

# AN EFFECT OF PERFORMING ARTS ON HAPPINESS IN WESTERN JAPAN: QUANTILE REGRESSION ANALYSIS

SEIRA SUZUKI

Osaka School of International Public Policy, Osaka University  
1-31 Machikaneyama, Toyonaka, Osaka, 560-0043 Japan  
E-mail: s-suzuki@osipp.osaka-u.ac.jp

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**Abstract** - The purpose of this paper is to reveal the gender difference in the effect of participation in the performing arts on happiness. The participation in the performing arts includes experiencing and appreciating them throughout life. In order to investigate the relationship, the author conducted a unique internet survey in 2015 which contain questions about not only present involvement in arts activities but also past ones. The sample size is 180, 65 for female and 115 for male. As for the method, quantile regression method is applied because the effect of arts differs by happiness quantiles as the previous studies indicate. This paper adds the perspective of different attitude toward arts by gender, so that the 11-scale happiness measurement is regressed by participation in the arts and other control variables for female and male respectively. As a result, for lower quantile people, only negative effects of arts related activities are significant. The past experiences show a positive effect for higher quantile people for both gender. It seems that happiness for female are more affected by the arts compared with that for male. Judging from the result that arts related activities have more positive impact on those who are already happy, arts might play the role to expand happiness difference.

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**Index terms** - Performing arts, Happiness, Quantile regression, Internet survey, Japan

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## I. INTRODUCTION

There are many people who are not interested in arts. One of the reasons why they tend to think in this way is that arts are not related to their lives. What if arts turn out to create some disparity? It is worth thinking the possibility that your lives might influenced by the arts surround you. Surely, it is difficult to identify what arts can do in general because it has a long-term effect and its effect depends on each recipient. With the periodical data of appropriate number of people and with the right methods, we can conduct empirical analysis for arts.

Unfortunately, the data related to arts are yet limited, recently those remarkable quantitative studies appear, which are listed in section 4. This paper plays the experimental role to analyse and discuss the relationships between arts and happiness in Japan. Considering that happiness helps us to live enriched lives and to get through the troubles we face, it is meaningful to provoke happiness. Indicating the effect of participation in performing arts on happiness might also change the system of society. This is motivation for this thesis.

Next two sections show the previous studies of the participation in performing arts and then the discussions about happiness index. In the section 4, the empirical researches about the relationships between arts and happiness are summarized. It is followed by the section 5 which indicates the objectives of this thesis by clarifying the different point with previous study. The Data set and method used for the analysis is shown in section 6 and 7. After section 8, which is for summarizing the result, the discussion for this research is shown as a conclusion in section 9.

## II. ARTS

It is difficult to define arts that is something to provide new insights with artists' skills. Although there are a number of ways to categorize them [1], this paper focuses only on performing arts; Dance, Music, Drama and so on. When it comes to enjoying performing arts, there are three ways. Firstly, people visit theatre and appreciate the live performance. Secondly, people obtain the recorded media such as CDs and DVDs and appreciate the performance via the media. Lastly, people take classes or take part in events and experience the performing arts. [2]

The reason to divide arts and focus only on performing arts is each type of arts affects people differently. For example, the influence of appreciating visual arts appears to be different from that of performing arts, however, both have a significant effect in the field of health care science. [3] The effects of experiencing the arts have been discussed recently in Japan (e.g. [4]). Kataoka points out the gender differences of types of the arts activities they choose to experience and discusses the differences of outcomes from the viewpoint of cultural capital. In particular, more women than men tend to experience arts activities in their childhoods. Additionally, those women who have experienced some types of arts activities have higher possibilities of getting married to the men with higher status. [5], [6]

## III. HAPPINESS INDEX

The empirical analysis on happiness is first conducted in the field of psychology especially mental health in 1960's (i.e. [7]). Reference [8] reveals that happiness

affects both in a positive and negative way. Thanks to the following research [9], happiness is proven to be measurable by asking people how happy they are. From late 60's, the main topic is which measurement should be used for calculating happiness. Not only single-item scaling devices, which are utilized for national opinion research [8], but also multi-item scales are investigated [10], [11]. The cumulation of researches prove Happiness Measure provides the rational information about people's well-beings. Happiness Measure is a numeral scale gain by asking people's happiness for their general lives. Since it is a self-reported measurement, the efficiency for the result is rather skeptical until Oswald and Wu [12] reveals the positive correlation between objective life satisfaction measurement and subjective 4-scale Happiness Measurement. Other happiness indicators are listed in [13] and [14].

It is often said that Easterlin [15] research, which links happiness with economic situation, is the one of the earliest happiness study in economics field. From late 1990's, the effect of people's happiness, which is regarded as subjective well-being (SWB), attracts economics researches [16]. It has been indicated that SWB are influenced by income, age, marital status, academic background, job, productivity, health, leisure, sports (e.g. [17]-[22]) and many are reviewed in [14], [23]. Moreover, as for modelling the SWB measures, Binder and Coad [24] reconsider that the effects of income, health, social relation and education on happiness are different with people located in different percentile of happiness distribution.

#### IV. PREVIOUS RESEARCHES ON ARTS AND HAPPINESS

Today, more and more attentions are paid for the relationships between happiness and arts, as one of the types of leisure. For example, [25] shows four common leisure activities, sport/exercise, music, church and watching TV soaps, have a positive effect on people's moods. Caldwell analyses the Buying-Consuming experiences and indicates that the motivation for participation in performing arts comes from people's mood states. [26]

Recently, more statistical analysis has been conducted. Fujiwara considers both direct and indirect effects of being audience to the arts and participation in sports and arts on happiness [27]. The relationships between music engagements and subjective well-being (SWB) are graphically indicated in [28]. Wheatley and Bickerton focus more on the relationships between 4 types of SWB and frequency of engagements in arts, culture and sports by using ordered probit analysis with U.K. data. [29] The result that arts participation has a positive effect on people's happiness are indicated not only with ordinal recalled SWB measurement but also with

almost on time collection of happiness index. Bryson and MacKerron use the application called mappiness and capture that happiness on time when the respondents experience activities. Then they indicate that happiness is affected by work combined with other activities including listening to music. [30]

Last but not least, Hand investigate the arts attendance with quantile regression analysis using large sample of U.K. government survey data. The arts attendance is described in two ways; the first one is the number of arts events in which respondents participated in the last 12 months and second one is monthly attendance in arts forms so as to measure a frequency of attendance. The result shows that arts attendance have impacts more on those in lower quantiles and they decrease for those at higher quantiles. [31]

#### V. OBJECTIVES

The accumulation of previous study reveals that arts attendance might increase people's happiness. Moreover, the effect differs by the quantile of happiness. On the other hand, it is also revealed that the tendencies to participate arts and the outcomes appear to be different by gender. This paper infuses these ideas and clarify the effect of arts participation on quantile happiness by gender. Another contribution of this paper is that this is the first analysis using the micro data about past and present participation of performing arts in Japan.

#### VI. DATA

The data used for the analysis is micro data collected via the internet research company. The research was taken place in February and August in 2016. The target is female and male, whose age ranged from 19 to 70 years old, living in Osaka or Kyoto prefectures, located in western Japan. The survey is conducted to 1000 people at the first time and 314 respond for the second time. When dropping samples without answering all the question, the sample size ends up with 180; 65 for female and 115 for male. The questionnaire includes happiness, appreciation of performing arts in past and present, experience of performing arts in past and present and personal attribution such as gender, age, marital status, having children, academic record, work style, living standard, income, living standard, performing arts expenditure, and so on.

##### A. Main Question Items

As for the happiness, the commonly used subjective well-being (SWB) measurement is included in the survey. That is asking respondents "How happy you are for your life in general?". Respondents answer to this question in 11-levels; 1 for very unhappy and 11 for very happy.

The types of performing arts asked in the survey are listed in Table 1. Five variables are generated in order to picture the situation of participation in performing arts. First, appreciation of them at present is created by asking the frequency of going to see the performance within a year. Second, dummy variable for experiencing them in a year is created. Third, as for the appreciating performing arts in their young days, it is utilized the 4-scale questions asking frequency of appreciation of live and recorded performances in elementary school and junior high school days. The possible responses are as follows: 'do not appreciate at all', 'do not appreciate so often', 'sometimes appreciate' and 'often appreciate'. Each answer for live and recorded appreciation in each school day is added. Hence, the scale is from 2 to 16. Forth, by asking whether respondents have experienced them as out-of-school and club activities in elementary school or junior school days, dummy variable of young age experience is created. Finally, a monthly expenditure consumed for performing arts are asked with 10 categories and respondents chose the closest category for their spending.

Drama	Playing Instruments	Kabuki
Ballet	Singing	Noh
Dance	Japanese Traditional Dance	Kyogen

TABLE. I 9 Types of Performing Arts

**B. Other Question Items**

In order to capture the attributions of the respondents, other variables are composed. Female dummy is 1 if the respondent is female. Age is categorized by 5 years from 25 to 70. Those who are born between January 1<sup>st</sup> and April 1<sup>st</sup> are 1 for early born dummy. From marital status, marriage dummy (1 if they are married with present spouse and 0 if divorced, widowed, never marriage) is created. Child dummy indicates 1 if the respondents have children aged under 6-year-old. Respondents' Final academic records are calculated from years of schooling. Also, dropout dummy (1 if they dropout from school at any stage of education) is created. From job related questions, two dummy variables are made; fulltime dummy (1 if they are fulltime workers and 0 if not) and employed dummy (1 if they are employed workers and 0 if not). As for the income respondents answer their annual income from the 10 categories (1 for 0 yen, 2 for under 1 million yen, 3 for between 1-2million yen, 4 for 2-4 million yen, 5 for 4-6 million yen, 6 for 6-8 million yen, 7 for 8-10 million yen, 8 for 10-12 million yen, 9 for 12-14 million yen, 10 for 14 million and more). The median of each categories is used for the income value. Living standard is a 11-scale continuous variable (1 for very poor to 11 for very wealthy).

The descriptive data is shown in Table 2. As for happiness, the mean is 6.46. Female respondents

answer slightly higher than male. Almost 65% of samples do not appreciate performing arts in a year and those who experience are 10.56% of the whole sample. The percentages are similar with the participation in young days and monthly expenditure.

Outcome Variables	Mean	SD
Happiness	6.46	2.34
female	6.56	2.19
male	6.41	2.43
Dependent Variables	%	
now appreciation (frequency in a year)		
0	35.56	
0.5	29.44	
1	10.00	
2	8.89	
4	7.78	
12	3.33	
24	3.89	
48	1.11	
d_now experience(1=yes, 0=no)	10.56	
young appreciation (0=none, ...,16=often)		
0	62.78	
4	11.67	
5	3.33	
6	3.89	
7	1.67	
8	7.22	
9	1.67	
10	0.56	
11	1.11	
12	3.33	
13	1.11	
16	1.67	
d_young experience (1=yes, 0=no)	16.67	
monthly expenditure for performing arts		
0	66.67	
1000	4.44	
3000	5.56	
5000	6.11	
7000	2.78	
9000	3.33	
11000	2.22	
13000	2.78	
15000	1.67	
24000	4.44	
Control Variables	%	
d_female (1=female, 0=male)	36.11	
age		
25	3.89	
30	13.89	
35	10.00	
40	15.56	
45	10.00	
50	12.22	
55	12.22	
60	5.00	
65	12.22	
70	5.00	
d_marriage (1=married with present spouse, 0=otherwise)	49.44	
d_childage6 (1=have children age<6, 0=otherwise)	6.67	
d_early birth (1=born between Jan 1st and Apr 1st, 0=otherwise)	27.78	
finalrecord (years of schooling)		
9	3.89	
12	32.22	
14	10.00	
16	47.22	
18	5.56	
21	1.11	
d_dropout (1=dropout from school, 0=otherwise)	6.67	
d_fulltime (1=have fulltime job, 0=otherwise)	62.22	
d_employed (1=employed, 0=otherwise)	86.67	
annual income		
0	4.44	
50	13.33	
150	12.78	
300	27.22	
500	21.11	
700	8.33	
900	7.22	
1100	2.22	
1300	2.78	
2100	0.56	
Living Standard		
1	6.11	
2	4.44	
3	5.00	
4	7.22	
5	13.33	
6	35.56	
7	10.56	
8	11.67	
9	3.89	
10	1.11	
11	1.11	
Number of Sample (=N)	180	

TABLE. II Descriptive Data

**VII. METHOD**

The method used for the analysis is quantile regression, which allows to analyse the causal relationship between the independent values with

dependent value at different location of distribution (e.g. [32]-[34]). Unlike the ordinary least square regression, which is effective when we try to evaluate the mean effect, quantile regression captures the distribution of the dependent variable so that it is more appropriate to analyse the distorted distribution of data. Besides, as it is indicated above [25], quantile regression is suitable method when it comes to measure happiness.

Clearly, this is also the case that quantile regression works well because the effects of arts participation on happiness tend to be different between each of those who participate and who do not in various location of distribution, as shown in Fig.1 and Fig.2. For female, those who appreciate performing arts once and more in a year seem to feel slightly happier than those who never do. For male, those who have appreciate arts more than once a year feel happier than those who do not. Also, the number of people who answer unhappy for their general lives are smaller when they appreciate performing arts more than once in a year.

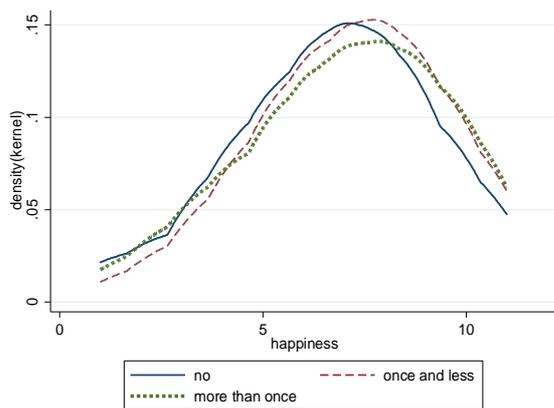


Fig. 1 Happiness distribution by frequency of arts appreciation in a year (Female)

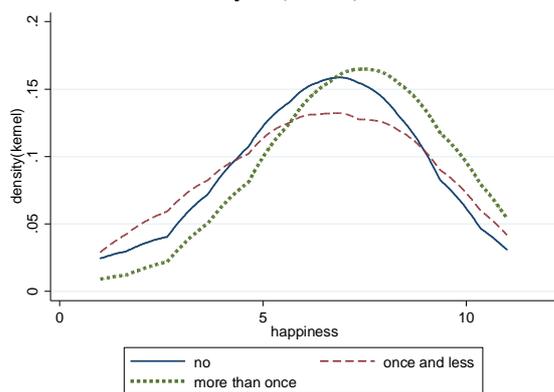


Fig. 2 Happiness distribution by frequency of arts appreciation in a year (Male)

This paper applies quantile regression with happiness as dependent variable. It is regressed by the participation in performing arts controlled by respondents' attributes. The equation that should be achieved is expressed as below. If the conditional distribution of  $y$  given  $x$  has its  $\tau$ th quantile equal to

$\beta_{0\tau} + \beta_{1\tau}x$ , then  $\beta_{0\tau}$  is the solution to the equation. Vector  $I(A)$  means the indicator function which takes 1 if condition A is satisfied and 0 otherwise. [35]

$$\min_{\beta} E[\tau I(y \geq \beta'x) + (1 - \tau)I(y < \beta'x)]|y - \beta'x|$$

In the equation,  $y$  equals to dependent variables, happiness.  $X$  contains appreciation and experience of performing arts at present (within a year) and also in their young days (elementary and junior high school days), log of expenditure for performing arts in a year and other relevant control variables such as age, early born, married with spouse present, having children under 6 years old, final academic record, school dropout, job status (fulltime and employed dummy variables) and log of annual income in a year.

### VIII. RESULT

The main result extracting the independent variables related to participation in performing arts is indicated in Table 3 and Table 4. The whole result is available by contacting with author. Table 3 is the result of OLS regression and indicates the mean effect. It is obvious from Table 3 that arts related activities have almost no significant effects on happiness.

Table 4 shows a different result. It is the result of quantile regression that indicates the effect in each quantile: 10%, 25%, 50%, 75% and 90%. First of all, there are no significant variables in 50% quantile however, more and more significant results appear in 10 and 90% quantiles. In the case of female, although the frequent appreciation of arts at a young age decrease happiness by 0.19 with 1% significant level in the lowest quantile, it turns out to increase by 0.09 with 5% significant in the highest quantiles. A unit increase of monthly expenditure of arts also decreases the happiness by 0.08% with 5% significant level in the lowest quantile and then increase the happiness as the quantile goes up. On the other hand, present experiencing performing arts indicates the opposite effect direction. It seems to have a positive effect in lower quantiles with no significant level, however, it has a negative effect in the highest quantile. As for experiencing arts in their young age, it consistently increases the happiness in any quantiles and it is significant in 75 and 90% of quantiles. Present appreciation of arts consistently has a negative effect on happiness in any percentile of distribution. Lastly, in the 10% quantile, experience of arts affects happiness positively and appreciation of arts affects negatively. In 75 and 90 % quantiles, participation in arts in young days has positive effects, where present participation in arts have negative effects.

In the case of male, only experiences of arts have a significant effect. As for experience at present, it decreases the happiness with 5% significance in the

lowest quantile. It affects positively only at 50% median percentile. As for experience at a young, it increases the happiness except at 25 percentile point. It has 10% significant positive effect in the 75% quantile. As monthly expenditure increase, happiness increases in lower quantiles but decreases in higher quantiles.

**DISCUSSION**

First of all, as for the analytical method, it is revealed that analysing the mean effect does not always fit the data by comparing the different results from OLS and quantile regressions. Especially, results of the lowest quantile and the highest quantile have more significant than other quantiles. That is to say that the impact of participation in the arts seems greater for those away from the central location. This result support the argument by Hand [31] and Wheatley and Bickerton [29].

Second, by adding the concept of gender difference of participation in the arts, result clearly shows that the relationships between subjective well-being (SWB) and performing arts differ by gender. Especially looking at the appreciation of arts in young days, the direction of effect for female and male is opposite. For female, those who feel very happy for their lives receive much greater impacts from appreciation of arts in young days, which affect negatively for unhappy people. For male, even though the result is insignificant, the as the quantile goes up the impact of appreciation of arts in young days decreases.

Another interesting result is that experiencing performing arts at a young age mostly have positive effects on happiness. As Harry [36] explains in his research, what influences people’s happiness changes over the lifecycles. Even though the factors that do not appear to be influential at present, might turn out to be important ones for future happiness. It partly explains the result that experiencing arts at a young age have positive significant effect on happiness, where experiencing them at present have negative effect.

Considering this result from the perspective of cultural capital is another approach to discuss. The idea of cultural capital introduced by Bourdieu [37] is that the experience of arts and other cultural factors are stored in people as a cultural capital. And the increase in cultural capital leads to higher academic skills. The empirical analysis has been conducted in Japanese data (e.g. [38]) and support that theory is applied to Japanese situation. In this case, the arts experience might reflect the effect of such variables that increase the happiness like final record.

Seemingly, the result here differs from the one by Hand [31] especially this paper cannot find the tendency for the positive relationship between happiness and arts in lower quantiles, which change into negative one in higher quantiles. There are so many reasons to think of what causes the different; number of sample size is rather small for this research, different tendency in U.K and Japan, omitted variables in both cases and so on. Considering the

Participation in Performing Arts	Happy	
	female (N=65)	male (N=115)
now appreciation	-0.01 (0.04)	0.01 (0.04)
d_now experience	-0.18 (0.85)	-0.44 (0.90)
young appreciation	-0.08 (0.07)	0.00 (0.07)
d_young experience	1.17 (0.87)	0.66 (0.57)
monthly consumption(log)	0.03 (0.05)	0.01 (0.04)

standard deviations are in parentheses  
 significance levels of 1, 5 and 10 % are denoted by \*\*\*, \*\* and \*.

**TABLE. III Result of OLS Regression**

Participation in Performing Arts	Happy		
	female (N=65)	male (N=115)	
<b>q10</b>			
now appreciation	-0.01 (0.03)	0.00 (0.06)	
d_now experience	1.00 (0.62)	-2.77 (1.24)	**
young appreciation	-0.19 (0.05)	0.04 (0.08)	***
d_young experience	0.25 (0.49)	0.58 (1.04)	
monthly consumption(log)	-0.08 (0.03)	0.08 (0.05)	**
<b>q25</b>			
now appreciation	-0.05 (0.06)	0.01 (0.07)	
d_now experience	-0.27 (1.28)	-0.25 (1.59)	
young appreciation	-0.26 (0.10)	-0.01 (0.10)	**
d_young experience	1.18 (1.02)	-0.14 (1.34)	
monthly consumption(log)	0.06 (0.07)	0.06 (0.07)	
<b>q50</b>			
now appreciation	-0.03 (0.06)	0.02 (0.05)	
d_now experience	-0.21 (1.25)	0.33 (1.15)	
young appreciation	-0.05 (0.10)	-0.05 (0.07)	
d_young experience	0.66 (0.99)	0.70 (0.97)	
monthly consumption(log)	0.04 (0.07)	0.03 (0.05)	
<b>q75</b>			
now appreciation	-0.04 (0.04)	-0.03 (0.07)	
d_now experience	-0.84 (0.87)	-0.46 (1.47)	
young appreciation	0.06 (0.07)	-0.04 (0.09)	
d_young experience	1.72 (0.69)	2.37 (1.23)	**
monthly consumption(log)	0.04 (0.05)	-0.01 (0.06)	*
<b>q90</b>			
now appreciation	-0.01 (0.02)	0.11 (0.07)	
d_now experience	-1.68 (0.48)	-0.44 (1.45)	***
young appreciation	0.09 (0.04)	-0.07 (0.09)	**
d_young experience	2.44 (0.38)	1.02 (1.22)	***
monthly consumption(log)	0.00 (0.03)	-0.07 (0.06)	

standard deviations are in parentheses  
 significance levels of 1, 5 and 10 % are denoted by \*\*\*, \*\* and \*.

**TABLE. IV Result of Quantile Regression**

fact that the sample size of this data is small, more trustworthy analysis would be appreciated for discussing future Japanese performing arts situation. However, it is worth considering the possibility that in Japanese case, the differences of people's happiness are partially enforced by the frequency of performing arts appreciation in a young age. Especially in case of female, those who are comparatively unhappy tend to become unhappier when they appreciated arts in a young age, while those who are happy tend to become happier.

In conclusion, it is such a difficult issue to discuss, this paper successfully indicates some relationships between participation in performing arts and different quantile of happiness distribution in Japan by gender. Participation in performing arts could play a role to enlarge the happiness disparity. It has to be mentioned that what we have as a result is not necessarily the causal relationship because the problem of endogeneity cannot be solved yet. Additionally, there are some analytical results that the theoretical reasonings are not explained here, and they are remains to be solved for the future studies.

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