed by "My parents like to watch and enjoy Cantonese opera culture, but I have no interest in Cantonese opera culture", and "This reflects that the intergenerational transmission of Cantonese opera in the Greater Bay Area has some hidden dangers and obstacles, and it is imperative to take measures to protect the heritage of Cantonese opera.

3.2 Analysis of factors influencing intergenerational family inheritance based on logistic regression

First, we have defined cultural transmission, intergenerational transmission and intergenerational transmission willingness in the introduction section Cultural transmission: culture is the general term for the material and spiritual wealth created by human beings in the process of social development, and cultural transmission refers to the process of transferring and taking over these two kinds of wealth between different people; intergenerational transmission: the process of transferring and taking over between two generations with blood relations; intergenerational transmission willingness: in Intergenerational transmission: the willingness of the new generation to pass on and take over the culture of the older generation in intergenerational transmission.

Since the existence of family intergenerational transmission can be directly classified into two categories of "yes" and "no" according to the questions and options in the questionnaire, no cluster analysis is conducted from this perspective.

In this section we will develop logistic regression models for family intergenerational inheritance behavior. We set the probability of the presence of family intergenerational inheritance behavior as P_i , and the probability of the absence of family intergenerational inheritance behavior as $1-P_i$ because this variable is all dichotomous, and the log ratio of the probability of the presence and absence of residents of family intergenerational inheritance behavior $\ln(\frac{P_i}{1-P_i})$ as the dependent variable, and the factors that may affect the presence of intergenerational The factors that may influence the existence of intergenerational transmission behavior are included in the model for regression, and the basic form of the model is as follows.

$$\ln\left(\frac{P_i}{1-P_i}\right) = \alpha_0 + \alpha_1 \times X_1 + \dots + \alpha_n \times X_n + \mu \quad (3)$$

After converting all qualitative variables in the variables defined in the previous section to 0-1 dummy variables, we introduced all independent variables into the equation of the dependent variable and observed through the model results which variables were the influencing factors of this dependent variable and also to what extent. In order to screen and remove variables that are not influential factors, we used a stepwise forward regression method to gradually screen the variables.

Table 6 Likelihood ratio chi-square test for the overall logistic regression model of intergenerational inheritance behavior

Step	Nagelkerke R Square	-2 Log likelihood	Chi-square	df	Sig.
3	0.031	1377.257	26.442	6	0.000

The model was stopped after 3 iterations of stepwise regression. It can be seen that the Nagelkerke R^2 is 0.031, and the overall likelihood of the model is more important than the chi-square test results compared to the goodness of fit. Next we calculate the -2 maximum likelihood of the model and perform a chi-square test, and the results show that the overall significance of the model has a p-value close to 0, much less than 0.05, indicating that the final logistic equation is significant overall.

Table 7 Intergenerational transmission logistic regression confusion matrix

Observed		Predicted		
		Y3		Percentage Correct
		0.0	1.0	
Family intergenerational transmission behavior	0.0	955	0	100.0
	1.0	343	0	0.0
Overall Percentage				73.6

The final model generated is.

$$\ln\left(\frac{P}{1-P}\right) = -0.529 - 0.95 * view_{23} - 0.292 * know_3 - 0.396 * fvr_1 \quad (4)$$

Qualitatively, the coefficient of remaining "neutral" is significant but negative for viewpoint 2, while all other coefficients are insignificant, indicating that residents who are neutral about viewpoint 2 have less intergenerational transmission behavior than those who strongly disagree with the benchmark. Regarding the channels of learning about Cantonese opera, residents who had learned about Cantonese opera through friends and relatives were likely to have less intergenerational transmission behavior than other channels. In terms of favorite cultural forms, residents who liked foreign cultures such as British and American dramas the most had less intergenerational transmission behavior.

Quantitatively, in terms of perceptions of viewpoint two, residents with a neutral attitude were 1.586 times more likely to have no intergenerational transmission behavior compared to the benchmark of strongly disagreeing. Regarding the channels of knowledge of Cantonese opera, residents who had learned about Cantonese opera through friends and relatives were 33.9% more likely to have no intergenerational transmission behavior. In terms of favorite cultural forms, the probability of not having intergenerational transmission behavior increased by 48.6% for residents who liked foreign cultures such as British and American dramas the most compared to the other two cultural forms.

4. Conclusions

The emotional and cognitive evaluation of Cantonese opera by residents of the Greater Bay Area is highly correlated with age and education. The score status of each age group reveals that residents of the Greater Bay Area generally show a decreasing trend in their emotional and cognitive evaluation of Cantonese opera with decreasing age, and it plummets in the interval from 19-35 years old to below 18 years old. At the same time, the group holding a high willingness to disseminate Cantonese opera accounted for 91.66% of respondents with other education levels, while only 71.59% of respondents with the highest education level of university/specialist degree, which can be inferred that there may be a gap in Cantonese opera education in higher education, resulting in a low awareness of Cantonese opera dissemination and transmission among students.

In the Ridit test, the highest Ridit score was for the option "neither I nor my parents are interested in Cantonese opera culture", reflecting that the family atmosphere for the intergenerational

transmission of Cantonese opera is thin, and the younger generation has failed to form a stable force in spreading and transmitting Cantonese opera.

Among the residents of the Bay Area, there is a positive relationship between the degree of knowledge of Cantonese opera and the willingness to disseminate it, with 92.31% of those with a low degree of knowledge of Cantonese opera having a weak willingness and 68.42% of those with a high degree of knowledge having a strong willingness. It can be seen that residents' knowledge of Cantonese opera can be enhanced by effectively promoting the culture and attaching importance to the development of Cantonese opera, thus increasing their willingness to disseminate Cantonese opera.

The reform and improvement of the Cantonese opera industry should be accelerated, and the remuneration of Cantonese opera practitioners should be guaranteed; the investment in education funding for Cantonese opera should be appropriately tilted, and the teacher strength and teaching level of Cantonese opera education should be improved. To address the shortcomings of Cantonese opera performance forms, Cantonese opera can be based on its traditional roots, incorporate the current trends in subject matter and themes, and improve the fluency in performance rhythm. In addressing the scarcity of talents, it should dare to activate new scriptwriting talents, give emerging actors a broader platform for development, and increase the investment of resources. It can learn from the selection method of Yueju opera, whose rising scriptwriting talent Yu Qingfeng has continuously won drama awards in recent years. The government can also play an important role in promoting the dissemination and transmission of Cantonese opera, among which, in terms of financial support, the HKSAR government's funding for Cantonese opera has grown significantly in recent years, which is a good momentum for the development of Cantonese opera.

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