

## Residents' perception of the negative impacts of a sporting event: scale validation

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### Abstract:

The aim of this study is to validate a scale to measure residents' perceptions of the negative impacts of a sporting event. The event under study was the Copa America de Fútbol 2015 held in Chile. The perception of the residents in two host cities (Concepción and Viña del Mar) was consulted before and after the event. An initial scale of 17 items was developed from the literature review and expert suggestions. An exploratory factorial analysis was performed with the sample collected before the event (N=1016), and a confirmatory factorial analysis was performed with the sample collected after the event (N=420). The results showed a final multidimensional scale with 16 items classified into four factors: social impact (six items), political and administrative impact (three items), environmental and socio-cultural impact (five items) and economic impact (two items). The results indicated that the proposed instrument was valid and reliable for the purpose of this study.

**Key words:** residents' perception, sporting event, negative impacts, scale development.

### Introduction

Physical Sporting events are important stimulators of life in the places where they are held, exerting not only economic but also social influence. Although most studies have analysed the economic impact of these events, numerous contributions have also been made in the last decade to analyse their social impact.

Many of the scholarly contributions on the impact of sports events have been made in the field of tourism research (e.g., Fredline, 2005) because of its focus on the attraction of visitors. In this sense, Fredline (2000) points out that many of the impacts of sports events are similar to those associated with tourism in general, especially in the long term, because an event can lead to a potential increase in tourism activity. However, the author highlights that some of the impacts of short-term events may be unique, as they are associated with very high concentrations of tourism activity in a small area over a short period of time, hence they may be more determinant than similar impacts related to tourism activity.

Social impacts are defined by Olsen and Merwin (1977, p. 41) as "changes in the structure and the functioning of the order of the social patterns that take place in conjunction with an environmental, technological and social innovation or alteration". However, in regard to defining the social impacts of sporting events, there is a clear tendency to conceptualize them from a tourism perspective because they are considered as events that attract tourism (Añó, Calabuig & Parra, 2012).

Some authors include among social impacts those effects that cannot be included in other categories, such as economic and environmental impacts, while others consider more broadly any impact on society and on the social sphere (Fredline, 2005). From the perspective of tourism, Mathieson and Wall (1982, p. 137) define social impacts as "changes in the quality of life of residents of tourist destinations". This definition includes economic and environmental changes such as the increase in the number of tourists as a result of a major sporting event increasing employment levels among citizens, which can be considered an economic impact which, in turn, has clear social implications. Additionally, possible damage to natural areas from tourism can affect the quality of life of local residents, resulting in a negative social impact (Fredline, 2005).

According to Parra, Calabuig, Núñez and Crespo (2017), the social impacts of sporting events can be defined as changes in the quality of life of residents as a result of hosting a sporting event in their locality.

The impacts of sporting events have been compiled by different authors and grouped them into different categories (economic, physical, socio-cultural and environmental). The literature on the impact of events on the quality of life of residents often differentiates between positive and negative impacts and between the benefits and costs (Calabuig, Parra, Añó & Ayora, 2014). Administrations and event organizers are tasked with identifying and predicting these impacts in order to minimize their negative effects and maximize their positive ones (Bowdin, Allen, Harris, McDonnell & O'Toole, 2012).

Sporting events often generate high expectations about the potential benefits for host cities, although citizens often perceive that these benefits do not come without associated costs (Kim, Gursoy & Lee, 2006). These negative impacts can be manifested in a number of areas: economic, social, environmental, socio-cultural, political and administrative (Fredline, 2004; Preuss & Solberg, 2006). In any case, the benefits and costs of a sporting event depend largely on the location, type and scale of the event (Parra, Aguado & Núñez, 2015).

As several authors have noted (e.g., Kim & Walker, 2012; Zhou, 2007), there is no unified approach to assessing the social impact of a given event, whether sporting or otherwise. For this reason, there is no standardized and universally accepted theoretical framework for assessing the social impact of sporting events (Kim and Walker, 2012).

Some authors have developed and validated multidimensional scales that include positive and negative impacts (González-García, Parra, Calabuig & Añó, 2016; Parra, Añó, Calabuig & Ayora, 2016). However, few studies have used scales that specifically analyse, from a multidimensional perspective, the negative impacts associated with these events (Kim, Jun, Walker and Drane, 2015; Parra et al., 2015). Therefore, the aim of this paper is to validate a multidimensional scale that allows us to identify the factors with which to analyse the residents' perception of the negative impacts resulting from the hosting of this type of sporting event.

## **Material & methods**

### *Participants*

The event under study is the Copa América de Fútbol held in 2015 in several cities of Chile: Antofagasta, La Serena, Viña del Mar, Valparaíso, Santiago, Rancagua, Concepción and Temuco. This event was held between 11 June and 4 July, with 12 CONMEBOL teams participating and the host country being the winner of the tournament.

In this paper, the perception of the residents in two cities hosting this sports event was consulted: Concepción and Viña del Mar. One consultation was held one month before the event (N=1016) and another one month after the event (N=420). Regarding the socio-demographic characteristics, in the consultation before the event, the average age of the interviewees was 29.34 (SD=13.27), while the percentage of men was 57.6% and that of women 42.4%; in the consultation after the event the average age was 30 (SD=15.48) and the percentage of men was 53.3% and that of women 46.7%.

### *Procedure*

Based on the review of the literature and following the suggestions of experts in this area, a measuring instrument was developed consisting of 17 items adapted from previous studies (Núñez, Calabuig, Añó & Parra, 2014; Parra et al., 2015). Those items included the possible negative impacts associated with the holding of sporting events. A five-point Likert-type scale was used in which 1 means strongly disagree and 5 means strongly agree.

For the distribution and collection of the questionnaires, a team of interviewers was trained in a seminar on the general aspects of social research and sports management. The objective and purpose of the study were also explained, along with the characteristics of the items and the questions comprising the questionnaire.

The sampling method was of a non-probabilistic type of convenience consistent with previous work (e.g., Gursoy & Kendall, 2006; Kim et al., 2006; Lorde, Greenidge & Devonish, 2011; Prayag, Hosany Nunkoo & Alders, 2013). As Kim et al. (2006) note, one of the main weaknesses associated with convenience sampling is selection bias. Thus, to avoid this bias in fieldwork, the interviewers were instructed to collect surveys of different population groups to interview gender- and age-proportional groups of residents.

### *Data analysis*

Data analysis was performed with SPSS 23, FACTOR 10.5 and EQS 6.2. First, an exploratory factor analysis (EFA) was carried out using the FACTOR program, with the pre-event sample (N=1016) following the recommendations of Lloret-Segura, Ferreres-Traver, Hernández-Baeza and Tomás-Marco (2014). This analysis was performed using the maximum likelihood (ML) extraction method and the Direct Oblimin rotation method. To determine the number of factors, the Implemented Optimization of Parallel Analysis procedure was used (Timmerman & Lorenzo-Seva, 2011), while to verify the fit of the model, the Root Mean Square of Residuals (RMSR) coefficients and the gamma or Goodness of Fit Index (GFI) proposed by Tanaka and Huba (1989) were analysed. Other indicators that were taken into account were the Generalized G-H Index to analyse the replicability of the factors derived from the EFA. Kaiser Meyer Olkin's (KMO) sample adequacy measures and Bartlett's sphericity test were also observed. Additionally, items with factorial loads less than .30 or greater than this value in two or more factors were eliminated before the next EFA was performed. Finally, the theoretical interpretability of the factor solution extracted from the EFA was checked.

Second, a confirmatory factorial analysis (CFA) was carried out, applying the Robust Maximum Likelihood Estimation (MLR) method with the purpose of correcting the possible absence of multivariate normality, through the use of statistics such as Satorra Bentler's  $\chi^2$  (Chou, Bentler & Satorra, 1991). Thus, for the evaluation of the global adjustment, different indices of goodness of fit recommended in the literature were used (Browne & Cudeck, 1993; Kline, 2005), such as the significance of Chi-square and its robust correction as provided by Satorra-Bentler (S-B  $\chi^2$ ) (Bentler, 2004; Satorra & Bentler, 1994). Additionally, other coefficients were calculated that allowed verification of the adequacy of the proposed models such as the ratio of  $\chi^2$  and its

degrees of freedom ( $X^2/df$ ; Wheaton, Muthén, Alwin & Summers, 1977) having acceptable values lower than five (Byrne, 2009; Carmines & McIver, 1981). The coefficients of the robust goodness-of-fit indices of the proposed models were also checked for the Non-Normalized Adjustment Index (NNFI; Hu & Bentler, 1995), the Comparative Fit Index (CFI; Bentler, 1990) and the Incremental Adjustment Index (IFI). For these indicators, values above .90 are considered a good fit (MacCallum & Austin, 2000). Finally, the Root Mean Square Error of Approximation (RMSEA) is shown, being necessary to consider a good adjustment of the same score below .08 (Browne & Cudeck, 1993).

In assessing the reliability of the scale, three measures were taken into account for each factor: Cronbach's alpha, Composite Reliability (CR) and Average Variance Extracted (AVE) (Hair et al., 2006). Convergent validity was also verified through the significance of the factorial loads in their respective dimensions and the values of the associated t-tests. In addition, discriminant validity, which concerns the clear distinction between any pair of constructs, was assessed using the method suggested by Fornell and Larcker (1981). This method allows for discriminant validity if the square root of the AVE value of a given factor is greater than the correlation coefficients between the factor and any other factor on the proposed scale. Another criterion for ensuring discriminant validity is that the correlations between the various pairs of factors should be less than .85 (Kline, 2005).

## Results

### Descriptive statistics

Table 1 shows the mean, standard deviation, asymmetry and kurtosis of each indicator. If we take into account that the neutral value of the scale is 3, the great majority of items in the consultation carried out before the celebration of the event are above this average, which indicates a tendency of the residents towards agreeing with the negative impacts of sporting event. However, in the subsequent consultations, the items show lower average scores and are closer to the neutral point of the scale, indicating that the negative impacts have not been so marked once the event is over. The values of asymmetry and kurtosis are acceptable because they are less than 3.0 for all of the items (Chou & Bentler, 1995).

Table 1. Average, standard deviation, asymmetry and kurtosis of the indicators of the negative impacts perceived by residents before and after the Copa América de Fútbol

		Mean (SD)		Asymmetry		Kurtosis	
		Before	After	Before	After	Before	After
E11	The celebration of the Copa América de Fútbol (CAF) will raise the prices of goods and services	3.73 (1.16)	3.10 (1.18)	-.63	-.17	-.45	-.75
E12	The CAF celebration will raise the prices of real estate	3.52 (1.22)	3.07 (1.16)	-.42	.01	-.76	-.68
PA-I1	Building infrastructure for the event wastes taxpayers' money	3.14 (1.30)	3.21 (1.22)	-.14	-.09	-1.02	-.81
PA-I2	The celebration of the CAF will increase citizens' mistrust of the institutions	3.00 (1.22)	2.95 (1.10)	-.02	.11	-.85	-.44
PA-I3	The celebration of the CAF will increase illegal activities in the country	3.18 (1.22)	2.87 (1.19)	-.13	.12	-.86	-.74
PA-I4	Celebration of the CAF will increase corruption in the country	3.14 (1.30)	2.93 (1.23)	-.11	.11	-1.03	-.79
S11	The CAF celebration will increase the city's traffic and congestion problems	3.91 (1.13)	3.49 (1.19)	-.79	-.51	-.24	-.52
S12	The CAF celebration will increase the noise generated in the city	3.85 (1.16)	3.37 (1.14)	-.72	-.39	-.43	-.43
S13	The celebration of the CAF will excessively alter the daily life of the residents.	3.59 (1.19)	3.06 (1.15)	-.47	.05	-.68	-.68
S14	The celebration of the CAF will distort and hinder the normal functioning of the city	3.57 (1.18)	3.05 (1.13)	-.45	-.02	-.67	-.63
S15	With the celebration of the CAF many citizens will avoid the area where the event was held	3.54 (1.20)	3.06 (1.15)	-.39	.03	-.78	-.66
S16	CAF celebration will cause restrictions on access to public facilities and services	3.48 (1.20)	2.98 (1.15)	-.38	.10	-.77	-.62
SCE-I1	The celebration of the CAF will lead to inappropriate behaviour (drug use, alcohol, prostitution).	3.61 (1.18)	3.15 (1.18)	-.44	-.17	-.72	-.69
SCE-2	CAF celebration will increase crime and vandalism levels in the city	3.67 (1.12)	3.09 (1.19)	-.44	-.01	-.65	-.79
SCE-I3	The celebration of the CAF will cause damage to the environment and natural areas (beaches, port).	3.55 (1.22)	2.97 (1.21)	-.45	.04	-.76	-.80
SCE-I4	CAF celebration will increase pollution in the city	3.53 (1.22)	2.98 (1.19)	-.45	.07	-.72	-.78
SCE-I5	The CAF celebration will increase the volume of waste in the area	3.83 (1.14)	3.19 (1.16)	-.80	-.11	-.11	-.69

Note: SD=Standard Deviation

### Exploratory factorial analysis

Following the recommendations of Lloret-Segura et al. (2014) an EFA was carried out for the 17 items associated with possible negative impacts of the event. After the analyses, it was decided to use the four-factor

solution as it was the one that best fit the object under study and had the best interpretability. No indicators had to be removed as all of the factorial loads exceeded the cut-off point of .30.

To check the fit of the model, the Root Mean Square of Residuals (RMSR) coefficients and the gamma index or GFI were analysed, which showed coefficients within the recommended cut-off points: RMSR =.03 (<.50) GFI=.99 (>.95). The Generalized G-H Index showed values higher than .80 in all the factors detected by the EFA (ranging from .80 to .88), indicating good replicability of the dimensions in other studies (Ferrando & Lorenzo-Seva, 2017). The variance explained by the 17 items grouped in the four factors was 63.07%.

Table 2. Scale of perception of the negative impact of residents: Result of rotated factor analysis

	F1	F2	F3	F4	Com.
<b>Economic Impact</b>					
EI1	.84				.70
EI2	.70				.56
<b>Political and administrative Impact</b>					
PA-I1		.65			.50
PA-I2		.80			.66
PA-I3		.45			.41
PA-I4		.53			.39
<b>Social Impact</b>					
SI1			.44		.38
SI2			.58		.54
SI3			.73		.58
SI4			.81		.64
SI5			.49		.36
SI6			.37		.39
<b>Socio-cultural and environmental Impact</b>					
SCE-I1				.57	.50
SCE-2				.61	.56
SCE-I3				.84	.68
SCE-I4				.82	.64
SCE-I5				.63	.46
<b>G H Index</b>	.80	.80	.85	.88	
<b>Eigenvalue</b>	1.29	1.17	6.42	1.84	
<b>Variance Explained (%)</b>	7.60	6.87	37.81	10.80	
<b>Items</b>	2	4	6	5	

Note: Com.=Communalities

*Confirmatory factorial analysis*

After the EFA, a confirmatory factorial analysis was performed from the factor solution proposed by the EFA that showed a good fit. However, it was decided to re-specify the model, and one indicator with a rather low factorial load was removed. The new factorial solution showed a good fit as seen in the model's goodness-of-fit indices: significant chi-square ( $\chi^2(98)=329.11; p<.05$ ) and a standard chi-square value ( $\chi^2/df=3.35$ ) of less than 5 and the RMSEA index showed a value of .058 (confidence interval=.049-.067), lower than .08. Along the same lines, the rest of the indices showed a good fit of the model, since they presented values higher than .90: NNFI=.93; CFI=.94; and IFI=.94.

For the reliability analysis, the Cronbach's Alpha, the composite reliability (CR) and the Average Variance Extracted (AVE) measurements were observed, and their values were adjusted to the parameters recommended by the literature, ranging from .78 to .85 for the first two and from .46 to .72 for the last one.

Table 3. Factor loadings, composite reliability, average variance extracted and Cronbach alpha measurement of the scale indicators in the post-event sample (N=420)

Items	$\lambda$	$\alpha$	CR	AVE
<b>Factor 1 - Economic Impact</b>				
EI1	.77	.83	.85	.72
EI2	.92			
<b>Factor 2 – Political and administrative Impact</b>				
PA-I2	.63	.77	.78	.54
PA-I3	.83			
PA-I4	.74			
<b>Factor 3 – Social Impact</b>				
SI1	.59	.83	.84	.46
SI2	.73			
SI3	.80			
SI4	.76			
SI5	.57			
SI6	.58			
<b>Factor 4 – Socio-cultural and environmental Impact</b>				
SCE-I1	.65	.84	.85	.53
SCE-2	.67			
SCE-I3	.76			
SCE-I4	.81			
SCE-I5	.74			

Note: CR=Composite Reliability; AVE= Average Variance Extracted

To check the convergent validity of the scale, it was verified that the factorial loads of the items of each construct were significant ( $t > 1.96$ ) because the values of the t-tests of all of the variables oscillated from 8.46 to 14.11. For discriminant validity, on the one hand, we found that all of the correlations between the various factors were less than .85, fulfilling this criterion as seen in Table 4; on the other hand, it was found that the square root of the AVE was greater than the correlation between pairs of factors.

Table. 4 Scale of residents' perceptions of negative impacts factor correlations

	F1	F2	F3	F4
Factor 1 – Economic Impact	.85			
Factor 2 – Political and administrative Impact	.35**	.74		
Factor 3 – Social Impact	.38**	.48**	.70	
Factor 4 – Socio-cultural and environmental Impact	.37**	.57**	.63**	.73

Note: \*\* indicates that the correlation is significant at the .01 level (bilateral). The diagonal offers the values of the  $\sqrt{\text{AVE}}$ .

## Discussion

In this study, we developed and validated a scale to evaluate residents' perceptions of the negative impacts associated with the celebration of a major sporting event, namely, the Copa America de Fútbol. Thus, following a similar procedure to other studies conducted in this area for scale development and validation (e.g., Kim and Walker, 2012; Kim et al., 2015), this paper combined exploratory and confirmatory factor analyses on the proposed items.

After the application of these analyses, the factor structure of the scale was formed by four dimensions with 16 items: economic impact (two items), political and administrative impact (three items), social impact (six items) and socio-cultural and environmental impact (five items). As seen in the results section, the scale presents an adequate validity and reliability for the sample object of this study, as shown by the different indices and coefficients used.

At present, there is no consensus among researchers regarding the different weights for the dimensions of the social impact of sports events. There is also no consensus on the integration of these dimensions into a scale that analyses the social perception of this type of event. This lack of consensus explains the diversity of proposals alluding to different dimensions with different names, depending on the study. This contrasts with research into other aspects related to sporting events where there is greater consensus and widely validated and consolidated scales, including factors such as the quality of service or the satisfaction of people attending these types of events (e.g., Calabuig, Crespo, Prado & Núñez, 2014; Ko, Zhang, Cattani & Pastore, 2011).

Most of the contributions made in the international context have used exploratory factor analysis as the most frequent statistical technique and Cronbach's Alpha to check the reliability of scales (e.g., Balduck, Maes & Buelens, 2011; Fredline et al., 2003; Kim et al., 2006; Parra, Calabuig, Añó, Ayora & Núñez, 2014; Ritchie, Shipway & Cleeve, 2009). Some of the studies by Kim and Petrick (2005) and Kim et al. (2006) developed the instruments from other scales or theoretical frameworks such as those of Delamere (2001). Additionally, Ritchie et al. (2009) and Zhou and Ap (2009) used other scales such as those of Fredline et al. (2003), and Lankford and Howard (1994) and Ap and Crompton (1998) similarly adapted their research on the impacts of tourism from the contributions of other studies. Additionally, recent case studies (e.g., Balduck et al., 2011; Llopis & Gil, 2011; Ma & Rotherham, 2015; Prayag et al., 2013) have developed their measuring instruments from various scales used in other work (e.g., Kim & Petrick, 2005), which in turn drew upon other instruments.

However, the studies that have used structural equation models and confirmatory factor analysis are scarcer and more recent (González-García, Añó, Parra & Calabuig, 2018; Kaplanidou et al., 2013; Kim et al., 2015; Kim & Walker, 2012; Lorde et al., 2011; Parra, González-García, Añó, & Ayora, 2016; Prayag et al., 2013). As Bollen (1989) points out, when there are well-developed theoretical frameworks and empirical evidence related to the area of research, confirmatory factor analysis is more appropriate when trying to develop a new tool.

Along the same lines as other work in this area (e.g., Chen and Tian, 2015; Kim and Petrick, 2005; Kim et al., 2015; Lee, Lee, Kang, Lee & Jeong, 2013; Llopis & Gil, 2011) it was decided to differentiate between positive and negative impacts to avoid possible problems of inconsistency between items of the same scale as they have a different meaning. In this paper we focus attention on the multidimensional nature of negative impacts.

The factors identified in this study coincide with the trend shown in the literature to recognize the appropriateness of analysing economic, social, socio-cultural and environmental impacts from both a positive and a negative point of view. This scale also includes a dimension related to the negative impacts associated with poor political and administrative management of sporting events from the perspective of residents. This area has not been considered as a dimension with its own content within the scales of the social perception of sporting events. This instrument therefore aims to contribute to consolidating the multidimensional nature of the negative

impacts and their necessary inclusion in multidimensional scales, thus allowing further research into the social impact of sporting events.

### Conclusions

Based on the analyses in this paper, the validity and reliability of the instrument to analyse residents' perceptions of the negative impacts associated with the holding of the Copa América de Fútbol was verified. The multidimensional scale comprises 16 indicators encompassed by the factors of social impact (six items), political and administrative impact (three items), environmental and socio-cultural impact (five items) and economic impact (two items).

The economic impact dimension has few variables, so future research may expand the number of items that explain these dimensions. It may also be useful to check the scale adjustment for other sporting events held in other locations.

### Conflicts of interest

The authors do not declare any potential conflict of interest with respect to the research, authorship and/or publication of this article.

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