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López-Bonilla, Jesús Manuel and López-Bonilla, Luis Miguel

University of Seville, University of Seville

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MEASURING SOCIAL CARRYING CAPACITY: AN EXPLORATORY STUDY

Jesús Manuel López-Bonilla
University of Seville (Spain)

Luis Miguel López-Bonilla
University of Seville (Spain)

The tourist carrying capacity commands a growing interest given that it is closely linked with sustainable tourist development. The justification of the utility of this concept is given by means of a simple and efficient methodological proposal, by analysing the social carrying capacity. To this end, an empirical application is carried out in the Western Andalusia. In some of the cases analysed, the satisfaction of the tourist is found to decline when the levels of the tourist use are higher with respect to those attributes of the tourist destination supply. This mechanism can constitute a useful alarm signal for tourism planners.

Keywords: *carrying capacity, tourist satisfaction, sustainable tourism, tourist destination.*

INTRODUCTION

In the application of the sustainable tourism indicators, the concept of carrying capacity is frequently used. This implies that the tourism destinations possess some limits in the volume and intensity that a specific geographic zone can bear without provoking any irreparable damage. Nevertheless, as Saveriades (2000) confirms, there is still neither a generally accepted definition nor a standard systematic procedure to assess this concept. One of the most renowned definitions was given by the World Tourism Organisation (1981), which signalled that carrying capacity represents the maximum number of visitors that a geographic or physical entity can receive without provoking an unacceptable alteration in the physical and social medium nor an unacceptable reduction in the quality of the visitors' experiences. In this definition, the two fundamental points can be distinguished as those based on the limits or thresholds are

established by the carrying capacity. In the words of Liu (2003), the concept is generally defined as the maximum number of visitors an area could accommodate without there being excessive deterioration of the environment or declining visitor satisfaction. In other words and in a more active sense, as Papageorgiou and Brotherton (1999) suggest, to maintain the integrity of the basic resources and provide a tourist experience of high quality.

Carrying capacity can have different partial definitions depending especially on the economic, social and environmental dimensions. The set of these types of capacity can constitute that which can be denoted as tourist carrying capacity. This could encompass the inter-relationship between all those aspects which affect the tourist destination and which show their "holistic" character. However, several authors declared that this concept is useful but it is also problematic to use it in practice to help the development of sustainable tourism (viz. Butler, 1997; Swarbrooke, 2001; Manning et al., 2002; Liu, 2003). The tourist carrying capacity is a concept handled in the academic literature from, above all, a theoretic view, since empirical studies on this concept are few and far between in the twentieth century. This is shown by a revision of the literature carried out by Coccossis et al. (2001), which detects an absence of specific methods in the carrying capacity research which come near to identifying the number of tourists, not to discover a "magic number" but as a rigorous and scientific approximation to measure it.

However, as Vera and Baños (2004) state, despite the limitations of practical application and its scarce acceptance, the concept of carrying capacity recovers a predominant role with the rise in the paradigm of sustainability. This academic interest in recent years triggered by the boost in sustainable tourism is reflected in the growing number of empirical studies (Morgan and Lok 2000; Saveriades 2000; López and Andrés 2000; Roig 2003; Eugenio-Martin 2004; Urtasun and Gutiérrez 2005; Navarro 2005; Hunter and Shaw 2007; López-Bonilla & López-Bonilla, 2007).

The article is organized as follows. The concept of social carrying capacity in tourism is first explained. This is followed by the contribution of a measuring methodology for social carrying capacity by means of an empirical application in the context of tourists. This application is initiated by a previous theoretical approach, where the objectives pursued are established, and it is completed with the collection of the results obtained from the analysis proposed. The work is finalized by the most outstanding conclusions as an effort to provide a tool valid for the sustainable planning of a tourist destination.

SOCIAL CARRYING CAPACITY

This work is centred on the social (or psychological) carrying capacity, which includes the typologies of the carrying capacity of the residents and of the tourists. Saveriades (2000) defines the social carrying capacity as the maximum level of use that can be absorbed by an area without an unacceptable decline in the quality of experience of visitors and without unacceptable adverse impact on the area's society. The two components of social carrying capacity are (1) the quality of experience that visitors will accept before seeking alternative destinations (that is to say, the tourists' psychological carrying capacity), and (2) the degree of tolerance of the host population to the presence of tourists (that is to say, the residents' psychological carrying capacity). This author warns that social capacity thresholds are perhaps the most difficult to evaluate (as opposed to environmental, economic and cultural), since they rely entirely on value judgements, and, furthermore, that the effects of tourism on host populations and on the attitudes or tolerance of residents to the development of tourism and the tourists themselves, have been more systematically studied.

Shelby and Heberlain (1984) developed a social carrying capacity model which focused on descriptive and prescriptive points. The former is centred on the facts and the latter on the more subjective aspects, in such a way that its descriptive focus detects a specific carrying situation and the prescriptive focus is fixed on the alarm signal. This signal is going to indicate the necessity of intervention by those responsible for the tourist destination in order to attempt to reduce the negative impacts that a tourist overload provokes.

This work attempts to contribute a methodological proposal to measure the social carrying capacity for which the least studied perspective is analysed: that of the perceptions of the tourists during their visit. Indeed, the empirical study of the focuses on psychological carrying capacity of the tourist, although a methodological approach can be used which is similar with respect to the psychological capacity of the residents. This proposal of a social carrying capacity measure is based on the level of the tourist satisfaction. As many authors affirm (viz Getz 1983; Coccossis et al. 2001; Choi and Sirakaya 2006), tourist satisfaction is considered as one of the principal indicators in the measurement of sustainable tourism and of carrying capacity. This indicator is normally based on the number of satisfied or unsatisfied tourists, proposing a ratio between the two types of tourists. However, the levels of the tourist satisfaction and service quality are wide-ranging. Therefore, a more exact

indicator which explains when the tourist satisfaction declines excessively should take into account comparisons of distinct perceptions of the tourists with respect to the tourist destination in different seasons of the year in order to test if a significant variation in tourist satisfaction exists.

Alldredge (1972) affirms that the satisfaction of the visitor declines as the level of use rises. This is confirmed in recent studies (Morgan and Lok 2000; Roig 2003; Eugenio-Martin 2004). Nevertheless there are other authors who have rejected this hypothesis (Shelby, Vaske and Heberlain 1989; Kuss, Gaefe and Vaske 1990; Lindberg, McCool and Stankey 1997; Manning 1999). Moreover, Lindberg, McCool and Stankey (1997) conclude that the level of use (expressed as the total number of visitors or density of tourists per area of use) has little or no effect on the resulting satisfaction expressions. In this paper, the ambivalence of these results is reduced by offering a methodological proposal of the evaluation of the social carrying capacity as a valid tool for the planning of sustainable tourism in the tourist destination as an attempt to overcome the qualitative and quantitative limitations which this concept of carrying capacity generates.

EMPIRICAL APPLICATION

Methodology and objectives

As mentioned earlier, this work is centred on the study of the psychological carrying capacity of the tourist which we try to analyse by means of the relationship between the level of use of the tourist destination and the tourist satisfaction with the place visited. The level of tourist use is going to be measured using the temporary concentration of visitors in a tourist destination while the satisfaction of the tourist is going to be assessed by means of the scores awarded to a series of basic components of the tourist supply of the destination, such as natural attractions, tourist goods and services and the infrastructure and public services.

The relationship considered earlier is studied by means of the tourist satisfaction expressed in relative values, that is to say, comparing the satisfaction of the visitors of the tourist destination at certain periods of the year when there are higher and lower levels of tourist use. To determine these periods we use the concept of tourist season in such a way that the high season is identified with a higher level of use than the low season or than the normal season. What can be denoted as relative

satisfaction is an indirect way of assessing the tourist satisfaction at different times. This can be useful to correct the slant in the interpretation in the concept of satisfaction in work carried out on this study material. In accordance with the original concept of carrying capacity, the decrease in the tourist satisfaction is under observation more than the discovery of the existence of dissatisfaction with the increase in the density of the destination visited. Hence, the principal objective is to detect the possible negative impact provoked by the high proportion of tourists occurring in certain times of the year. To a certain extent, the study of relative satisfaction of the tourist can lead to the degree of saturation of the tourist destination in specific seasons of the year. In any case, it constitutes an indicator of the psychological carrying capacity of the tourist inasmuch as it takes into account a change in the usual level of satisfaction of the visitor: the critical level or alarm signal is activated when the satisfaction of the tourist with the place visited falls significantly.

Data sourced from the Andalusian Tourist Board Survey, which is periodically carried out by the Institute of Statistics of Andalusia (Spain). This provides information about the assessments that the visitors carry out with respect to a series of supply attributes of the tourist destination visited. These components include a wide set of characteristics of the tourist product, thereby yielding an approximation to the knowledge of the whole experience of the visitor to the tourist destination. In this way, the responses to the satisfaction resulting from the basic tourist goods and services, the tourist resources, the infrastructure and equipment and the public services are contemplated.

Hence, in the empirical study, the levels of tourist satisfaction are considered with respect to the distinct components of the supply of the tourist destination. For its part, the tourist destination is represented by the Autonomous Community of Andalusia in Spain. Specifically, the data used refers to the tourists who visit Western Andalusia which is made up of the provinces of Cadiz, Cordoba, Huelva and Seville. We analyse these four Andalusian provinces to make a major degree of information available by comparing the types of tourism which predominate in each province. These are divided with broad strokes into the "sand and sun" tourism of Cadiz and Huelva and the inland tourism of the provinces of Cordoba and Seville. Therefore the sample elements of Cadiz and Huelva have been considered by exclusively referring to the coastal municipalities. The "sand and sun" tourism is based on a major concentration of visitors during the summer period.

In this way, the influence which the tourist season can exert is ascertained and is identified by means of the quarterly periods. The

principal objective of research, described earlier, can be first specified as the hypotheses which are given in detail.

H1. The tourist season significantly influences the satisfaction with the accommodation of the tourist destination.
H2. The tourist season significantly influences the satisfaction with the restaurants of the tourist destination.
H3. The tourist season significantly influences the satisfaction with the leisure and entertainment of the tourist destination.
H4. The tourist season significantly influences the satisfaction with the bus services of the tourist destination.
H5. The tourist season significantly influences the satisfaction with the taxi services of the tourist destination.
H6. The tourist season significantly influences the satisfaction with the overall quality of the tourist destination.
H7. The tourist season significantly influences the satisfaction with the beaches of the tourist destination.
H8. The tourist season significantly influences the satisfaction with the scenery of the tourist destination.
H9. The tourist season significantly influences the satisfaction with the urban surroundings of the tourist destination.
H10. The tourist season significantly influences the satisfaction with the courtesy and care in the tourist destination.
H11. The tourist season significantly influences the satisfaction with the value-for-money of the tourist destination.

The statistical procedure to contrast the hypotheses under consideration is based on the analysis of the variance. In the second stage of the study, from the possible verification of the existence of significant differences satisfaction in the indicators with respect to the quarterly periods, we endeavour to find out which those periods of the year are which affect the tourist assessment the tourist. We do this observing if they coincide with the zones of highest density of level of tourist use.

The level of tourist use

The Autonomous Community of Andalusia is the Spanish region which receives the most Spanish tourists and the second most popular region for foreign tourists. The model of tourist development in Spain, in general, is based on “sand and sun” tourism and, therefore, a high concentration of tourists exists during the summer months. However, there are other Spanish regions and provinces which though not situated near the sea, also receive an important number of tourists in other seasons

of the year. In Andalusia both situations exist simultaneously, that is to say, there is a type of "sand and sun" tourism predominant in Andalusian provinces and there are other types of tourism distinct from that of "sand and sun" in other provinces which can be grouped under the term of inland tourism in general.

The levels of tourist use are measured using the number of tourists who visit each tourist destination during the four quarterly periods of the year, and we denote this as the tourist density. Social density is identified through the relationship of this number of tourists and the number of residents of the tourist destination. In the first place, the levels of tourist use of the Andalusian provinces are observed using quarterly data. Table 1 shows a first impression of these levels of use, where the numbers of tourists who have visited Western Andalusia during 2005 can be appreciated. The data of Cadiz and Huelva refer to the total number of the tourists who is received by this province, since information broken down into municipalities, though desirable, is not available in order to differentiate those coastal municipalities.

Table 1. Tourist density in Western Andalusia 2005

Destinations	First quarter		Second quarter		Third quarter		Fourth quarter		Year
	Tourists	%	Tourists	%	Tourists	%	Tourists	%	Tourists
Cadiz	507,849	14.60	935,136	26.88	1,390,274	39.96	645,500	18.56	3,478,759
Cordoba	176,456	16.53	326,027	30.77	315,584	29.78	241,482	22.79	1,059,589
Huelva	344,304	19.14	504,481	28.05	597,050	33.19	352,935	19.62	1,798,771
Seville	438,988	20.92	645,982	30.79	460,581	21.95	552,622	26.34	2,098,174
Western Andalusia	1,467,597	17.40	2,411,626	28.59	2,763,489	32.76	1,792,539	21.25	8,435,293

Likewise, Table 1 reflects the current situations of the levels of tourist use in the four Andalusian provinces in relative values. The levels of tourist use in Western Andalusia are widely dispersed. The provinces of Cadiz and Huelva possess a high proportion of tourists in the third quarter of the year (July, August and September): a common occurrence for the "sand and sun" tourism model. Thus, there is a concentration of 39.96% of visitors to Cadiz and 33.19% to Huelva during the summer season. This percentage would be even higher if the tourist demand of

only coastal municipalities were considered. On the other hand, the provinces of Cordoba and Seville have a high number of visits during the second quarterly period of the year (April, May and June), reaching figures practically the same, around 31% of tourists in the year. In these two provinces of inland tourism, the number of visitors is distributed more equitably over the four quarterly periods of the year.

Table 2. Social density in Western Andalusia 2005

Destinations	Tourist Ratios per 100 Residents			
	First quarter	Second quarter	Third quarter	Fourth quarter
Cadiz	43.62	80.31	119.40	55.44
Cordoba	15.15	28.00	27.10	20.74
Huelva	29.57	43.33	51.28	30.31
Seville	37.70	55.48	39.56	47.46
Western Andalusia	126.04	207.12	237.34	153.95

In Table 2, the social density is shown, that is to say, the number of tourists per 100 residents in the tourist destination. It can be observed that Cadiz also presents the most pronounced data, whereby the tourists outnumber the residents during the third quarter. This is followed by Huelva, whose number of tourists surpasses half of the number of residents during the summer period. This last situation also appears in Seville during the second quarter and is almost reached in the fourth quarter. On the other hand, the lowest social density is found in Cordoba, where only 28 tourists are counted for each 100 residents.

Levels of tourist satisfaction

The analysis of tourist satisfaction is carried out using the four samples which represent the tourists who visited each Andalusian province. These samples are composed of 197 tourists in Cadiz, 103 tourists in Cordoba, 138 tourists in Huelva and 172 tourists in Seville. As mentioned earlier, these samples are extracted from the Andalusian Tourist Board Survey 2005. Tourists who visited these geographic places

for holiday and leisure reasons are selected. Furthermore, the selected sample elements are those who only visited one province in order to prevent confusion in the assessment awarded by the tourists. The satisfaction levels of the tourists are measured on a ten-point scale, according to their low or high degree of satisfaction of the visit to the tourist destination.

These levels of tourist satisfaction are analysed at both a general and specific level. On the one hand, the satisfaction indicators are considered at a general level through the denoted simplified index of perception of the Andalusian Tourist Board Survey, represented by the geometric mean of all the attributes of supply of the tourist destinations which are considered in the study. On the other hand, the satisfaction indicators are observed at a specific level, relative to each one of these tourist supply attributes. The greatest mean scores of general satisfaction stand out in the first quarter in Cadiz (8.14), Huelva (7.14), and Seville (8.37) and in the third quarter in Cordoba (7.94). However, the lowest scores were attained in the second quarter in Huelva (6.67) and in the first quarter in Cadiz (7.24) and Seville (7.87) and in the fourth quarter in Cordoba (7.62). The specific satisfaction indicators are separately based on each one of the components of the tourist supply in the Western Andalusian provinces. They are obtained by calculating the arithmetic means of each supply component. The data is given in Table 3.

With respect to those specific satisfaction indicators, the highest average scores of the four Andalusian zones are received by scenery (8.29), courtesy and care (8.05) and restaurants (7.99), while the lowest average scores go to the taxi services (7.31), bus services (7.31) and the urban surroundings (7.17).

Table 3. Tourist Satisfaction in Western Andalusia 2005

ATTRIBUTES	CADIZ					CORDOBA					HUELVA					SEVILLE					TOTAL
	T1	T2	T3	T4	Year	T1	T2	T3	T4	Year	T1	T2	T3	T4	Year	T1	T2	T3	T4	Year	
Accomodation	7.80	8.16	7.96	8	7.99	7.96	7.65	7.75	7.33	7.65	7.74	6.71	8.29	7.05	7.56	8.49	8.64	8.25	7.56	8.24	7.83
Restaurants	8.29	8.36	7.42	8.10	8.03	7.83	8.26	8.18	8.26	8.14	8.03	7.77	7.32	7.36	7.62	8.39	8.29	7.73	8.33	8.16	7.99
Leisure	8.33	7.94	7.35	7.47	7.77	7.32	7.62	7	7.17	7.38	6.82	6.13	6.32	7	6.59	9.16	9.10	8.60	8.54	8.89	7.57
Buses	7.67	7.52	6.64	7	7.31	7.75	8	6.50	6.25	7.31	7.60	7	5	7	6.62	8.11	8.21	7.62	8	8.02	7.21
Taxis	7.67	7.62	6.44	7.13	7.33	7.43	7.67	7.90	7.29	7.61	5	5	6.33	5.67	5.67	7.81	7.28	6.41	6.89	7.13	6.80
Overall Quality	8.15	7.96	7.37	7.52	7.74	7.42	7.76	8.59	8.03	7.90	6.83	5.96	7.24	6.56	6.70	8.55	9.09	8.10	8.19	8.46	7.67
Beaches	8.74	8.51	7.46	8.31	8.17	-	-	-	-	-	7.86	8	7.27	7.71	7.60	-	-	-	-	-	7.95
Scenery	8.50	8.21	7.51	7.85	8.01	7.81	7.96	9.41	8.93	8.47	8.10	7.52	7.95	6.69	7.66	9.10	9.32	8.96	9.26	9.14	8.29
Urban Surroundings	7.84	7.58	7.11	7.12	7.41	8.31	8	7.88	7.19	7.08	6.11	5.89	6.43	6.38	6.90	6.91	6.74	7.49	8.20	7.36	7.17
Courtesy/care	8.82	8.20	7.40	7.86	8.04	8	8.10	8.29	8.30	8.16	7.98	7.30	7.53	7.28	7.57	8.80	8.56	8.16	8.48	8.48	8.05
Value-for-money	7.84	7.88	7.37	7.48	7.64	7.72	7.48	8.24	7.63	7.71	7.13	6.63	6.82	6.80	6.87	8.49	8.51	7.57	7.90	8.08	7.57
Index	8.14	7.98	7.24	7.58	7.72	7.75	7.85	7.94	7.62	7.69	7.14	6.67	6.89	6.82	7.03	8.37	8.31	7.87	8.09	8.09	7.53

However, in each province, the high individual assessment of the beaches in Cadiz (8.17) and the leisure activities in Seville (8.89) are particularly outstanding. On the other hand, the lowest single assessments were awarded to the leisure activities in Cordoba (7.38) and Huelva (6.59). By observing the yearly quarters it can be determined that it is in Cadiz where the set of attributes (except accommodation) most clearly follows its seasonal pattern and receives the highest average scores in the third quarter and the lowest average scores in the first quarter. This fact triggers the possibility of establishing a relationship between the levels of tourist use or tourist density of the destinations visited and the satisfaction experienced by the tourists who visit the tourist destination. In the following unit we test the levels of significance which can exist in the differences between the distinct yearly quarters with respect to all those components of tourist supply in each geographic zone.

RESULTS

The analysis of the variance is carried out with respect to the supply attributes of the tourist destination and relative to the four Andalusian provinces. The validity of the data to be used is first tested. To this end, a test of homogeneity of variances is carried out by means of Levene's test. The robustness of the statistical procedure is considered to be sufficiently reliable. However, the Kruskal-Wallis test has been also applied as a non-parametric alternative to the variance analysis and it has been observed that the analysis results are very similar for the robustness test. The variance analysis results are given in Table 4.

Table 4 shows that the overall quality and the urban surroundings are the only attributes upon which the distinct seasons exert a significant influence. It is observed, however, that is a great influence of the distinct seasons on the Andalusian coastal provinces, especially on Cadiz, where a predominance of "sand and sun" tourism exists. These areas have a high saturation of tourists during the summer period, which is defined as the third quarter of the year. Thus, it can be appreciated that the seasons significantly influence the tourist satisfaction in all the attributes in Cadiz (except for accommodation) with a significance level of 1%. This also occurs in seven of the eleven components of the tourist supply in Huelva, especially in those attributes of accommodation, overall quality, scenery and urban surroundings, also with a significance level of 1%.

Table 4. Variance analysis results

ATTRIBUTES	CADIZ	CORDOBA	HUELVA	SEVILLE
	P-value	P-value	P-value	P-value
Accommodation	0.1739	0.2924	0.0000**	0.0081**
Restaurants	0.0000**	0.3817	0.0357*	0.0459**
Leisure	0.0000**	0.8996	0.0657	0.0625
Buses	0.0027**	0.4500	0.0042*	0.2236
Taxis	0.0024**	0.6903	0.0884	0.0609
Overall Quality	0.0000**	0.0012**	0.0000**	0.0000**
Beaches	0.0000**	--	0.2948	--
Scenery	0.0000**	0.0000**	0.0000**	0.1782
Urban Surroundings	0.0000**	0.0037**	0.0008**	0.0006**
Courtesy/care	0.0000**	0.5603	0.0396*	0.0087**
Value-for-money	0.0000**	0.0790	0.1293	0.0001**
Index	0.0041**	0.0051**	0.1004	0.1004
*P < 0.05; **P < 0.01				

The hypotheses which corroborate in the coastal provinces are H2, H4, H6, H8, H9 and H10, while in the inland provinces only hypotheses H6 and H9 are confirmed. The inland provinces possess a more evenly-distributed level of tourist use throughout the whole year, with a higher concentration of tourists in the second quarter. It is necessary to test if this influence is related to the excess of the level of use of the different areas. To this end, we analyse which those quarters are where this influence appears, by carrying out multiple comparisons between the distinct

quarters using the Bonferroni and Tamhane tests in accordance with the existence or not of homogeneity in the variances, respectively. The results are shown in Table 5.

Table 5. Multiple comparisons between quarterly periods

ATTRIBUTES	CADIZ		CORDOBA		HUELVA		SEVILLE	
	Quarter	P-value	Quarter	P-value	Quarter	P-value	Quarter	P-value
Accomodation	--	--	--	--	T1-T2 T2-T3 T3-T4	0.0050** 0.0000** 0.0010**	T1-T4	0.0330*
Restaurants	T1-T3 T2-T3 T3-T4	0.0000** 0.0000** 0.0000**	--	--	T1-T3	0.0500*	--	--
Leisure	T1-T3 T1-T4 T2-T3	0.0000** 0.0000** 0.0000**	--	--	--	--	--	--
Buses	T1-T3 T2-T3	0.0060** 0.0170*	--	--	T1-T3	0.0030**	--	--
Taxis	T1-T3 T2-T3	0.0050** 0.0040*	--	--	--	--	--	--
Overall Quality	T1-T3 T1-T4 T2-T3 T2-T4	0.0000** 0.0000** 0.0000** 0.0120*	T1-T3 T2-T3	0.0010** 0.0270*	T1-T3 T2-T3 T3-T4	0.0010** 0.0000** 0.0260*	T1-T2 T2-T3 T2-T4	0.0180* 0.0000** 0.0000**
Beaches	T1-T3 T2-T3 T3-T4	0.0000** 0.0000** 0.0020**	--	--	--	--	--	--

Scenery	T1-T3 T1-T4 T2-T3	0.0000** 0.0010** 0.0000**	T1-T3 T1-T4 T2-T3	0.0000** 0.0020** 0.0000**	T1-T3 T3-T4	0.0010** 0.0030**	--	--
Urban Surroundings	T1-T3 T1-T4 T2-T3 T2-T4	0.0000** 0.0000** 0.0160* 0.0140*	T1-T4	0.0010**	T2-T3	0.0250*	T1-T4 T2-T4	0.0040** 0.0010**
Courtesy/care	T1-T2 T1-T3 T1-T4 T2-T3 T3-T4	0.0050** 0.0000** 0.0000** 0.0000** 0.0400*	--	--	T1-T2	0.0370*	--	--
Value-for-money	T1-T3 T1-T4 T2-T3 T2-T4	0.0010** 0.0220* 0.0010** 0.0140*	--	--	--	--	T1-T3 T2-T3	0.0040** 0.0050**
*P < 0.05; **P < 0.01								

In Table 5 it can be clearly seen that the third quarterly period of the year in the Andalusian coastal provinces is what differs significantly with respect to the other periods of the year. The attributes of restaurants and beaches in Cadiz are especially noticeable, with a significance level of 1%, as is the attribute of the overall quality in Huelva. In these three components, the third quarter is the only one which establishes its differences with the other three quarterly periods of the year.

Nevertheless, in the inland provinces, the third quarter in Cordoba and the second quarter in Seville are those prominent, although in a less obvious way. In this latter case, the attribute of overall quality stands out, where the second quarter is the only one which differs from the other quarters of the year. Apart from the aforementioned quarters, which exert a major influence, there are significant differences in various attributes of the four Andalusian provinces which are produced in the first quarter. To be exact, the first quarter is that which has the least volume of tourists of the year in the four Andalusian provinces.

CONCLUSIONS

Beyond criticism, tourism carrying capacity, remains a powerful concept and as such can serve planning and management towards sustainable tourism (Mexa and Coccossis, 2004). In recent years, academic and professional interest has increased in this measure which is now considered as a key aspect of sustainable tourist development. However, the utility of its application has been questioned in the academic literature owing to the difficulties encountered of putting it into practice. Nevertheless, this in turn could be due to the scarce scientific treatment it has received. In this study, this tendency is refuted by considering a methodological proposal in which the possibilities of measuring the social carrying capacity of a tourist destination are verified.

The empirical application considered is based on studying the psychological carrying capacity of the tourist, that is to say, we verify the tolerance levels of the visitors to the tourist destination with respect to its highest levels of use, which are identified with the tourist season. To this end, the degree of satisfaction that the tourists have according to the set of tourist supply components of the destination is taken into account during distinct times of the year. The opinions are analysed of those tourists who visit four Western Andalusian provinces during 2005. This same methodology can be adapted to the psychological carrying capacity of the resident in the tourist destination.

It is observed that the tourist season exerts a significant influence on the coastal provinces, based on "sand and sun" tourism, which is where major tourist density normally exists. Specifically, the tourist season significantly influences the tourist satisfaction with respect to restaurant services, overall quality, scenery, urban surroundings and courtesy and care in Cadiz and Huelva. On the other hand, it only exerts its influence on the overall quality and urban surroundings in Cordoba and Seville. Furthermore it can be clearly observed that the third quarter of the year in the coastal provinces establishes some significant differences with respect to the other quarterly periods of the year: notably the restaurant services and beaches in Cadiz and the overall quality in Huelva. However, this same clarity is not present in the results of the other two provinces since the significant differences between quarters are sustained only in Seville and only in the second quarter. Hence, in those provinces with a predominance of "sand and sun" tourism there is major evidence of seasonal differences in the tourism supply. Nevertheless, it would be necessary to know how these variations in the quarterly periods of the year are related to the levels of tourist satisfaction. It can be seen that in

Huelva, the tourist satisfaction significantly decreases in relation to only the restaurant and bus services during the peak season, by comparing the first and third quarters.

In contrast, nearly all the attributes experience a significant drop in tourist satisfaction in the peak season in Cadiz. In this case, although significant reductions are produced in other yearly quarters, it is the third quarter which predominates in the multiple comparisons between quarters. In particular, the methodology used is an indirect approximation to the measurement of the social carrying capacity, since it is based on the detection of a change in the usual level of satisfaction of the visitor by comparing distinct seasons of the year. This may constitute an alarm signal which is activated at the moment when the satisfaction with the destination declines significantly, with respect to a determined number of attributes in the tourist supply. This alarm signal could indicate the necessity of intervention by tourism planners in order to correct any negative impacts. With this proposal, Shelby and Heberlein's model (1984) is completed, by carrying out the study with a combination of both the descriptive focus and the prescriptive focus. With this methodology, it can be observed that, apart from being unadvisable, it is also unnecessary to calculate a determined number of tourists as a tolerance threshold of the tourist destination. Following the suggestions of Coccossis et al. (2001), we present a straightforward and efficient methodology which can meet the requirements of a measurement indicator of sustainable tourism, although it should be complemented with an estimation of the carrying capacity of other economic, social and environmental areas. All this could make up the tourist carrying capacity. The planners of the tourist destinations could make use of this tool to detect negative impacts of excesses in the levels of use in the tourist destination and, therefore, take consequent action. Finally, it should be mentioned that quarterly periods and provinces are studied in this paper, and the results could be improved by means of using other more reduced periods of time, such as months or weeks, and other more specific geographic zones, such as towns which receive a great number of tourists in determined periods.

In this way, this methodology would be more feasible for tourist destinations where some acceptable levels of satisfaction are reached, as in the case considered here, since all the attributes of all the Andalusian provinces greatly exceed an average score of five.

Furthermore, it is common knowledge that the decrease in tourist satisfaction is not provoked solely by the high levels of tourist use, but other factors of influence also exist. Hence, it is necessary to carry out other studies on those factors for which one can directly ascertain the

degree of rejection by the visitors facing these situations of possible saturation, and in the same way, the relationships which may exist with these other factors can be interpreted.

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Jesús Manuel López-Bonilla (lopezbon@us.es) is an Assistant Professor at University of Seville, Department of Business Administration and Marketing, Facultad de Ciencias Económicas y Empresariales. Avenida Ramón y Cajal, 1 – 41018 Seville, Spain.

Luis Miguel López-Bonilla (luismi@us.es) is an Associate Professor at University of Seville, Department of Business Administration and Marketing, Facultad de Ciencias Económicas y Empresariales. Avenida Ramón y Cajal, 1 – 41018 Seville, Spain.