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A cluster approach

Roberto Zanola

Consumer Preferences for Circus:

A Cluster Approach

Roberto Zanola*

University of Eastern Piedmont

Department of Public Policy and Public Choice, Italy

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Abstract

Despite its importance, circus has been completely neglected by cultural economics. There are two main reasons for this: first, circus has been considered as a minor performing arts; secondly, quantitative information on circus are difficult to collect. This paper represents an attempt to fill this gap by analysing the answers based on 268 questionnaires submitted to people attending Acquatico Bellucci circus. Clustering results suggest the existence of a distinct and interpretable two-cluster solution: traditional and enthusiastic circus attendances and contemporary circus attendances.

JEL Classification: C2; D2; Z1.

Key Words: circus; demand; performing arts; Italy; attendance.

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1 Introduction

Circus is one of the most accessible art forms that continuously exists since the Roman empire (Dupavillon, 1982; Dapporto and Sagot-Duvauroux, 2000). Nowadays, internationally circus is flourishing. Canada, Russia, China, France, Belgium and Australia have national circus schools; Portugal, Sweden and Belgium have independent schools; Cirque du Soleil, founded by the Quebec government in 1985, has now several shows across countries (Hall, 2002).

Although its cultural importance, however, circus has been completely neglected by cultural economics. There are two main reasons for this. First, the economics of arts has considered circus as a minor performing arts. Secondly, there are difficulties in the collection of reliable quantitative information on circus. This paper represents an attempt to fill this gap. In particular, the aim of this paper is two-fold: (i) to identify groups of consumers based on their preferences for attending circus, and (ii) to compare demographic and socio-economic characteristics among the identified subgroups of circus consumers.

In order to group individuals according to the preferences, five categorical data related to different types of circus attractions are compared. To elaborate the data I used an agglomerative hierarchical cluster analysis based on 268 questionnaires submitted to people attending Acquatico Bellucci circus, intended to be as representative as practicable of the circus' consumers in Italy[1]. Data within each clusters are then analyzed using chi-square and ANOVA test differences to better analyse circus consumer preferences.

The rest of the paper is synthesized as follows. Section 2 presents the objectives and data used in this study. Results are shown in Section 3. Finally, the paper ends with the concluding remarks in Section 4.

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[1]For a description of the market for circus in Italy see Zanola (2007).

2 Method and data

The general aim of the paper is to analyze the characteristics of circus consumers. Based on preferences of circus consumers for animals, juggling, acrobatics, vaulting, and clownery[2], this study intended to answer to the following research questions:

- Can circus consumers be grouped on the basis of their preferences for circus numbers? And if yes,

- Do circus consumers have different demographic and socio-economic profile?

- Do circus consumers display different rates of consumption?

- Do circus consumers have different reasons for attending circus?

In order to answer the first question, a cluster analysis was performed to group consumers with respect to their preference scores for different types of circus numbers. Clustering is an operation of multidimensional analysis which consists of portioning a set of objects into subsets, such that each object belongs to one and only one subset of the partition (Everitt et al, 2001). Due to the absence of any a priori about the number of consumer groups, a hierarchical approach was selected.

Two basic approaches to hierarchical cluster analysis exists, agglomerative or decisive (Fukuoka et al., 2007). Agglomerative hierarchical clustering is a statistical technique to join smaller clusters into larger clusters; decisive hierarchical clustering splits larger clusters into smaller ones. In this study the agglomerative method was adopted by using the squared Euclidian distances as a measure of dissimilarity between groups to preserve both profile level and shape for quantitative variables.

The design for this study was based on a structured questionnaire survey at a sample of people attending Acquatico Bellucci circus, intended to be as representa-

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[2]The traditional classification by Burgess (1974) has been integrated to take account of some recently developed attractions.

tive as practicable of the circus' consumers in Italy (Del Sarto and Zanola, 2008). A convenience intercept of sample of circus consumers was interviewed during weekdays, both at the afternoon and the night show. Respondents were asked for their preference ratings for different types of circus numbers. They also were asked questions concerning various demographic and socioeconomic factors, such as gender, age, education, and employment status. Additionally, questionnaire respondents were asked about the frequency of circus attendance and their motivations for such attendance.

The majority of respondents were female (54%), quite similar to provincial percentage (51.80%). Forty-five per cent of the respondents was in their late 30s or early 40s, compared to the provincial percentage of 36.37 per cent. 18.66 per cent of those surveyed were graduated. The most representative professions were clerks (24.25%) and workers (20.15%), while the less representative one was retired individuals (4.48%).

Of the 268 consumers surveyed, forty per cent had never attended circus within three years before, while for a significant twenty per cent of consumers was the third time. Fifty per cent of those consumers attended circus to accompany children, 28.73 per cent because they liked it and marketing strategies (reductions) only convinced 7.46 per cent to go to circus. It is likely that some mixed reasons existed, but data failed to catch them. Finally, preferences for circus numbers were expressed with a score 1-4. The highest preference level among respondents was for vaulting (2.92), followed by acrobatics (2.78). Complete summary statistics are presented in Table 1.

Insert Table 1 about here

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3   Results

A distinct and interpretable two-group solution was identified based on preference scores for five different types of circus numbers: animals, juggling, acrobatics, vaulting, and clownery. Factor scores were first subjected to k-mean iterative cluster analysis with Wards linkage method to find naturally-occurring respondent groups. Two clusters appeared to be clearly distinct from one another based on visual inspection of the dendrogram (Figure 1), as well as as using the combinated Calinski/Harabasz, and Duda/Hart stopping rules (Lattin et al, 2004), as reported in Table 2.

<div align="center">
Insert Figure 1 about here

Insert Table 2 about here
</div>

Based on the characteristics of these preferences, two clusters (subgroups) were identified and named as the contemporary circus group (33%) and the traditional and enthusiastic circus group (67%). The first group dislikes numbers with animals and shows low preferences for other numbers compared to those of the second group. By contrast, the traditional circus group shows strong preference for animals and vaulting, and more generally for all types of circus numbers. Table 3 presents the final cluster centers for the two groups, which are the means of the five circus number preferences used as grouping variables in the cluster analysis, ranged from 1 to 4. Discriminant analysis shows that the 97.73 per cent of cases are correctly grouped by the cluster analysis, confirming that the two group solution is the most suitable.

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Insert Table 3 about here
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A natural question to ask is whether the two cluster member preferences differed across some observable characteristics. If such characteristics were useful in identifying cluster membership, marketing strategies aiming at promoting circus attendance

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could be targeted more effectively. Characteristics of respondents were classified according two main groups: (i) demographic and socio-economic characteristics; (ii) frequency and motivations for attending circus. The two clusters were contrasted across these two broad characteristics.

The first set of characteristics were compared in Table 4, which displays those variables that are statistically different among groups according to the levels of significance of the chi square statistic and ANOVA tests.

<center>Insert Table 4 about here</center>

Overall, when considering demographic and socio-economic factors, the results of the Bartlett's test for equal variances between the two groups cannot be rejected, with the exception of education. However, there are some significant mean differences between clusters when applying the ANOVA tests to single variables. The significant F value of 5.69 tell us that people aged 26-35 differ from zero, i.e. the means are not equal between groups. Analogously, the F value of 5.28 confirms the existence of such a difference for people aged 36-45. Mean differences between the two cluster also exist in the case of contractors and students.

In addition to the demographic and socio-economic characteristics, also factors such as utilization and motivations for attending circus were compared. Table 5 reports the main results.

<center>Insert Table 5 about here</center>

Although the null hypothesis of equal variances between groups is not rejected for overall utilization factors, high frequency consumers (three times or more within the last three years) seem to prefer traditional circus and the F statistic in the ANOVA applied to single variables confirms such a significant mean difference. By contrast, the Bartlett's test accepts the null hypothesis of different variance when overall reasons for attending circus are considered.

4 Conclusion

This study examined the structure of consumer preferences for different circus numbers. To this aim, 268 questionnaires submitted to people attending Acquatico Bellucci circus were analyzed using cluster analysis. The results presented in this study suggest the existence of a distinct and interpretable two-cluster solution. Cluster 1 consumers are contemporary circus likers, who strongly dislike animals in circus. Cluster 2 is represented by traditional and enthusiastic circus consumers. The two clusters were also contrasted across two broad characteristics of respondents: (i) demographic and socio-economic characteristics; (ii) frequency and motivations for attending circus. The levels of significance of the chi square statistic and ANOVA tests show the existence of some mean differences between the two clusters, whose explanation, however, is not easy to find. Hence, in the future, further investigation is necessary to analyse such a differences in order to better define marketing strategies.

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Table 1. Descriptive statistics

| Variable	Obs	Mean	Std. Dev.	Min	Max
gender	268	.4589	.4992	0	1
age1	268	.1231	.3292	0	1
age2	268	.2948	.4568	0	1
age3	268	.4254	.4953	0	1
age4	268	.0933	.2914	0	1
age5	268	.0560	.2303	0	1
edu1	268	.3171	.4662	0	1
edu2	268	.4776	.5004	0	1
edu3	268	.1866	.3903	0	1
prof1	268	.2425	.4294	0	1
prof2	268	.1306	.3376	0	1
prof3	268	.1381	.3456	0	1
prof4	268	.0448	.2072	0	1
prof5	268	.0560	.2303	0	1
prof6	268	.2015	.4019	0	1
prof7	268	.1679	.3745	0	1
use1	268	.3992	.4907	0	1
use2	268	.2313	.4225	0	1
use3	268	.1604	.3677	0	1
use4	268	.1791	.3841	0	1
mot1	268	.5000	.5009	0	1
mot2	268	.2873	.4533	0	1
mot3	268	.0746	.2633	0	1
mot4	268	.1045	.3064	0	1
animal	233	2.7554	1.0928	1	4
juggl	245	2.9184	1.0928	1	4
acrob	233	2.5794	.8056	1	4
vault	238	2.7857	.8717	1	4
clown	237	2.5232	.8760	1	4

Figure 1. Dendrogram
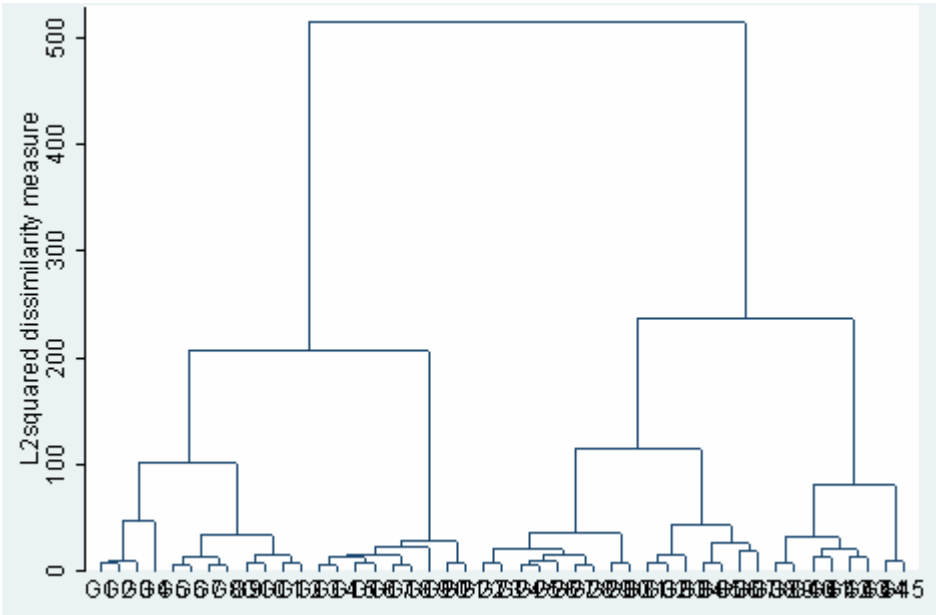
Table 2. Stopping rules for cluster analysis

Number of cluster	Calinski/Harabasz pseudo-F	Number of clusters	Duda/Hart	
			Je(2)/Je(1)	Pseudo T-squared
		1	0.7424	77.37
2	77.37	2	0.7244	51.37
3	66.71	3	0.6736	41.68
4	67.52	4	0.7182	28.25
5	63.40	5	0.6612	27.67

Table 3. Final cluster canters

	Contemporary circus group (n=88)		Traditional and enthusiastic circus group (n=137)	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**
animal	1.534	.546	3.525	.501
juggl	2.307	.889	2.650	.845
acrob	2.557	.920	2.927	.828
vault	2.670	.827	3.058	.784
clown	2.159	1.004	2.825	.938

Table 4. Comparison of demographic and socio-economic characteristics between the to groups

	Contemporary circus group (n=88)		Traditional and enthusiastic circus group (n=137)		Overall comparison Chi2
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	
Gender					
male	.420	.496	.482	.501	0.0108
Demographic					
age1	.159	.368	.124	.331	
age2	.216**	.414	.365**	.483	
age3	.511**	.503	.358**	.481	
age4	.091	.289	.102	.304	
age5	.023	.150	.044	.205	0.7589
Education					
tit1	.375**	.487	.255***	.438	
tit2	.375**	.487	.525**	.501	
tit3	.227	.421	.212	.410	2.8375***
Occupation					
prof1	.284	.454	.241	.429	
prof2	.057***	.233	.139***	.347	
prof3	.182	.388	.124	.331	
prof4	.034	.182	.036	.188	
prof5	.114**	.319	.036**	.188	
prof6	.159	.368	.219	.415	
prof7	.170	.378	.189	.394	0.1948

Table 5. Comparison of characteristics between the two groups

	Contemporary circus group (n=88)		Traditional and enthusiastic circus group (n=137)		Overall comparison Chi2
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	
Utilization					
use1	.443	.500	.343	.476	
use2	.239	.429	.255	.438	
use3	.193	.397	.139	.347	
use4	.125**	.333	.241**	.429	2.1644
Motivation					
mot1	.545	.501	.460	.5''	
mot2	.182*	.388	.409*	.493	
mot3	.102	.305	.051	.221	
mot4	.148***	.357	.073***	.261	9.0338*

*,**,*** significance at 0.01. 0.05, 0.10 respectively.

Appendix 1. Variable description

Variable	Description
gender	Dummy variable (male=1)
age1	Dummy variable whose value is 1 for people aged 16-25; 0 otherwise
age2	Dummy variable whose value is 1 for people aged 26-35; 0 otherwise
age3	Dummy variable whose value is 1 for people aged 36-45; 0 otherwise
age4	Dummy variable whose value is 1 for people aged 46-55; 0 otherwise
age5	Dummy variable whose value is 1 for people aged over 55; 0 otherwise
edu1	Dummy variable whose value is 1 for low educated individuals; 0 otherwise
edu2	Dummy variable whose value is 1 for qualified individuals; 0 otherwise
edu3	Dummy variable whose value is 1 for graduated individuals; 0 otherwise
prof1	Dummy variable whose value is 1 if clerk; 0 otherwise
prof2	Dummy variable whose value is 1 if contractor; 0 otherwise
prof3	Dummy variable whose value is 1 if practitioner; 0 otherwise
prof4	Dummy variable whose value is 1 if retired; 0 otherwise
prof5	Dummy variable whose value is 1 if student; 0 otherwise
prof6	Dummy variable whose value is 1 if worker; 0 otherwise
prof7	Dummy variable whose value is 1 if other profession; 0 otherwise
use1	Dummy variable whose value is 1 if never attended circus within three years before; 0 otherwise
use2	Dummy variable whose value is 1 if once attended circus within three years before; 0 otherwise
use3	Dummy variable whose value is 1 if twice attended circus within three years before; 0 otherwise
use4	Dummy variable whose value is 1 if three times or more attended circus within three years before; 0 otherwise
mot1	Dummy variable whose value is 1 if respondent went to circus for accompanying children; 0 otherwise
mot2	Dummy variable whose value is 1 if respondent went to circus because s/he liked it; 0 otherwise
mot3	Dummy variable whose value is 1 if respondent went to circus because of discounted ticket; 0 otherwise
mot4	Dummy variable whose value is 1 if respondent went to circus for other reasons; 0 otherwise
animal	Continuous variable ranged 1-4 to capture preferences for animals
juggl	Continuous variable ranged 1-4 to capture preferences for juggling
acrob	Continuous variable ranged 1-4 to capture preferences for acrobatics
vault	Continuous variable ranged 1-4 to capture preferences for vaulting
clown	Continuous variable ranged 1-4 to capture preferences for clownery

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