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# Analyzing social perception as a key factor in the management of protected areas: the case of the Sierra Nevada Protected Area (S Spain)

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Protected areas cannot be considered as elements isolated from the human groups that inhabit them. Consideration of the social factor is fundamental to guarantee the success of any management model. In this sense, analyzing the perception of people who live in protected areas can be a key tool for the formulation of proposals for improving the existing models. This article explores perceptions of local residents in Sierra Nevada Protected Area in Southern Spain and identifies the socio-demographic factors that affect these perceptions. The main objective is to generate relevant data for the protected area management team. The recommendation we ~~could~~ offer entail a review of the communication plan and participatory strategy considering social differences in perceptions of the local population.

**Keywords:** protected areas; local residents´ perceptions; public participation; conservation; environmental management

## 1. Introduction

Protected areas (PAs) constitute, at present, the main tool for conserving biodiversity (Alkan, Korkmaz, and Tolunay 2009). In recent years, the protected surfaces worldwide have grown considerably, especially in developed lands. Spain surpasses the figure of 7 million protected hectares, 27.9% of the national territory, distributed over 1,905 protected natural areas. Fifteen of these are National Parks, representing a total of 364,626 hectares (8% of the protected surface) (Atauri ~~et al.,~~ 2014).

In the PAs within Spain, we find local populations firmly rooted in the land, where they also project their expectations for the future (Corraliza 2014). These spaces have traditionally been used for their natural resources to cover the daily needs of the local population (Dixon and Sheman 1990; Harnish 2014). This leads us to surmise that the mere declaration of PAs does not guarantee their success in the conservation of biodiversity (Hayes 2006; Pretty and Smith 2004). Thus, making conservationist objectives compatible with the interests of local communities is the key to success in conservation strategies (Reed 2008; Bruzzi ~~et al.,~~ 2011; Andrade and Rhodes 2012). Because these territories are generally of a rural nature, in isolated locations, they may lack basic services and entail difficulties for social and cultural promotion, which has

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consequences for today's society and for future generations (Serrano-Bernardo et al., 2015). There is, however, a tendency to overlook the impact that the management of these areas may have on the local community (Macura, 2015; Corraliza, García, and Valero 2002). As Kaplan, (1989) points out "PAs are more than the sum of elements making up the scenery." In other words, there are no guarantees of the long-term existence of PAs without the support and active participation of the local inhabitants (McShame and Wells 2004). Their knowledge and approval are crucial (Pietrzyk-Kaszynska et al., 2012). The effectiveness of PAs is not only determined by the state of conservation or the plan for maintenance, it is also crucial to consider the social perception of the local communities (Allenford and Allenford, 2013; Hirschnitz-Garbers and Stoll-Kleemann 2010).

In this context, analysis of the perception of populations living within PAs has been distinguished as a tool of growing relevance in recent years (Cruz, Hernández and Pereira 2009; Huber and Arnberger 2016). Such information could be extracted and extrapolated to reformulate strategies in search of excellence among the models for managing PAs (Alexiades, Cortés and Valcuende 2014).

Perception is understood as the cognitive process by which one recognizes, interprets and identifies stimuli and sensations that come from the physical and social surroundings. In turn, social perception would designate a type of perception in which "social and cultural factors bear an influence, and which has to do with both the physical setting and the social atmosphere" (Vargas 1994, 53). In a PA, the perception of the local population is the result of a balance between the costs and the benefits produced by the PA, the dependence on resources and knowledge about the PA itself (Chen, Fu, Lu and Xu 2006).

Gauging the opinion and attitudes of the population in the face of management strategies can provide valuable information that will allow us to improve the models of management of such areas and adopt policies in line with the interests, needs and expectations of the local population that are also compatible with the objectives of conservation (Klaus et al., 2010; Lauber, Decker, and Knuth, 2008; Mascia 2003; Rodríguez 2012). In fact, when the local population is excluded from the model of management in PAs and their needs and aspirations are ignored, it is extremely difficult to enforce conservation policies (Andrade and Rhodes 2012). The key is none other than "knowledge for action," analyzing how people interpret the workings of a PA, deriving a solid base of sociological knowledge from whence to implement new policies and develop new strategies (Martino 2008).

The aim of the present contribution is to divulge the results of the first paper on local population perception carried out in the Sierra Nevada Protected Area (SNPA) since its establishment in 1989 (Law 2/1989, 18 July). It harbors the largest National Park in Spain. The reason for selecting this particular natural area is twofold: firstly, the SNPA is one of Spain's best known PAs, having an international projection; and secondly, the manager team of the SNPA noted the need to carry out such analysis due to the non-existence of studies of this nature that could help to resolve conflicts between locals and managers.

Based on the results of surveys carried out among the population of the SNPA, this article examines:

(a) The perception that the population within the study area has about the following aspects: sense of rootedness, measures of conservation, benefits and improvements in the quality of life since the declaration of the PA and a general assessment of the SNPA management.

(b) How socioeconomic factors such as gender, age or work status may influence the social perception of the SNPA.

(c) Is there any relationship between the social perception of the SNPA and the level of information and local participation in ~~the~~ management?

## 2. Material and methods

### *2.1. Description of the area of study*

The study area is located in south-east Spain, between the provinces of Granada and Almería. The SNPA was officially established by Decree 24/2007, on January 30, and comprises the territorial realms integrated by the National Park and the Natural Park of Sierra Nevada, which constituted the Biosphere Reserve of the same name declared by UNESCO in 1986. The Natural Park of Sierra Nevada was officially recognized as such in 1989. Ten years later, in 1999, the central area of high peaks was declared a National Park, a concentric figure of protection (Figure 1). The territory is furthermore recognized as a Zone of Special Protection of Birds (SPA), according to the European Community Directive 79/409/CEE, 2 April. From 2014, it is one of the IUCN World Green List of PAs. Two remarkable characteristics are its location, as it is the southernmost mountain chain in Europe, and its considerable altitude. Indeed, it is one of the highest reliefs in Europe: the Mulhacén, at 3,479 m (11,414 feet) is the ceiling of the Iberian Peninsula. This region also hosts the Sierra Nevada Ski resort situated 27 km from the city of Granada (Delgado ~~et al.,~~ 2007; Serrano-Bernardo, and Rosúa-Campos 2008). The diverse

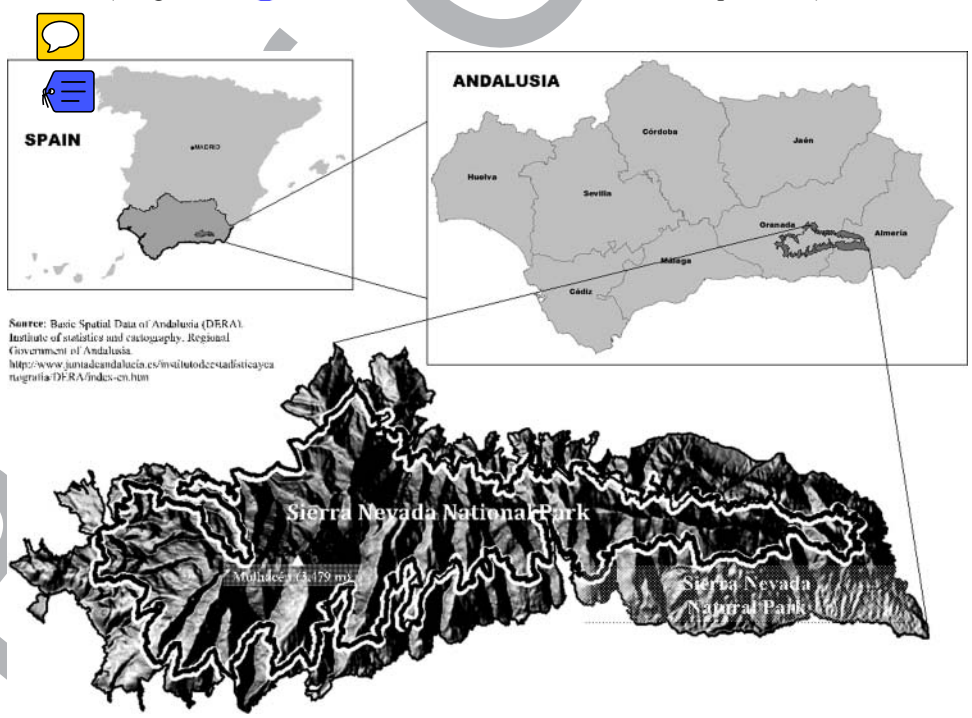


Figure 1. Localization map of Sierra Nevada Protected Area (SNPA) (S Spain). *Own elaboration using software ArcGIS 10.2.2. Map layers taken from: Basic Spatial Data of Andalusia (DERA). Institute of Statistics and Cartography. Regional Government of Andalusia. DERA Available at:* http://www.juntadeandalucia.es/institutodeestadisticaycartografia/DERA/index-en.htm.

flora, much unlike that of the rest of Europe (Serrano-Bernardo, Rosúa, and Díaz-Miguel 2007), includes mountain pines and deciduous forests of chestnut trees, holm oaks and acerolas (Molero-Mesa and Pérez-Raya 1987). At the highest altitudes there are over 80 endemic species.

The study area has a population of 95,674 inhabitants and covers an area of 172,318 hectares (85,883 hectares of National Park and 86,435 of Natural Park) that harbor 60 municipalities (37 in the province of Granada and 23 in Almería) pertaining to the geographic regions Marquesado del Zenete, Valle de Lecrín, Área Metropolitana, Río Nacimiento, Alpujarra Granadina and Alpujarra Almeriense (~~Sierra Nevada: database, 2014~~). The foremost economic activity is Services (main activity: tourism services) followed by Agriculture (woody crops: almond, olives tree, vineyard; arable crops: wheat and barley). Although the primary activities are still important overall, the amount of cultivated land has decreased, as some agrarian systems of subsistence were not competitive (~~Sierra Nevada: database 2014~~). The growth trends of the municipalities vary. While the villages near the capital city of Granada have undergone residential expansion and the service sector has benefited, the mountain villages are favored by tourist activity and the demand for specialized and diverse services. There is some industrial activity in the area nearby Granada, where municipalities show economic and population growth; the average for the province being in the range of 10%–15%. In any case, these are establishments or workshops that could be called family businesses rather than industries (~~Sierra Nevada: database 2014~~).

### 2.2. *The questionnaire*

This study was carried out by means of a validated questionnaire addressing five dimensions: (1) awareness of being part of a protected space; (2) conservation of the space (model of public management, measures of conservation); (3) knowledge about the initiatives carried out (public use activities, volunteer networks, educational program, special wards); (4) economic development and quality of life (benefits, improvement in quality of life); and (5) participation and channels of communication.

The questionnaire was applied between April 2015 and October 2015. A total of 600 individuals were sampled and the response rate was 63.6%. The methodology for data collection involved personal house-to-house visits. The respondents who completed the questionnaire were inhabitants of the municipalities belonging to the SNPA, excluding visitors and people who work in the area but do not reside there.

### 2.3. *Sampling procedure*

The size of the sample selected for study was 383 completed surveys. Accordingly, for a confidence level of 95%, under the hypothesis of maximum indetermination and simple random sampling, the real error is ± 5.0% for the entire sample. This sample took in six geographic zones within the study area, represented proportionally according to 2014 data from the multiterritorial system of Andalusia (Appendix A).

In each geographic region (Granada and Almería) a two-stage sampling was performed, first selecting the primary sampling units (municipalities) in random and proportional fashion, then the final units (individuals) by random routes, fixing quotas for sex, work status and age, based on the socio-demographic information provided by 2014 data from the multiterritorial system of Andalusia.

### *2.4. Statistical analysis*

The software used for statistical analysis was SPSS v.22.0 (IBM Corp. 2013). The questionnaire on the whole and each one of its five parts were subjected to the Cronbach Alpha Method to check reliability. To determine the construct validity, factor analysis of the data was carried out through Principal Component Analysis (using the measure KMO ~~of~~ Kaiser Meyer and Olkin, plus the Bartlett test) and Varimax rotation.

In order to study the possible association between variables, the Chi-Square test or Fisher's test (for 2 × 2 tables) was used and the Pearson contingency coefficient and the Gamma coefficient were used to study the strength of this association.

For quantitative variables, Mann–Whitney test, ANOVA analysis, and Scheffe test for multiple comparisons, was used to check the differences between different modalities. Shapiro–Wilk's test was performed to check the normality of these variables. For all the statistical tests, the significance level was set at 0.05.

## 3. Results

### *3.1. Validation of the questionnaire*

The levels of consistency obtained with Cronbach's $\alpha$ for each one of the dimensions ranged from ,925 to ,786, giving a global average of ,881 for the questionnaire (Appendix B). These results reflect a high level of internal consistency. Together with the values obtained by factor analysis and Varimax rotation, they ensured reliability of the questionnaire as an effective tool to assess the opinion of the SNPA residents.

### *3.2. Perception of the local population*

#### *3.2.1. Rootedness*

The participants were asked ~~if~~ they felt that the SNPA was something "personal", a part of their history as well as part of their future opportunities. The response to this item was largely positive: 66.9% said "YES," while 33.1% answered "NO" (Table 1).

The variables age and work status of the inhabitants are significantly associated with "rootedness". People who have a job are associated with the response "YES," whereas the unemployed tend to respond "NO." The segment of population aged 30 to 59 is the one expressing a greater sense of rootedness. The variable "gender" showed no statistically significant relationship.

#### *3.2.2. Measures of conservation*

Those surveyed were first asked ~~if~~ they agreed or disagreed with the model of public management of the SNPA, and 11.0% of the sample responded that they disagreed with the intervention by the public administration in the conservation and care of the space (Table 2, Part A). A significant association between age, gender, work status and the agreement/disagreement with the model of public management was identified. Older people do not agree with this model. Women answer "YES" significantly more than men. And finally, people who are unemployed tend to agree with the model of public management

A second item contained a query as to whether they considered the measures taken by the management team of the SNPA as permissive, excessive or coherent with conservation. In this case, 49.4% of respondents labeled them as excessive, 17.4%

Table 1. Attitudes of the respondents toward the question: "Do you feel a sense of rootedness in the SNPA?"

| | | Yes | No | Total | *p*-value | Contingency coef (*p*-value) | Gamma (*p*-value) |
|---|---|---|---|---|---|---|---|
| Gender | Male | 136 (35.7%) | 59 (15.5%) | 195 (51.2%) | | | |
| | Female | 119 (31.2%) | 67 (17.6%) | 186 (48.8%) | ,276 | ,061 (0.232) | – |
| Total | | 255 (66.9%) | 126 (33.1%) | 381 (100%) | | | |
| Employment situation | Unemployed | 110 (28.9%) | 81 (21.3%) | 191 (50.1%) | | | |
| | Employed | 145 (38.1%) | 45 (11.8%) | 190 (49.9%) | ,0001 | ,195 (.0001) | – |
| Total | | 255 (66.9%) | 126 (33.1%) | 381 (100%) | | | |
| Age group | < 30 | 52 (13.6%) | 41 (10,8%) | 93 (24.4%) | | | |
| | 30–44 | 67 (17.6%) | 24 (6.3%) | 91 (23.9%) | | | |
| | 45–59 | 78 (20.5%) | 19 (5.0%) | 97 (25.5%) | ,0001 | ,215 (.0001) | – |
| | > = 60 | 58 (15,2%) | 42 (11.0%) | 100 (26.2%) | | | |
| Total | | 255 (66.9%) | 126 (33.1%) | 381 (100%) | | | |

considered them permissive and 33.2% as coherent (Table 2, Part B). The statistical analysis shows a significant association of this response with gender and age. Accordingly, men tend to view the measures as excessive, and women as permissive. No direction of association could be determined for age.

The third query in this block was about the inhabitants' agreement or otherwise with these measures. Total disagreement was expressed by 57.9% while 42.1% expressed agreement (Table 2, Part C). No associations were detected between the agreement/disagreement and the variables of study.

### 3.2.3. *Benefits and improved quality of life*

The individuals surveyed were requested to use a scale from 0 (lowest) to 10 (best) to score the perception they had about the benefits of living in the SNPA with regard to economic development, the creation of jobs, development of the tourist sector, improvement of infrastructure, and the enhanced image of Sierra Nevada. The highest scores were obtained for "development of the tourist sector" (5.54), and "enhanced image of Sierra Nevada" (5.87), whereas the lowest was for "creation of jobs" (3.56) (Table 3).

The analysis revealed an association between the socioeconomic factors considered in this study (gender, age and work status) and the scores ~~on~~ each one of these aspects. Women gave higher scores than men in all the aspects considered. Regarding work status, the unemployed respond with higher scores than the employed except for the aspect "enhanced image of Sierra Nevada" in which no significant differences were identified between the unemployed/employed. Age was found to have different associations depending on the aspects analyzed (Appendix C). With regard to the aspect "economic development" those over 60 years of age and individuals aged 30–44 gave similar scores (the lowest ones), standing apart from the other two age groups who scored these aspects in different dimensions. For the rest of the items, respondents aged below 30 gave significantly higher scores than the rest of the age groups, where results were fairly homogeneous

The question "Do you consider that your quality of life has improved since the Sierra Nevada was declared a National Park in 1989?" evoked a largely negative response.

Table 2. Measures of conservation.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Part A. Do you agree with the model of public management in the SNPA? | | | | | | | |
| | | Yes | No | Total | *p*-value | Contingency coef (*p*-value) | Gamma (*p*-value) |
| Gender | Male | 160 (42.0%) | 35 (9.2%) | 195 (51.2%) | < ,0001 | ,221 (< ,0001) | – |
| | Female | 179 (47.0%) | 7 (1,8%) | 186 (48.8%) | | | |
| Total | | 339 (89.0%) | 42 (11.0%) | 381 (100%) | | | |
| Employment situation | Unemployed | 180 (47.2%) | 11 (2.9%) | 191 (50.1%) | < ,0001 | ,166 (,001) | – |
| | Employed | 159 (41.7%) | 31 (8.1%) | 190 (49.9%) | | | |
| Total | | 339 (89.0%) | 42 (11.0%) | 381 (100%) | | | |
| Age group | < 30 | 90 (23.6%) | 3 (0.8%) | 93 (24.4%) | | | |
| | 30–44 | 84 (22.0%) | 7 (1.8%) | 91 (23.9%) | | | |
| | 45–59 | 84 (22.0%) | 13 (3.4%) | 97 (25.5%) | ,003 | ,187 (0.003) | ,450 (< ,0001) |
| | > = 60 | 81 (21.3%) | 19 (5.0%) | 100 (26.2%) | | | |
| Total | | 339 (89.0%) | 42 (11.0%) | 381 (100%) | | | |
| Part B. Do you consider the measures taken by the administration of the SNPA AS permissive, excesive or coherent? | | | | | | | |
| | | Permissive | Coherent | Excessive | Total | *p*-value | Contingency coef (*p*-value) | Gamma (*p*-value) |
| Gender | Male | 26 (10.0%) | 40 (15.4%) | 86 (33.2%) | 152 (58.7%) | ,011 | ,184 (0.011) | – |
| | Female | 19 (7.3%) | 46 (17.8%) | 42 (16.2%) | 107 (41.3%) | | | |
| Total | | 45 (17.4%) | 86 (33.2%) | 128 (49.4%) | 259 (100%) | | | |
| Employment situation | Unemployed | 23 (8.9%) | 35 (13.5%) | 45 (17.4%) | 103 (39.8%) | ,167 | ,117 (.167) | – |
| | Employed | 22 (8.5%) | 51 (19.7%) | 83 (32.0%) | 156 (60.2%) | | | |
| Total | | 45 (17.4%) | 86 (33.2%) | 128 (49.4%) | 259 (100%) | | | |
| Age group | < 30 | 5 (1.9%) | 24 (9.3%) | 20 (7.7%) | 49 (18.9% | | | |
| | 30–44 | 10 (3.9%) | 23 (8.9%) | 30 (11.6%) | 63 (24.3%) | | | |
| | 45–59 | 12 (4.6%) | 26 (10.0%) | 41 (15.8%) | 79 (30.5%) | ,028 | ,228 (.028) | ,030 (,708) |
| | > = 60 | 18 (6.9%) | 13 (5.0%) | 37 (14.3%) | 68 (26.3%) | | | |
| Total | | 45 (17.4%) | 86 (33.2%) | 128 (49.4%) | 259 (100%) | | | |
| Part C. Do you agree/disagree with these measures? | | | | | | | |
| | | Agreement | Disagreement | Total | *p*-value | Contingency coef (*p*-value) | Gamma (*p*-value) |
| Gender | Male | 56 (21.6%) | 96 (37.1%) | 152 (58.7%) | | | |
| | Female | 53 (20.5%) | 54 (20.8%) | 107 (41.3%) | ,055 | ,126 (0.042) | – |
| Total | | 109 (42.1%) | 150 (57.9%) | 259 (100%) | | | |
| Employment situation | Unemployed | 50 (19.3%) | 53 (20.5%) | 103 (39.8%) | | | |
| | Employed | 59 (22.8%) | 97 (37.5%) | 156 (60.2%) | ,087 | ,106 (0.087) | – |
| Total | | 109 (42.1%) | 150 (57.9%) | 259 (100%) | | | |
| Age group | < 30 | 26 (10.0%) | 23 (8.9%) | 49 (18.9%) | | | |
| | 30–44 | 25 (9,7%) | 38 (14.7%) | 63 (24.3%) | | | |
| | 45–59 | 30 (11,6%) | 49 (18,9%) | 79 (30.5%) | ,370 | ,109 (0.370) | ,102 (,284) |
| | > = 60 | 28 (10.8%) | 40 (15.4%) | 68 (26.3%) | | | |
| Total | | 109 (42.1%) | 150 (57.9%) | 259 (100%) | | | |



As shown in Table 4, just 31.8% responded affirmatively, while 68.2% of the respondents held that their quality of life had not improved.

225

The statistical analysis revealed an association between the perception of the improvement in quality of life and the variables gender and age. Perceived improvement

Table 3. Perception about the benefits of living in the SNPA, ANOVA ($n = 381$, $\alpha = 0.05$, Fcrit = 2.9783, df = 3;377)

| | | | Economic development | Job opportunities | Tourism industry development | Infrastructure improvements | Enhanced image of Sierra Nevada |
|---|---|---|---|---|---|---|---|
| Gender | Male | Mean | 3.26 | 2.96 | 5.06 | 4.52 | 5.51 |
| | Female | Mean | 4.51 | 4.19 | 6.04 | 5.42 | 6.24 |
| | Group total | Mean | 3.87 | 3.56 | 5.54 | 4.96 | 5.87 |
| | *p*-value | | < ,0001 | < ,0001 | < ,0001 | < ,0001 | 0.003 |
| Employment situation | Unemployed | Mean | 4.34 | 4.21 | 5.93 | 5.41 | 6.10 |
| | Employed | Mean | 3.40 | 2.92 | 5.14 | 4.52 | 5.63 |
| | group total | Mean | 3.87 | 3.56 | 5.54 | 4.96 | 5.87 |
| | *p*-value | | < ,0001 | < ,0001 | < ,0001 | < ,0001 | 0.068 |
| Age group | < 30 | Mean | 4.91 | 4.70 | 6.77 | 6.05 | 6.65 |
| | 30–44 | Mean | 3.52 | 3.23 | 4.96 | 4.47 | 5.26 |
| | 45–59 | Mean | 4.09 | 3.38 | 5.56 | 4.69 | 5.89 |
| | > = 60 | Mean | 3.00 | 2.99 | 4.89 | 4.66 | 5.68 |
| | Group total | Mean | 3.87 | 3.56 | 5.54 | 4.96 | 5.87 |
| | *p*-value | | < ,0001 | < ,0001 | < ,0001 | < ,0001 | < ,0001 |

*Note:* Mean scores based on 10-points scale: 1 – lowest 10 – highest.

Table 4. Attitudes of the respondents toward the question: "Do you consider that your quality of life has improved since the Sierra Nevada was declared a protected area?"

| | | Yes | No | Total | *p*-value | Contingency coef (*p*-value) | Gamma (*p*-value) |
|---|---|---|---|---|---|---|---|
| Gender | Male | 52 (13.6%) | 143 (37.5%) | 195 (51.2%) | ,036 | ,111 (,29) | – |
| | Female | 69 (18.1%) | 117 (30.7%) | 186 (48.8%) | | | |
| Total | | 121 (31.8%) | 260 (68.2%) | 381 (100%) | | | |
| Employment situation | Unemployed | 66 (17.3%) | 125 (32.8%) | 191 (50.1%) | ,240 | ,060 (,240) | – |
| | Employed | 55 (14.4%) | 135 (35.4%) | 190 (49.9%) | | | |
| Total | | 121 (31.8%) | 260 (68.2%) | 381 (100%) | | | |
| Age group | < 30 | 42 (11%) | 51 (13,4%) | 93 (24.4%) | ,009 | ,172 (,009) | ,188 (,023) |
| | 30–44 | 22 (5.8%) | 69 (18.1%) | 91 (23.9%) | | | |
| | 45–59 | 31 (8.1%) | 66 (17.3%) | 97 (25.5%) | | | |
| | > = 60 | 26 (6.8%) | 74 (19,4%) | 100 (26.2%) | | | |
| Total | | 121 (31.8%) | 260 (68.2%) | 381 (100%) | | | |

in the quality of life is greater among the younger age group, as well as among women when compared to men.

### 3.2.4. *General assessment of the SNPA management*

230 Local inhabitants were asked to score from 0 (lowest) to 10 (best) their general perception about the tasks of management carried out in the PA. The average score ~~is~~ just 4.85 points (Figure 2).

The analysis reveals a relationship between all the established variables and the general assessment of the management model. Women gave higher scores than men, the

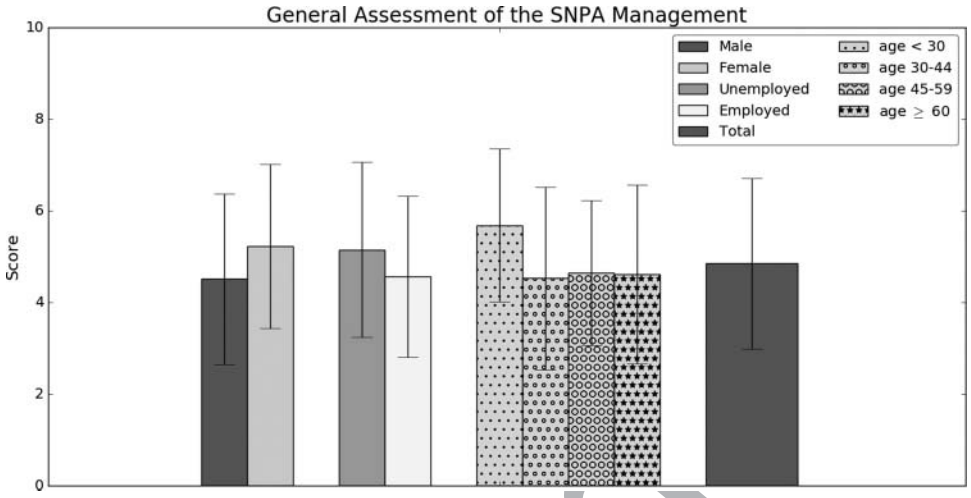


Figure 2. General assessment of the SNPA management.

unemployed higher than the employed, and the younger participants (<30) higher than the rest of the age groups.

### *3.3. Relationship between the social perception of Sierra Nevada Protected Area and local channels of information and participation*

We put forward the question, "Do you receive periodic information about the SNPA?" Just 10.5% of the respondents reported receiving periodic information about the PA, whereas 89.5% responded negatively.

In order to identify possible associations between the social perception of SNPA and the level of information, these results were crossed with the perceptions about rootedness, measures implemented in the PA, the improvement in quality of life and the general assessment of the SNPA.

The statistical analysis revealed a significant association between the information level and the perception about the improvement in quality of life and the general assessment of the SNPA management. No significant associations were identified with perceptions about rootedness and measures implemented in the PA (Table 5). The respondents who reported being well informed (10.5%) are associated with positive perceptions as to improvement in the quality of life (7.6%). In contrast, the 89.5% who responded that they are not well informed are associated with negative perceptions (65.4%). Regarding the general assessment of the SNPA management, higher scores are linked to people receiving periodic information about the PA (Figure 3).

Respondents were asked if they were aware of the existence of channels of public participation and the response was clearly negative. 89.5% questioned people do not know the existence of these channels while only 10.5% are aware of their existence.

In this case, the statistical analysis revealed a significant association between the awareness of channels of participation and the perceptions about measures implemented in the PA, the improvement in quality of life and the general assessment of the SNPA management. The non-awareness of channels of participation is associated with the perception "excessive." The awareness of these channels is associated with a positive

Table 5. Association between the information level and the social perception of the SNPA.

| | | Yes | No | Total | *p*-value | Contingency coef (*p*-value) | Gamma (*p*-value) |
|---|---|---|---|---|---|---|---|
| Rootedness | Yes | 28 (7.3%) | 227 (59.6%) | 255 (66.9%) | ,725 | ,022 (,603) | – |
| | No | 12 (3.1%) | 114 (29,9%) | 126 (33.1%) | | | |
| Total | | 40 (10.5%) | 341 (89.5%) | 381 (100%) | | | |
| Measures implemented in the SNPA | Permissive | 2 (0.8%) | 43 (16.6%) | 45 (17.4%) | | | |
| | Coherent | 11 (4.2%) | 75 (29.0%) | 86 (33.2%) | ,321 | ,093 (,321) | –,131 (0.421) |
| | Excessive | 14 (5.4%) | 114 (44.0%) | 128 (49.4%) | | | |
| Total | | 27 (10.4%) | 232 (89.6%) | 259 (100%) | | | |
| Quality of life | Yes | 29(7.6%) | 92 (24.1%) | 121 (31.8%) | | | |
| | No | 11 (2.9%) | 249 (65.4%) | 260 (68.2%) | < ,0001 | ,287 (< ,0001) | – |
| Total | | 40 (10.5%) | 341 (89.5%) | 381 (100%) | | | |

perception of the improvement in quality of life while non-awareness is associated with negative perception (Table 6). Finally, higher scores in the general assessment of the SNPA management are linked to individuals who are aware of the existence of these channels of participation to voice their proposals (Figure 3).

## 4. Discussion

Local perceptions of the SNPA revealed interesting issues. An important issue is the fact that people over 60 manifest a lower degree of rootedness (Figure 4). ~~The public~~ management has meant a drastic change in the territorial model. In their own words, "the land of their forefathers has changed hands." It is a little less surprising to find that those younger than 30 reportedly feel less tied to the land. Migrations from rural zones to find

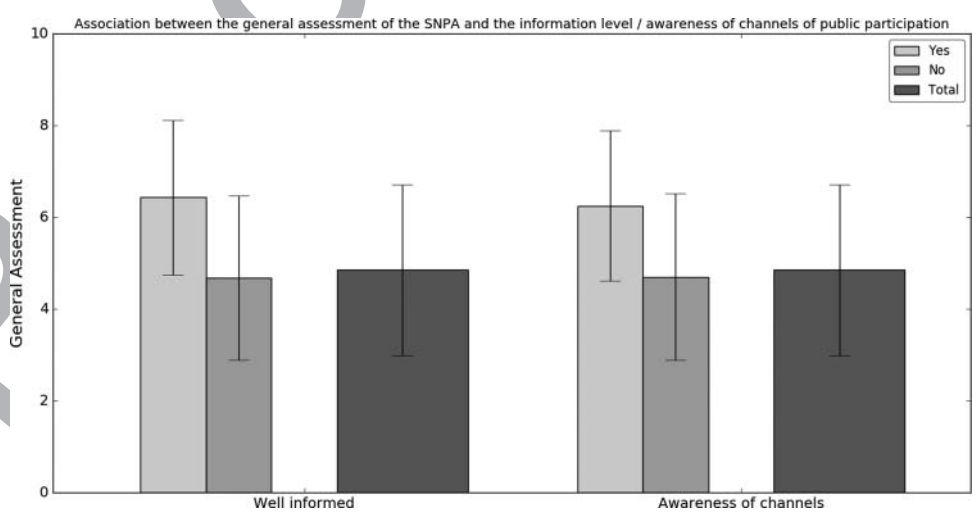


Figure 3. Association between the general assessement of the SNPA and the information level/ awareness of channels of public participation.

Table 6. Association between the awareness of channels of participation and the social perception of the SNPA.

| | | Yes | No | Total | *p*-value | Contingency coef (*p*-value) | Gamma (*p*-value) |
|---|---|---|---|---|---|---|---|
| Emotional attachment | Yes | 30 (7.9%) | 225 (59.1%) | 255 (66.9%) | ,290 | ,059 (,251) | – |
| | No | 10 (2.6%) | 116 (30.4%) | 126 (33.1%) | | | |
| Total | | 40 (10.5%) | 341 (89.5%) | 381 (100%) | | | |
| classification Protected areas policies | Permissive | 9 (3.5%) | 36 (13.9%) | 45 (17.4%) | ,002 | ,211 (,002) | ,473 (,001) |
| | Coherent | 17 (6.6%) | 69 (26.6%) | 86 (33.2%) | | | |
| | exccesive | 7 (2.7%) | 121 (46.7%) | 128 (49.4%) | | | |
| Total | | 33 (12.7%) | 226 (87.3%) | 259 (100%) | | | |
| Quality of life | Yes | 26 (6.8%) | 95 (24.9%) | 121 (31.8%) | < ,0001 | ,238 (< ,0001) | – |
| | No | 14 (3.7%) | 246 (64.6%) | 260 (68.2%) | | | |
| Total | | 40 (10.5%) | 341 (89.5%) | 381 (100%) | | | |

educational and work opportunities could explain this response (Ayuda, Pinilla, and Sáez 2001). Regarding the impact of the variable "work status" on the rootedness perception, our study leads one to conclude that the people who feel a closer link with the land are the ones who have relied on it for sustenance over the years and have behavioral connections with nature, as also noted by Folmer et al. 2013 in "Explaining Emotional Attachment to a Protected Area by Visitors' Perceived Importance of Seeing Wildlife, Behavioral Connections with Nature, and Sociodemographics."

Another concern is the fact that most inhabitants of the SNPA held positive attitudes towards the public management model (Ciocánea et al. 2016; Karanth and Nepal 2012; Martino 2008). This attitude is conditioned by the socio-demographic variables (Kamal et al. 2015) so that the older individuals tend to reject the model for the reasons

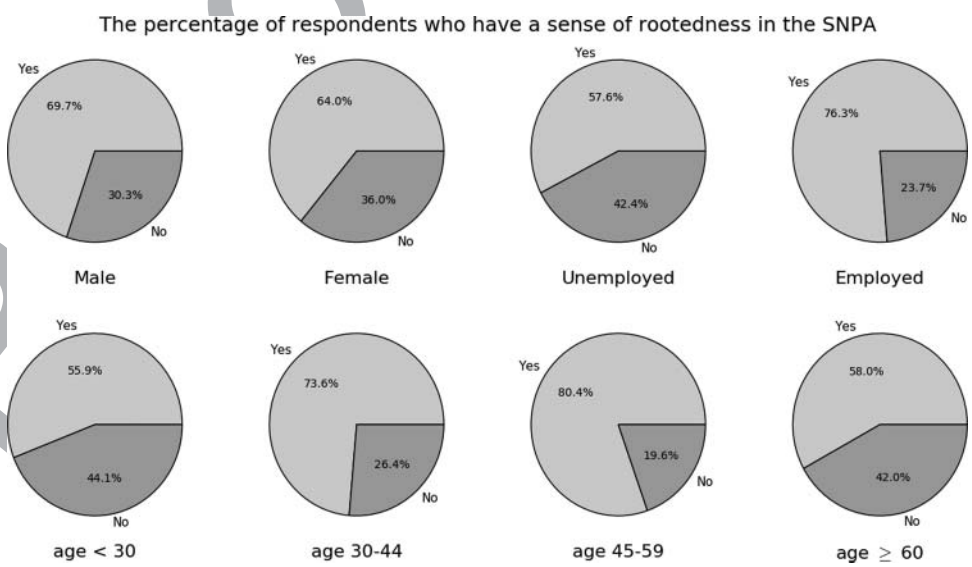


Figure 4. The percentage of respondents who have a sense of rootedness in the SNPA.

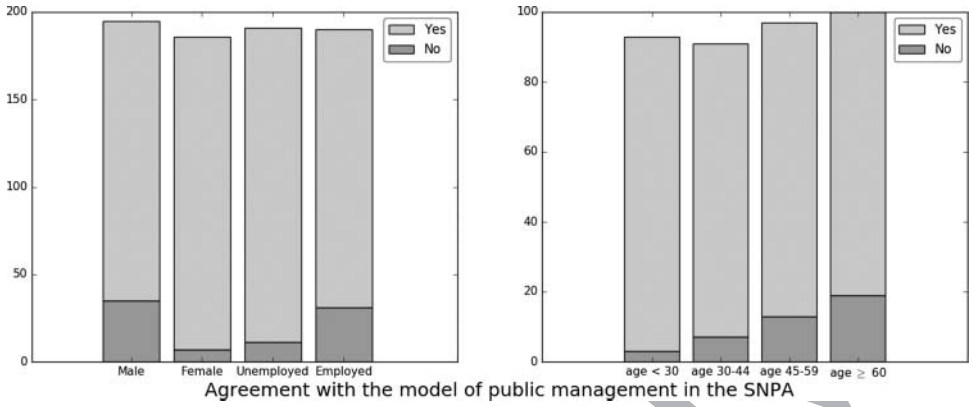


Figure 5. Agreement with the model of public management in the SNPA.

mentioned above, and this rejection is greater in the case of men, reaffirming a tradition of agricultural and ranching activity predominantly involving males (Figure 5). Consequently, as Cruz (2009, 58) notes, the male population more directly perceives the modifications and adaptations in these sectors introduced after the area was declared as protected. Sowinska-Swierkosz and Chmielewski (2014) point out that farmers perceive the PA as "the place of their work and a source of their livelihood." The fact that this social group express different opinions from other individuals is reported in some recent studies (Natori and Chenoweth 2008; Nijnik and Mather 2008; Rogge et al., 2007). In terms of work status, the favorable response that the unemployed express might be explained because they foresee greater potential for economic growth and future employment if the administration is in charge (Ciocánea et al., 2016).

Regarding the perception of the measures of conservation, men tend to consider administrative measures "excessive," while women categorize them as "permissive" (Figure 6). The justification for this trend can again be traced to the historic or traditional role of the male in rural economic development (Ayuda et al., 2001).

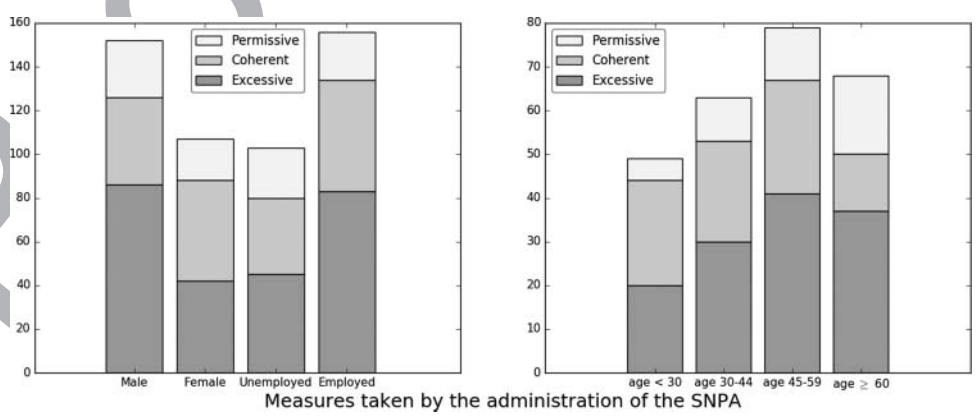


Figure 6. Measures taken by the administration of the SNPA.

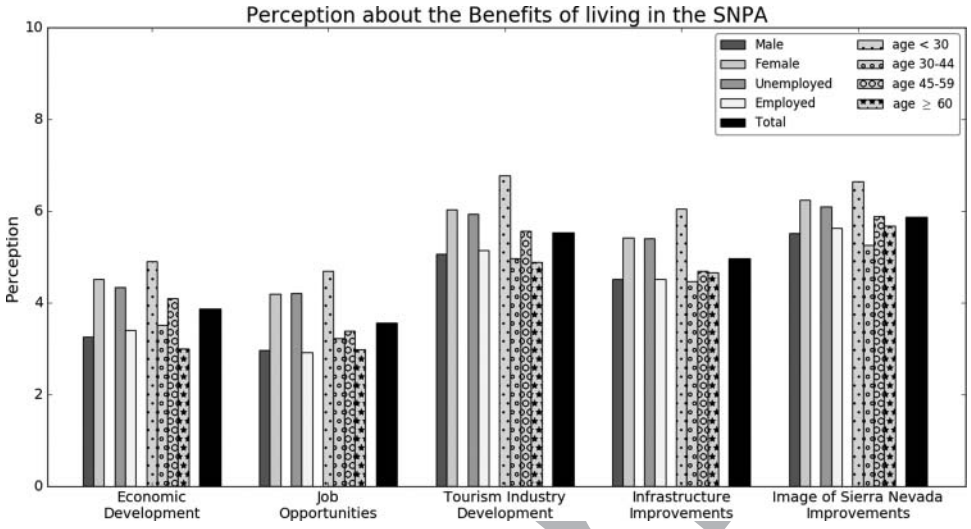


Figure 7. Perception about the Benefits of living in the SNPA.

On the other hand, women gave higher scores than men for all of the benefits addressed (economic development, creating jobs, tourist sector, improved infrastructure, enhanced image of Sierra Nevada) (Figure 7) which suggests that the sectors representing business activities and agriculture or livestock have mostly involved men, and that many women could be unaware of the changes taking place over recent years (Cruz 2009). Our fieldwork would support this interpretation, as we found that a lack of knowledge translated into higher scores, as also reported in other studies (Allendorf and Allendorf 2013). The low scores, mostly from men, can be explained by the widespread belief that protected status is an impediment for their economic development, due to norms and limitations (Srivastav and Srivastav 2015).The surveyed population affirms that "the cost of any investment has multiplied, and that getting a business started takes much longer." The lack of business initiatives means an exodus of the population. The low scores given for creating jobs would reflect the overall sensation of a population that does not see the space as a resource for employment (Camarero et al., 2009). As for tourism and the image of Sierra Nevada, the general opinion may be that the ski area gets nearly all the attention and promotion as Piñar (2000) suggests, hence the low score for these items. Meanwhile, the low score for infrastructure can be attributed to a widespread opinion that "local work is mostly superficial, making old buildings look better but less authentic." Regarding the other two variables analyzed, the high scores given by the younger individuals (under 30) could have to do with the positive impact of programs for heightening awareness and reinforcing communication in which some of this age group may have taken part (Bento-Silva et al. 2015). It is interesting to note that the score obtained for each of the aspects analyzed varies considerably in terms of the amount of protected land that each municipality in the survey actually possesses. Thus, the populations of villages with a minimal share of protected land express a more favorable opinion than the ones having 100% of their surface under protection. The explanation may be that the latter take advantage of the image of protected space to obtain government funds, while also avoiding restrictions.

The quality of life, understood as the set of material and spiritual conditions that determine human well-being, and the possibilities, perspectives and position of

individuals in society (López and Palomino 1999; Bruzzi et al. 2011), has interesting implications in the light of our results. The most positive perceptions, corresponding to the youngest age group, which have to do with educational programs that build awareness, usually directed at local youths. Over time, this target population grew to perceive the protected space as a strong point and a motor for development, personal and otherwise; that is, a source of opportunities rather than obstacles for development (Dimitrakopoulos et al. 2010; Owinoa et al. 2012).

Finally, it is also important to mention the link between the SNPA inhabitants' perceptions of the PA and the level of information and participation in the management model. (Rodríguez-Darias et al. 2016). The inclusion of the local population in PA through improved channels of information and communication will result in more positive perceptions and thus in a higher level of compliance with the PA (Andrade and Rhodes 2012).

## 5. Conclusions

In light of the findings expounded here we can conclude that attitudes towards the SNPA differ by gender, age and work status. Other factors such as information level and public participation in the model of management also influence the local perceptions of the SNPA. Informed and active citizens have more positive perceptions of the SNPA.

The instruments of information and participation in the SNPA management model are insufficient in view of the social response gathered here. Therefore, we stress the need to improve participative channels and the need to revise the existing strategies for information using the results obtained within the framework of this study, as understanding the social differences in perceptions of the PA is fundamental to improve the participation and information plans.

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## Appendix A. Samples distribution by geographic regions.

| | Population SIMA | Sample size |
|---|---|---|
| Alpujarra Granadina | 18.834 | 75 |
| Alpujarra Almeriense | 9.744 | 39 |
| Granada Metropolitan Area | 36.133 | 145 |
| Guadix–Marquesado | 6.075 | 24 |
| Rio Nacimiento | 5.979 | 24 |
| Valle de Lecrín | 18.909 | 76 |
| TOTAL | 95.674 | 383 |

Source: Multiterritorial Information System of Andalusia (SIMA).

## Appendix B. Validity and reliability of the questionnaire.

| Dimensions | No. of Items | Cronbach's $\alpha$ |
|---|---|---|
| Awareness of being part of a protected space | 4 | ,786 |
| Conservation of the space | 5 | ,879 |
| Knowledge about the initiatives carried out | 9 | ,874 |
| Economic development and quality of life | 5 | ,875 |
| Participation and channels of communication | 7 | ,925 |
| Global questionnaire | 30 | ,881 |
| Kayser–Meyer–Olkin coefficient = 0.916 | Bartlett's $p$-value = ,004 | |

**Appendix C. Multiple comparisons.**

| Dependent variable | | (I) age group | (J) age group | Mean difference (I-J) | Std. error | Sig. | 95% Confidence interval | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower bound | Upper bound |
| Economic development | Scheffe | <30 | 30–44 | 1,39749 | 0,31497 | 0,000 | 0,5130 | 2,2820 |
| | | | 45–59 | 0,82119 | 0,31000 | 0,073 | –0,0493 | 1,6917 |
| | | | > = 60 | 1,91398 | 0,30772 | 0,000 | 1,0499 | 2,7781 |
| | | 30–44 | < 30 | –1,39749 | 0,31497 | 0,000 | –2,2820 | –0,5130 |
| | | | 45–59 | –0,57630 | 0,31174 | 0,333 | –1,4517 | 0,2991 |
| | | | > = 60 | 0,51648 | 0,30947 | 0,427 | –0,3525 | 1,3855 |
| | | 45–59 | < 30 | –0,82119 | 0,31000 | 0,073 | –1,6917 | 0,0493 |
| | | | 30–44 | 0,57630 | 0,31174 | 0,333 | –0,2991 | 1,4517 |
| | | | > = 60 | 1,09278 | 0,30442 | 0,005 | 0,2379 | 1,9476 |
| | | > = 60 | < 30 | –1,91398 | 0,30772 | 0,000 | –2,7781 | –1,0499 |
| | | | 30-44 | –0,51648 | 0,30947 | 0,427 | –1,3855 | 0,3525 |
| | | | 45–59 | –1,09278 | 0,30442 | 0,005 | –1,9476 | –0,2379 |
| Job opportunities | Scheffe | < 30 | 30–44 | 1,46816 | 0,32233 | 0,000 | 0,5630 | 2,3733 |
| | | | 45–59 | 1,31748 | 0,31725 | 0,001 | 0,4266 | 2,2084 |
| | | | > = 60 | 1,70892 | 0,31492 | 0,000 | 0,8246 | 2,5933 |
| | | 30–44 | < 30 | –1,46816 | 0,32233 | 0,000 | –2,3733 | –0,5630 |
| | | | 45–59 | –0,15067 | 0,31903 | 0,974 | –1,0466 | 0,7452 |
| | | | > = 60 | 0,24077 | 0,31670 | 0,901 | –0,6486 | 1,1301 |
| | | 45–59 | < 30 | –1,31748 | 0,31725 | 0,001 | –2,2084 | –0,4266 |
| | | | 30–44 | 0,15067 | 0,31903 | 0,974 | –0,7452 | 1,0466 |
| | | | > = 60 | 0,39144 | 0,31153 | 0,664 | –0,4834 | 1,2663 |
| | | > = 60 | < 30 | –1,70892 | 0,31492 | 0,000 | –2,5933 | –0,8246 |
| | | | 30–44 | –0,24077 | 0,31670 | 0,901 | –1,1301 | 0,6486 |
| | | | 45–59 | –0,39144 | 0,31153 | 0,664 | –1,2663 | 0,4834 |
| Tourism industry development | Scheffe | <30 | 30–44 | 1,81815 | 0,29605 | 0,000 | 0,9868 | 2,6495 |
| | | | 45–59 | 1,21749 | 0,29139 | 0,001 | 0,3992 | 2,0358 |
| | | | > = 60 | 1,88419 | 0,28924 | 0,000 | 1,0720 | 2,6964 |
| | | 30–44 | < 30 | –1,81815 | 0,29605 | 0,000 | –2,6495 | –0,9868 |
| | | | 45-59 | –0,60066 | 0,29302 | 0,242 | –1,4235 | 0,2222 |
| | | | > = 60 | 0,06604 | 0,29088 | 0,997 | –0,7508 | 0,8829 |
| | | 45–59 | < 30 | –1,21749 | 0,29139 | 0,001 | –2,0358 | –0,3992 |
| | | | 30–44 | 0,60066 | 0,29302 | 0,242 | –0,2222 | 1,4235 |
| | | | > = 60 | 0,66670 | 0,28614 | 0,145 | –0,1368 | 1,4702 |
| | | > = 60 | < 30 | –1,88419 | 0,28924 | 0,000 | –2,6964 | –1,0720 |
| | | | 30–44 | –0,06604 | 0,29088 | 0,997 | –0,8829 | 0,7508 |
| | | | 45–59 | –0,66670 | 0,28614 | 0,145 | –1,4702 | 0,1368 |
| Infrastructure improvements | Scheffe | < 30 | 30–44 | 1,58124 | 0,27846 | 0,000 | 0,7993 | 2,3632 |
| | | | 45–59 | 1,36304 | 0,27408 | 0,000 | 0,5934 | 2,1327 |
| | | | > = 60 | 1,39376 | 0,27206 | 0,000 | 0,6298 | 2,1577 |
| | | 30–44 | < 30 | –1,58124 | 0,27846 | 0,000 | –2,3632 | –0,7993 |
| | | | 45–59 | –0,21819 | 0,27561 | 0,890 | –0,9921 | 0,5558 |
| | | | > = 60 | –0,18747 | 0,27360 | 0,925 | –0,9558 | 0,5808 |
| | | 45–59 | < 30 | –1,36304 | 0,27408 | 0,000 | –2,1327 | –0,5934 |
| | | | 30–44 | 0,21819 | 0,27561 | 0,890 | –0,5558 | 0,9921 |

(*continued*)

| Dependent variable | | (I) age group | (J) age group | Mean difference (I-J) | Std. error | Sig. | 95% Confidence interval | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower bound | Upper bound |
| Enhanced image of Sierra Nevada | Scheffe | > = 60 | > = 60 | 0,03072 | 0,26913 | 1,000 | –0,7250 | 0,7865 |
| | | | < 30 | –1,39376 | 0,27206 | 0,000 | –2,1577 | –0,6298 |
| | | | 30–44 | 0,18747 | 0,27360 | 0,925 | –0,5808 | 0,9558 |
| | | | 45–59 | –0,03072 | 0,26913 | 1,000 | –0,7865 | 0,7250 |
| | | < 30 | 30–44 | 1,38143 | 0,27174 | 0,000 | 0,6183 | 2,1445 |
| | | | 45–59 | 0,75856 | 0,26746 | 0,047 | 0,0075 | 1,5096 |
| | | | > = 60 | 0,96516 | 0,26549 | 0,005 | 0,2196 | 1,7107 |
| | | 30–44 | < 30 | –1,38143 | 0,27174 | 0,000 | –2,1445 | –0,6183 |
| | | | 45–59 | –0,62286 | 0,26896 | 0,149 | –1,3781 | 0,1324 |
| | | | > = 60 | –0,41626 | 0,26700 | 0,489 | –1,1660 | 0,3335 |
| | | 45–59 | < 30 | –0,75856 | 0,26746 | 0,047 | –1,5096 | –0,0075 |
| | | | 30–44 | 0,62286 | 0,26896 | 0,149 | –0,1324 | 1,3781 |
| | | | > = 60 | 0,20660 | 0,26264 | 0,892 | –0,5309 | 0,9441 |
| | | > = 60 | < 30 | –0,96516 | 0,26549 | 0,005 | –1,7107 | –0,2196 |
| | | | 30–44 | 0,41626 | 0,26700 | 0,489 | –0,3335 | 1,1660 |
| | | | 45–59 | –0,20660 | 0,26264 | 0,892 | –0,9441 | 0,5309 |