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Local communities responding to ecological challenges - A psychosocial approach to the Natura  
2000 network

Carla Mouro & Paula Castro

Department of Social Psychology, ISCTE, Lisbon

Centro de Investigação e Intervenção Social, CIS/ISCTE, Lisbon

Correspondence to: Carla Mouro, CIS/ISCTE, Av. das Forças Armadas, 1649-026 Lisbon,  
PORTUGAL. E-mail: [carla.mouro@iscte.pt](mailto:carla.mouro@iscte.pt)

Telephone: +351 217903079; Fax: +351 217903962

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### Abstract

The institutionalisation of biodiversity conservation through legal instruments has led to mixed reactions at both the individual and community levels, with conflict and resistance co-existing with support. The overall purpose of this article is to describe how rural communities living in areas included in the Natura 2000 Network of protected sites, where local practices of land use are regulated by new legal directives, receive biodiversity conservation goals. Previous studies suggest that this reception is strongly shaped by place identification, but their contradictory results demand further clarification. This study examines the role of psychosocial variables identified by previous studies as potentially relevant moderators of identification: (a) vested interest in natural resources, (b) evaluation of the designation process of protected areas, and (c) institutional trust. It further extends previous research by analysing the support given to contextually relevant ecological practices. Results reveal a positive link between place identification and attitudes in the high vested interest condition and show that support for conservation practices is better predicted in the high vested interest and low trust conditions. The discussion focuses on the relevance of analysing contextually relevant psychosocial moderators when attempting to understand how local communities' relation with biodiversity conservation is affected by legislative innovation.

## Introduction

Human responsibility for environmental problems, like climate change or biodiversity loss, is today persistently discussed in the public sphere. Since the late 1970s, when a new environmental concern emerged among the public of many countries (van Liere & Dunlap, 1981) and this debate began, it has been accompanied by a steady trend towards the institutionalisation of environmental protection. Numerous worldwide treaties - like the 1983 Bonn Agreement or the 1997 Kyoto Protocol - were signed and new environmental laws and regulations were issued. In the last two decades, the concept of “sustainable development” (Brundtland Report, 1987), which proposes the conciliation between conservation and human welfare goals (Bonnes & Bonaiuto, 2002; Chan et al., 2007; Rosa & Silva, 2005), has strongly shaped these laws, particularly in the European Union (Baker, 2007). This means that today numerous innovative laws and regulations are pressuring individuals and communities to change towards sustainability goals. For instance, individuals are called upon through national campaigns to adopt new habits like the separation of domestic waste, and communities are asked to alter agricultural practices and hunting traditions for the sake of biodiversity protection. However, as studies looking at the tenacity of racism under de-segregation laws have demonstrated (Durrheim & Dixon, 2005), legislative innovation cannot immediately alter the ideas and practices of a whole society, as it is not a simple task to generalise the acceptance of new norms (Castro & Batel, 2008).

These same difficulties are evident in the ecological domain. Research has shown not only a persistent gap between concern and behaviour (Vining & Ebreo, 2002) but also that individuals and communities react to pressures towards pro-ecological change in complex ways, presenting both acceptance of and resistance to change (Castro, 2006; Castro & Mouro, 2009; van Vugt, 2002). Attempting to deal with these difficulties, research concluded that the predictors of ecological behaviours in the public and in the private spheres were different and needed to be

separately examined (Stern, 2000). There has been insistent research to date on behaviours of the private sphere, e.g. water conservation (Corral-Verdugo, Bechtel & Fraijo-Sing, 2003), or recycling (Castro, Garrido, Reis & Menezes, 2009). However, comparatively less research has been conducted on ecological *Nonactivist behaviours in the public sphere* (Stern, 2000), a broad category encompassing conducts such as environmental citizenship actions and support for public policies. Traditionally, willingness to pay more taxes for environmental causes has been taken as the example of support for public policies (Stern, 2000), and it is therefore now important to examine other actions from the same category. For instance, nowadays land use practices are shaped by public policies and subject to public control, and more knowledge is required about how this affects local communities' beliefs, attitudes and support for conservation practices. The broad purpose of the present paper is then to contribute to extending current knowledge of *nonactivist behaviours in the public sphere* by exploring communities' reactions to new public policies, laws and regulations that make them change certain practices relevant for biodiversity conservation.

Previous studies examining the reactions of communities in similar situations, like the designation of natural parks or the transformations in familiar landscapes, have shown how these are affected by identity processes (Bonaiuto, Carrus, Martorella & Bonnes, 2002; Buchecker, Hunziker & Kienast, 2003; Carrus, Bonaiuto & Bonnes, 2005; Stoll-Kleeman, 2001). However, although convergent regarding the importance of identity variables, the studies have so far yielded conflicting results. In the present article we will attempt to extend and clarify these results.

In this context, the paper has two specific goals. The first is to describe how local communities respond to legal pressures for change towards ecologically relevant practices by testing the predictive links between beliefs, attitudes and support for conservation practices. The

second goal is to examine whether certain psycho-social variables, such as the evaluation of the decision-making process for the definition of the protected areas, interact with place identification and help shape communities' reactions. The context of the study and the theoretical assumptions that organise the main hypotheses are now presented.

*Natura 2000 network and local communities: the context of the study*

The present article explores how communities deal with biodiversity conservation shaped by means of public policies, of which Natura 2000 Network is a significant example. This Network of protected sites resulted from the transposition of European Directives to the national legislations of EU member-states and aims at preventing habitat fragmentation and ensuring the survival of species on the brink of extinction. The Network currently covers approximately 20% of the European Union territory and unlike Natural Parks it is an “umbrella” designation with no visible boundaries that covers a mosaic of realities, including public and private properties.

The definition of protected areas has been a central goal of the European Union's environmental policy in the last decades. However, living in protected areas like the Natura 2000 sites imposes on rural communities a number of limitations, such as the prohibition of intensive farming or forestry practices, and restrictions on the construction of both small (e.g. residential buildings) and large-scale projects (e.g. highways). As a result, communities go through a complex process of adapting to the new laws, which includes both adjustment and resistance to the proposed changes. This is reflected by the contestation local communities often offer to the limitations imposed on certain economic activities (Visser, Moran, Regan, Gormally & Skeffington, 2007).

It is then important to address the complexity of these local reactions, attempting to understand how both representational and identity processes, as well as evaluations of the

relationship with the relevant legal authorities, shape acceptance or refusal of legally framed conservation practices. These are the goals of the present article, which is an outcome of a conservation project joining biologists and social psychologists and led by a national Environmental NGO. The project aims to re-establish a corridor of the Mediterranean ecosystem needed for the preservation of the Iberian lynx (*lynx pardinus*) (LPN, 2005), a “critically endangered” species (IUCN, 2006), and takes place in two Portuguese Natura 2000 Sites: “Moura-Barrancos” located in *Baixo Alentejo* (South-East), and “Caldeirão” in *Algarve* (South). These are predominantly rural areas, with some urban nuclei, where an aged population lives isolated in “montes” (small houses at the top of low elevations). The first action of the project, launched before any other, was the conduction of a survey for examining the positions of local communities towards natural protected areas and biodiversity protection; this allowed for a “before-after” evaluation design that is not frequently found in this area of research. The present article, based in this first survey, is then the first outcome of the project.

*Coping with change in the ecological domain - Environmental beliefs, attitudes and ecological behaviour*

The mixed reactions of local communities to ecological protection assured by legal means indicate that we need to know more about how interactions between societal, community and individual level variables shape the acceptance of ecological behaviours in the public sphere. This section addresses some dimensions of the interaction between the societal and the individual levels, while the next section deals with the interplay between the societal and community levels.

At a societal level, governments’ commitment to attaining sustainability goals originated the launch of campaigns and projects to encourage changes in individual behaviour: individuals are called to initiate certain practices (e.g. waste separation, extensive farming) and to ban others

(e.g. hunting in specific periods or places). These procedures which attempt to “normalise” ideas and behaviours in a society are also triggers of debate and controversy in public life (Castro, 2006; Jovchelovitch, 2007), instigating processes of negotiation and transformation in meaning. In many cases this results in the emergence of complex representational fields accommodating both new and old norms and sometimes reconciling what were formerly considered contradictory ideas (Castro & Lima 2001; Hovardas & Stamous, 2006; Moloney & Walker, 2002; Moscovici, 1988).

When examining these complex representational fields, research shows that beliefs aligned with the new norms, e.g. pro-conservation beliefs, present higher levels of endorsement and less variance than non-ecological beliefs (Milfont & Duckitt, 2004; Castro, et al., 2009). Studies also show that individuals are aware of both positive and negative arguments on ecological practices and can use a combination of both to respond to everyday demands (Castro et al., 2009; Kurz, Donaghue, Rapley & Walker, 2005). Moreover, these contrasting belief constellations also play different roles in the decision-making processes leading to the choice of behaviour: for instance, levels of water consumption (Corral-Verdugo et al., 2003) or of recycling of metal cans (Castro et al., 2009) seem to be better predicted by the rejection of the negative beliefs and not so much by acceptance of the positive ones. These results highlight how the views held on a specific subject are not always only positive or negative but often a combination of both (Castro, 2006; Castro et al., 2009). In line with this, research has suggested that attitude-intention relations are weaker when more heterogeneous beliefs are present (Armitage, 2003), reinforcing the need for assessing the distinct contribution of separate sets of beliefs in understanding reactions to controversial and dilemmatic situations.

A second point that has to be considered is that attitudes are influenced by circulating norms (Staats, 2003). When the norms are very strong or even have legal force, as in the case under



analysis, the attitudes expressed by respondents will therefore tend to be aligned with the norm. Consequently, in a highly normative domain like that of environmental protection (Castro, 2006), opposition and resistance will have to be expressed in ways that do not directly oppose the norm, as research on subtle forms of racism has shown (Durrheim & Dixon, 2005). General agreement with the norm can be displayed through global positive attitudes and beliefs, while resistance may be put forward in a more subtle manner, i.e., by contextual, utilitarian, resource specific arguments about the difficulties of implementing certain behaviours (Castro et al., 2009; Kurz et al., 2005). In this case, beliefs can arguably be better predictors of behaviours than attitudes as, in fact, research has demonstrated for behaviours of the private sphere (Corral-Verdugo et al., 2003). Assuming that a global evaluation (about protected areas in general) will be more permeable to normative pressures than an evaluation of a specific situation (the regional protected area), distinct sets of beliefs may also have a different predictive strength for general and specific attitudes on the same subject.

The present study will address these two points by

- (a) using a pool of beliefs that includes both positive and negative ideas circulating in society on the designation of protected areas;
- (b) testing the predictive paths for both general (distal) attitudes and specific (proximal) attitudes towards protected areas;
- (c) comparing the predictive strength of the traditional link ‘attitudes-support for ecological practices’ to the alternative link ‘beliefs-support for ecological practices’.

### *Coping with change II - Identity and community involvement*

At the community level, research shows that place identification plays a significant role in predicting the reactions of communities subjected to societal demands to adopt biodiversity

protection practices. However, the results reveal that a high place identification is in some cases positively associated with support for ecologically relevant change (Carrus et al., 2005; Uzzell, Pol & Badenas, 2002; van Vugt, 2002) while in others it predicts resistance to it (Bonaiuto et al., 2002; Stoll-Kleeman, 2001; Uzzell et al., 2002). Specifically regarding the designation of natural parks, researchers have suggested that these contradictory findings may be due to “key features of the designation process” (Carrus et al., 2005, p.252.), namely psycho-social factors acting as moderators. This line of research suggests the following hypotheses regarding relevant moderators: (1) when local residents are involved in the local economy and policies are imposed by extra-local authorities, “we should expect a negative relation between local identity and support for the protected area”; (2) conversely, when local residents have no vested interests in local resources and are involved in the decision-making processes, “we should expect a positive relation between local identity and support for the protected area” (Carrus et al., 2005, p.242).

However, these hypotheses have not yet been directly tested. In the present paper the moderator effects of three psycho-social factors will be examined. One factor is the *evaluation of the process* of site designation. Communities are frequently marginalised in the decision-making processes which lead to the selection of the sites or planned interventions (Buchecker et al., 2003; Stoll-Kleeman, 2001), despite public participation being an acknowledged pillar of sustainability (Pol, 2002). In fact, the decisions on Natura 2000 areas relied primarily on the scientific expertise of biodiversity conservation, disregarding local, context-specific contributions (Stoll-Kleeman, 2001, Visser et al., 2007). The second relevant variable to distinguish positions towards environmental issues is *trust in the authorities* (Bonaiuto et al., 2008; Lima & Castro, 2005) responsible for designating the sites. Finally, the moderating role of *vested interest* in the land will also be assessed by differentiating those who own land from those who do not. Landowners are a very relevant interest group because they are directly affected by the regulations on land use

practices and are privileged local partners for conservation projects (Visser et al., 2007). Further extending previous research, the impact of these variables on the acceptance of sustainable practices will also be analysed.

### *Specific Goals and Hypotheses*

The present article focuses on how communities deal with change enforced through innovative legislative tools. Two specific goals shape the main hypotheses of the study.

The first goal is a general one related to the need for a thorough description of the positions of local communities before the launch of the other actions of the conservation project. To achieve this goal, beliefs, attitudes and practices related to protected areas were assessed. Departing from previous findings suggesting that environmental protection has acquired a normative character (Castro, 2006), three main hypotheses were developed concerning these variables:

*Hypothesis 1:* The pool of beliefs will be organised into two distinct factors: one related to positive assertions about the protected areas (pro-ecological beliefs) and another related to (dys)functional consequences of the definition of a protected area (non-ecological beliefs). Pro-ecological beliefs will present higher means than non-ecological ones. The latter will also present greater variance in responses (Castro & Lima, 2001; Castro et al, 2009; Milfont & Duckitt, 2004).

*Hypothesis 2:* Attitudes towards protected areas in general (distal evaluations) will be better predicted by pro-ecological beliefs, while attitudes towards the regional protected areas (proximal evaluations) will be better predicted by non-ecological beliefs.

*Hypothesis 3:* Support for conservation practices will be better predicted by beliefs than by attitudes. More specifically, we expect (rejection of) non-ecological beliefs to be a better

predictor of support for conservation practices than (endorsement of) pro-ecological beliefs (Corral-Verdugo et al., 2003).

The second goal is to analyse community reactions to change by linking them to psycho-social moderators relevant for the context in which change is implemented. Research has demonstrated how place identification has a significant impact on communities' reactions to protected areas, but it has also yielded conflicting results in this regard (Bonaiuto et al., 2002; Carrus et al., 2005). To contribute towards the clarification of these results, we will test the impact of three potential moderators which can alter the effects of identification (see Carrus et al., 2005; Lima & Castro, 2005): (a) vested interest in the land; (b) evaluation of the process of site designation; and (c) trust in the institutions responsible for the designation process. The following pattern of results is expected:

*Hypothesis 4a:* When 'vested interest' is *low*, higher place identification will be related to stronger support for protected areas; when 'vested interest' is *high*, higher place identification will be related to weaker support for protected areas.

*Hypothesis 4b:* When 'process evaluation' is *good*, higher place identification will be related to stronger support for protected areas; when 'process evaluation' is *bad*, higher place identification will be related to weaker support for protected areas.

*Hypothesis 4c:* When 'institutional trust' is *high*, higher place identification will be related to stronger support for protected areas; when 'institutional trust' is *low*, higher place identification will be related to weaker support for protected areas.

The moderating capacity of these factors regarding the pattern of relations among beliefs and attitudes, and between attitudes and support for practices will also be analysed, without any specific *a priori* hypotheses. Analyses will be organized by moderator as the proposed

moderators were not previously tested for the links studied here and because correlations were expected between the various variables addressed.

## Method

### *Participants and procedure*

In total, 161 residents in eight counties from the two Natura 2000 Protected Areas referred above participated in a telephone survey that took place from November 2005 to May 2006. The sampling criterion was non-probabilistic quotes based on the 2001 National Census data for the Resident Population within the selected counties. For each household, the person who had last celebrated her/his birthday and was at least 18 years old was invited to participate. The study was introduced as wishing to '*get to know residents' opinions about the region where they live*'. Participants were informed of the anonymous character of the survey and took an average of 20 minutes to complete the questionnaire.

Overall, women are 70.8% of the respondents.<sup>1</sup> Mean age is 51.3 years (SD=17.9) and education level is low for the majority of the sample (Table 1).<sup>2</sup> Regarding the place of residence, 79 (49%) participants live in counties classified as predominantly urban areas and 82 (51%) live in predominantly rural counties.<sup>3</sup>

### Insert Table 1

### *Variables*

The instrument was based on previous research and on previous contacts with the conservation team and local residents. The questionnaire was kept short, in recognition of the constraints associated with telephone surveys and of the socio-demographic characteristics of the

population. All items were responded on a five point scale ranging from 1–*I totally disagree* to 5–*I totally agree*; exceptions to this are clearly specified.

*Beliefs about Protected Areas* – Eight items, adapted from Carrus and colleagues (2005)<sup>4</sup> to the local context, assessed beliefs about protected areas. Examples are: “*Protected areas improve the quality of life.*” or “*...lead to less employment in the region where they are located.*”

*Attitude towards Protected Areas in general (Global attitude)* – The evaluation of protected areas was measured with one question: *In general, what is your position towards protected areas?*

*Attitude towards Regional Protected Areas (Regional area attitude)* – One question assessed the position towards protected areas in the region where the participants lived – *What is your position regarding the protected areas in your region, that is, in [Alentejo/Algarve]?*

*Conservation practices* – Agreement with practices aimed at maintaining the characteristics of regional protected areas was measured with four items (e.g. *refraining from hunting species considered protected by authorities*), aggregated in a single index ( $\alpha=.61$ ; mean inter-item  $r=.28$ ;  $M=4.32$ ,  $SD=.75$ ). The relevant practices for this context were identified by the conservation project team.

*Local Identification* – Place Identification was measured with two items (I feel proud to live in ...; I enjoy living in ...), which resulted in a Local identification index ( $r=.60$ ;  $M=4.34$ ;  $SD=.99$ )<sup>5</sup>.

*Vested interest in the use of natural resources* – This was assessed with the question “*Do you own a piece of land in this region?*”. *Yes* and *No* correspond to high and low levels of vested interest.

*Process evaluation* – Process evaluation was assessed with a single item – *Generally speaking, how do you evaluate the process through which protected areas in your region were designated?*– responded on a five point scale (from 1–*It went very bad* to 5–*Very good*).

*Institutional trust* – Levels of trust were assessed with the question – *To what extent do you trust the following entities to give you information about the protected areas?* – followed by a list of entities evaluated on a five point scale (from 1–*No trust at all* to 5–*I totally trust*) (Lima & Castro, 2005). The two items regarding trust in national authorities - the Government and the National Institute for Nature Conservation - were aggregated ( $r=.53$ ;  $M=2.95$ ,  $SD=1.19$ ) to generate a single index.

Socio-demographic variables such as sex, age, residence time and education level were also included in the questionnaire, as well as previous knowledge about the protected area.

## Results

### *Assessment of the positions of local communities towards protected areas*

The first goal of the study was to describe how local communities respond to legal pressures related to the conservation of protected areas. The first hypothesis related to this objective predicted that beliefs about the protected areas would be organised into two factors with different levels of agreement and variance. A principal component analysis with Varimax rotation yielded two factors of beliefs about the protected areas, responsible for 65% of the total variance (Table 2). The first factor, with three items, was called Pro-Conservation beliefs – it emphasises the value of protected areas for the conservation of nature and to foster human welfare. The second factor, constituted by two items, focuses on the negative impact of protected areas for economic development – it was called Negative Economic Impact. Average scores for both factors were calculated (Pro-Conservation -  $\alpha=.66$ ; mean inter-item  $r=.39$ ;  $M=4.52$ ,  $SD=.58$ ; Negative

Economic Impact –  $r=.61$ ;  $M=2.91$ ,  $SD=1.28$ ). The two factors are not significantly related ( $r=-.15$ ; ns). The level of agreement with Pro-Conservation beliefs is significantly above the point 4 (Agree) of the scale ( $t=3.988$ ,  $p<.000$ ; 86.8% support<sup>6</sup>), while Negative Impact beliefs do not differ from the scale mid-point ( $t=-.824$ , ns) and presents higher variability in responses (37.8% agreement and 33.1% disagreement).

#### Insert Table 2

Moreover, the residents in the two Natura 2000 sites expressed positive attitudes towards both Protected Areas in general ( $M=4.32$ ;  $SD=1.00$ ; 82.9% support) and towards the Protected Area in their region ( $M=4.39$ ;  $SD=1.00$ ; 85.5% support), with the means of both attitudes testing significantly higher than the point 4 (Agree) of the scale (*Global attitude*:  $t=3.988$ ,  $p<.000$ ; *Regional area attitude*:  $t=4.846$ ,  $p<.000$ ).

To summarise, the conjugation of positive attitudes and the endorsement of *Pro-Conservation* beliefs indicates that protected areas are globally supported as conservation instruments. Moreover, the greater variance presented by the factor aggregating beliefs about the *Negative Impact* of protected areas suggests that the most varied positions in the community can be found around these beliefs. A more detailed analysis of the patterns of articulation between *Pro-Conservation* and *Negative Impact* factors reveals that over 30% of the respondents agree simultaneously with both, suggesting that the positions on these legal tools emerge as complex.

#### *Coping with change: articulating beliefs, attitudes and practices*

The correlations between psycho-social and socio-demographic variables are presented in Table 3<sup>7</sup>. As further analyses showed that socio-demographic variables had no predictive power



when entered together with other psychosocial variables on multiple regressions, they are not reported in subsequent analyses.

### Insert Table 3

The second hypothesis predicted that distal and proximal evaluations of protected areas would be predicted by different sets of beliefs. As hypothesised, the multiple regressions performed showed that *Global attitudes* are better predicted by *Pro-Conservation* beliefs ( $B=.546, p<.000$ ), while *Regional area attitudes* are better predicted by *Negative Impact* beliefs ( $B=-.115, p<.000$ ) - and also by *Global attitude* ( $B=.318, p<.000$ ) (Table 4).<sup>8</sup>

The third hypothesis tested the direct effects of both beliefs and attitudes in predicting support for conservation practices. Multiple regressions were performed using first beliefs (first block) and then attitudes (second block) as predictors, following traditional models, or using the inverse order between the blocks. As anticipated, support for conservation practices is better predicted by beliefs than by attitudes. In fact, attitudes alone have much lesser predictive power regarding support for conservation practices (Attitudes as first block:  $\text{Adj.}R^2=.036$ ;  $F(2,142)=3.667, p<.05$ ) than beliefs (Beliefs as first block:  $\text{Adj.}R^2=.137$ ;  $F(2,142)=12.474, p<.000$ ). Moreover, when attitudes enter as the second block, the overall percentage of accounted variance ( $\text{Adj. } R^2$ ) is reduced from .137 to .127 ( $F \text{ Change}(2,140)=.136, \text{ns}$ ). Contrary to what was expected, however, *Pro-Conservation* beliefs significantly predict support for conservation practices ( $B=.392$ ), whereas *Negative Economic Impact* beliefs do not (Table 4).

### Insert Table 4

*Change in context: analysing psycho-social moderators*

The second objective of this research was to examine psycho-social moderators for the relationship between local identification and attitudes towards protected areas. Three potential moderators were tested: vested interest, process evaluation, and institutional trust. Moderating effects were assessed using hierarchical multiple regression analysis (Aiken & West, 1991). To minimise problems of multicollinearity, mean-centred scores of all the predictor variables were used. These scores were entered into step 1 of the regressions and the relevant two-way interactions (with the moderator) were entered into step 2 (Table 5). The model was tested for each moderator separately, first with the *Regional area attitude*, and then with support for conservation practices, as criterion variables.

## Insert Table 5

It was expected that the relation between place identification and the *Regional area attitude* would be reversed for different levels of the moderators (Hypotheses 4a, 4b and 4c). The first moderator, vested interest, was transformed into a dummy variable (0-low vested interest; 1-high vested interest) before entering the analyses. The analyses revealed a significant combined effect of place identification and vested interest ( $B=.299$ ;  $p<.05$ ;  $effect\ size=1.9\%$ ) in predicting the *Regional area attitude*. The results of the moderation effect are depicted in Figure 2. *Local identification* positively predicts the *Regional Area attitude* among residents with *high vested interest* (although moderately significant:  $B=.163$ ;  $p=.10$ ), while among low vested interest residents this relation is not significant ( $B=-.136$ ;  $ns$ ). This pattern of relations is inconsistent with Hypothesis 4a, where a positive link between place identification and attitudes was expected when vested interest was low - and not in the high vested interest condition as found here. No

further moderating significant effects were found regarding the relation between local identification and attitudes or support for practices.

Insert Figure 1

The effects of the three moderators on the relations among beliefs, attitudes and practices were assessed in the same multiple regressions (Table 5). No moderating effects were found for attitudes. Two significant interaction effects were found regarding support for conservation practices: one concerns vested interest and the other concerns institutional trust.

The analyses yielded a significant interaction effect of the *Regional area attitude* and vested interest in predicting conservation practices ( $B=.368$ ;  $p<.05$ ; *effect size*=3.1%). The examination of this interaction shows that the *Regional area attitude* predicts *support for conservation practices* among *high vested interest* residents ( $B=.247$ ;  $p<.05$ ), while among low vested interest residents this relation was not significant ( $B=-.121$ ; *ns*) (Figure 2).

Insert Figure 2

Institutional trust is a moderately significant moderator in predicting support for conservation practices ( $B=.156$ ;  $p<.10$ ; *effect size*=2.3%). The nature of the interaction between *Pro-Conservation* beliefs and institutional trust was examined for the high (+1 s.d.), medium and low (-1 s.d.) levels of the moderator (Figure 3). The agreement with *Pro-Conservation* beliefs positively predicts *support for conservation practices* among participants presenting *low institutional trust* ( $B=.509$ ,  $p<.000$ ) and *medium institutional trust* ( $B=.326$ ,  $p<.001$ ), while for residents with high institutional trust this relation was not significant ( $B=.142$ , *ns*).

Insert Figure 3

### Discussion

In the present study the reactions of communities to innovative laws and regulations attempting to assure biodiversity conservation were addressed as expressions of support for new ecological policies, and taken as a way of examining *non-activist behaviours in the public sphere* (Stern, 2000). As legal innovations enter the public sphere, they carry with them a normative weight that may affect public positions thus making it necessary to uncover the paths towards acceptance and resistance that lie behind socially desirable positions. In this study, two means were used to examine the reactions to the regulations targeting biodiversity conservation.

The first was the test of alternative associations for the traditional belief-attitude-behaviour links. As would be expected for a highly normative and legally framed context, local communities globally support the designation of natural protected areas. However, the results also demonstrate how positive and negative ideas in some cases co-exist and are elaborated by the same individual (Castro & Lima, 2001), and how the rejection of negative ideas circulating in society is relevant for the formation of positive attitudes (Castro et al., 2009; Corral-Verdugo et al., 2003). As expected, the endorsement of pro-conservation beliefs, an option aligned with the norm of evaluating nature conservation in a positive way, predicts positive attitudes towards protected areas in general. On the other hand, the rejection of the idea that protected areas have negative economic impacts is highly predictive of attitudes towards the regional protected areas, i.e., the local attitudes.

Another relevant finding was that the support for conservation practices in such a context was better predicted by beliefs, more specifically by pro-conservation beliefs, than by attitudes. These

results demonstrate the importance of research employing heterogeneous sets of beliefs expressing conflicting meaning in order to understand the complex interactions between societal demands and individual reactions (Castro, 2006). It also indicates the need to further explore the role of contradiction and ambivalence in dealing with controversial issues such as the one under analysis.

Nonetheless, the hypothesis that beliefs about the negative impact of protected areas would better predict the support for conservation practices (Castro et al., 2009; Corral-Verdugo et al., 2003) was not confirmed. Instead, this support was predicted by pro-conservation beliefs. This reinforces the literature suggesting that public and private sphere behaviours are indeed predicted by different patterns of variables (Stern, 2000). Also, the usual formulation of laws in rather generic and abstract terms may enable communities both to present high global levels of support and try to reinterpret the law and express disagreement on context-specific applications (Castro & Mouro, 2009; Tuffin & Frewer, 2008). Further research is required that focuses explicitly on this subject.

The second purpose of the study was related to previous studies showing how reactions of individuals and communities are shaped by community-based psycho-social factors, such as place identity, but that had yielded conflicting results (e.g. Carrus et al., 2005). A contribution was made to disentangling these conflicting results by testing three potential psycho-social moderators for this relation: vested interest in local natural resources, evaluation of the process of designation and trust in institutions responsible for the protected areas. Vested interest was the only significant moderator, although contrary to expected it was for landowners that higher levels of place identification predicted more positive attitude towards the regional protected area. The findings therefore suggest that it is when residents directly suffer the impact of the laws demanding change (high vested interest) by being forced to deal with imposed regulations that

control their land uses on a daily basis, that pride of living in a protected area is particularly relevant to enabling positive evaluations of legislative interventions.

Further analysis of the moderating impact of these variables also showed that vested interest and institutional trust play a significant role in predicting support for conservation practices. When residents are landowners or distrust national authorities, a clearer pattern of relations between beliefs, attitudes and practices can be found: for landowners, support for conservation practices is dependent upon a positive attitude towards protected areas, and for those who distrust authorities the endorsement of pro-conservation beliefs is relevant for predicting support for conservation practices. A direct consequence of this pattern of results is that although reactions of residents with vested interest can be predicted in this context, the same is not true for those not directly dealing with the legal pressures on a daily basis. Residents with low vested interest are nevertheless also part of the public sphere where debates about the importance of these pro-environmental interventions take place. This means that further research is needed to understand their positions as well as the dynamics occurring within and between the different psycho-social clusters comprised within the communities.

As mentioned, the survey presented in this paper was the first step of a before-after design. The second survey will be an opportunity to improve some of the limitations of this first study such as the limited number of items used for each variable. It will also be a suitable moment to test other psycho-social variables that may offer further insights into the relationships communities develop with the law, such as sense of community (Obst & White, 2005) or protest intentions (de Weerd & Klandermans, 1999).

On the whole, as social researchers these results strongly advise us not to unduly homogenise the local communities living under Natura 2000 or other legal frameworks of nature conservation. They highlight the need to bring the voices of the communities into the debates and

to focus on the psycho-social factors which organise different types of views on what is happening, and on the dynamics of the interaction between these distinct perspectives (Castro & Mouro, 2009). They evidence how local interventions need to respond to local dimensions by adapting their approach to the preoccupations of different groups within the communities (Dewulf, Craps & Dercon, 2004). In this sense, these results also have important consequences for policy analyses as they demonstrate how different groups with distinct approaches to change need to be considered if we want to obtain a clearer picture of the forms of acceptance and resistance occurring in the communities involved in legally framed nature conservation.

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Table 1. Socio-demographic characterisation of the participants

		Global	Region 1 - SCI Moura-Barrancos	Region 2 - SCI Caldeirão
<i>Sex</i>	Female (%)	70.8	65.5	76.6
<i>Age</i>	M (SD)	51.3 (17.9)	50.7 (17.9)	51.9 (18.0)
	Min-Max	18-88	18-88	18-83
<i>Education level (%)</i>				
	Less or equal to primary school	50.3	47.0	53.9
	6 <sup>th</sup> grade	10.7	13.3	7.9
	9 <sup>th</sup> grade	11.9	9.6	14.5
	12 <sup>th</sup> grade	16.4	16.9	15.8
	University degree	10.7	13.3	7.9
<i>Place of residence (%)</i>				
	More Urban/More Rural	49/51	36/64	64/36

Table 2. Factorial structure of beliefs about protected areas

	<i>Negative</i>	
	<i>Pro-Conservation</i>	<i>economic impacts</i>
Protected Areas (PA) improve the quality of life	.796	
Preserving our natural heritage through PA is the right thing to do to	.792	
Protected Areas help to preserve the environment	.718	
Protected Areas result in less employment		.840
The protection of nature through PA has a negative effect on economic activities		.838
<i>Explained variance (Total 65%)</i>	35.8	29.1

Table 3. Correlation matrix for psychosocial and socio-demographic variables

[illegible]

Place of residence was categorised as 1–Urban, 2–Rural. Regional protected area was categorised as 1-SAC Moura-Barrancos, 2- SAC Caldeirão \*\* $p < .01$  \* $p < .05$

Table 4. Multiple regressions on attitudes and practices

<i>Criterion</i>	Global attitude <sup>1</sup>		Regional area attitude <sup>2</sup>		Support conservation practices <sup>3</sup>	
<i>Predictor</i>	<i>B</i>	<i>Effect size</i>	<i>B</i>	<i>Effect size</i>	<i>B</i>	<i>Effect size</i>
(Constant)	-.102		.215**		-.204*	
Pro-Conservation beliefs	.546***	15.3%	.262**	3.2%	.392***	10.1%
Negative Impact beliefs	-.042	1.1%	-.115***	8.9%	-.025	5.2%
Global attitude			.318***	8.9%	-.009	0.0%
Regional Area attitude					.041	0.2%

\*\*\* $p < .000$  \*\* $p < .01$  \* $p < .05$  <sup>1</sup>Adj.R<sup>2</sup>=.171;  $F(2,144)=16.054$ ,  $p < .000$ ; <sup>2</sup>Adj.R<sup>2</sup>=.342;

$F(3,141)=25.958$ ,  $p < .000$ ; <sup>3</sup>Adj.R<sup>2</sup>=.127;  $F(4,140)=6.229$ ,  $p < .000$ .



Table 5. Hierarchical multiple regressions predicting attitude towards regional protected area and support for conservation practices

Moderators:	<i>Vested interest</i>	<i>Process evaluation</i>	<i>Institutional trust</i>
Criterion: <i>Regional area attitude</i>	<i>B</i>	<i>B</i>	<i>B</i>
(Constant)	-.301	-.319	-.320
Local Identity	-.136	.077	.004
Pro-conservation beliefs	.548**	.438**	.522**
Negative impact beliefs	-.174**	-.128**	-.113**
<i>Moderator</i>	.061	-.008	-.041
Local identity x <i>Moderator</i>	.299*	-.048	-.030
Pro-conservation beliefs x <i>Moderator</i>	-.257	-.035	.075
Negative impact beliefs x <i>Moderator</i>	.071	-.003	-.010
Adjusted R <sup>2</sup>	.270 <sup>a</sup>	.227 <sup>b</sup>	.185 <sup>c</sup>
Criterion: <i>Conservation practices</i>	<i>B</i>	<i>B</i>	<i>B</i>
(Constant)	-.411	-.414	-.395
Local Identity	-.181	-.050	-.101
Pro-conservation beliefs	.287*	.385**	.326**
Negative impact beliefs	-.121	-.039	-.027
Regional area attitude	.002	.085	.067
<i>Moderator</i>	-.027	-.004	-.011
Local identity x <i>Moderator</i>	.048	.072	-.034
Pro-conservation beliefs x <i>Moderator</i>	.230	-.133	-.156 <sup>†</sup>

Negative impact beliefs x <i>Moderator</i>	-.049	-.031	.001
Regional area attitude x <i>Moderator</i>	.368*	.056	.020
Adjusted R <sup>2</sup>	.187 <sup>d</sup>	.109 <sup>e</sup>	.127 <sup>f</sup>

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\*\* $p < .01$  \* $p < .05$  †  $p < .10$  <sup>a</sup>  $F(7,136)=8.541$ ,  $p < .000$ ; <sup>b</sup>  $F(7,111)=5.942$ ,  $p < .000$ ; <sup>c</sup>  $F(7,124)=6.826$ ,

$p < .000$ ; <sup>d</sup>  $F(9,134)=4.663$ ,  $p < .000$ ; <sup>e</sup>  $F(9,109)=2.604$ ,  $p < .01$ ; <sup>f</sup>  $F(9,122)=3.119$ ,  $p < .01$ .

Figure 1. Regional area attitude on Local identification by Vested interest condition

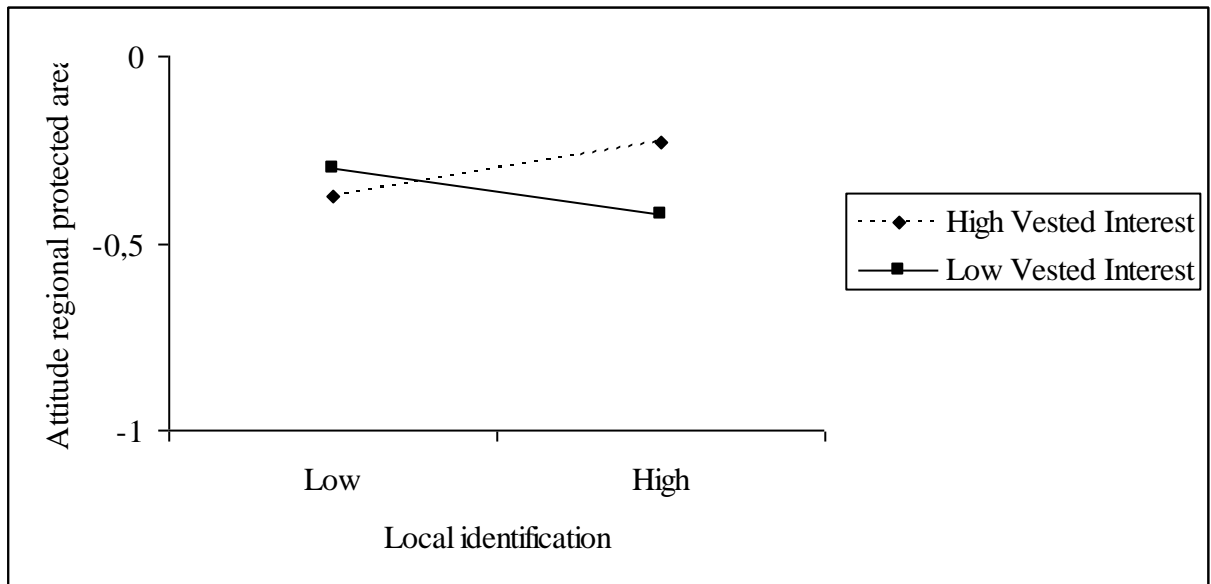


Figure 2. Support for Conservation practices on Regional area attitude by Vested interest

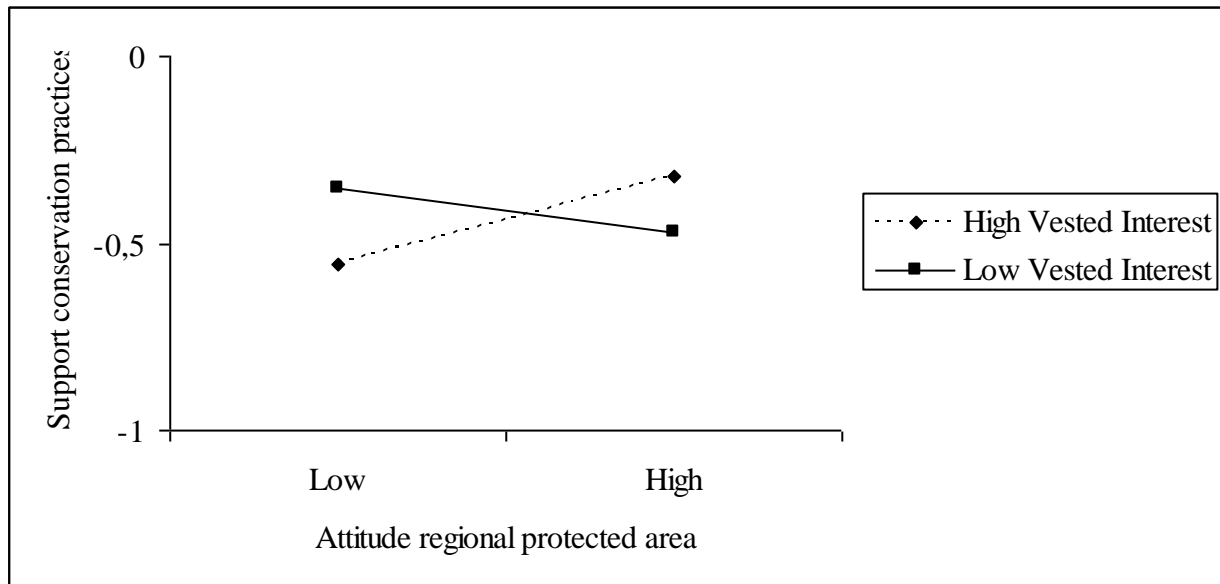
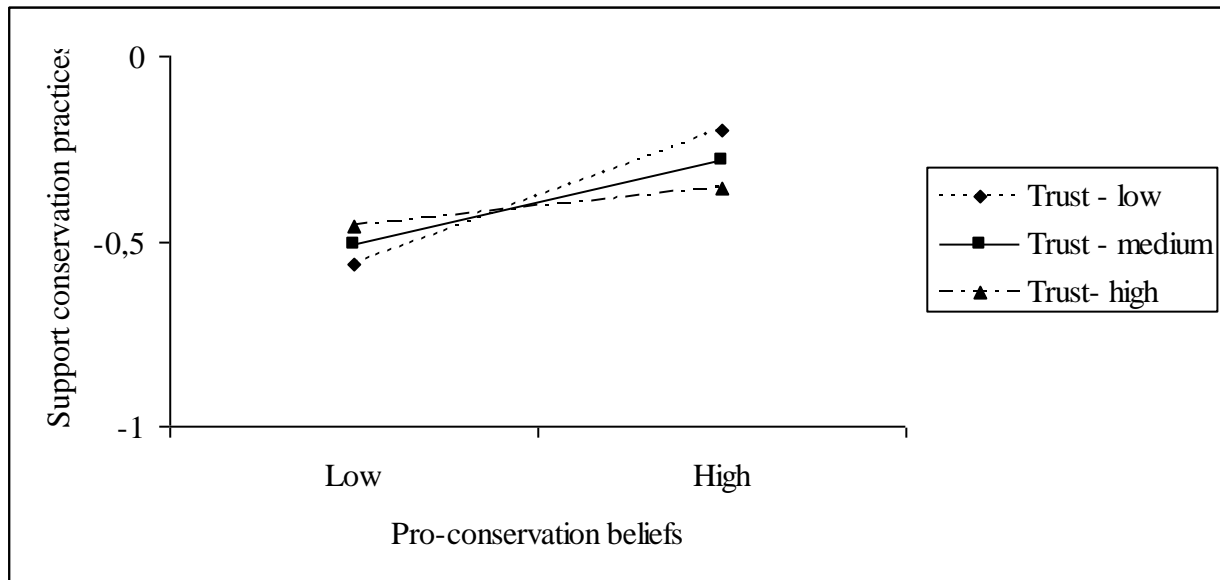


Figure 3. Support for Conservation practices on Positive beliefs by Institutional trust



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<sup>1</sup> This is consonant with the demographic composition of the counties included in the sample (INE, 2004): 60% of the population over 15 years is female. Also, 8 to 15% of the residencies are one-person households and about 70% of these are occupied by a woman living alone.

<sup>2</sup> These are again quite representative of the official figures for the counties under study, where 46 to 57% of the resident population over 19 years is at least 50 years old (INE, 2004). Education levels range from 61 to 65% with complete primary schooling, from 11 to 17% with 6<sup>th</sup> grade, from 11 to 13% with 9<sup>th</sup> grade, from 10 to 20% with secondary school, and from 5 to 10% with a university degree (INE, 2004).

<sup>3</sup> According to national definitions (INE, 2004) urban areas consist of counties with a population density superior to 100 inhabitants/km<sup>2</sup> or with a resident population superior to 2000 inhabitants.

<sup>4</sup> These items were originally used to measure attitudes towards natural parks (Bonaiuto et al., 2002, p.639). In the present paper, we departed from a definition of attitude as an “evaluation ... along a dimension of favour or disfavour” (Ajzen & Fishbein, 2000, p.3) and therefore formulated evaluative questions to measure attitudes in the present study. Instead, the items used by Carrus and colleagues (2005) were considered beliefs because they convey positions about the consequences of designating protected areas and are not direct evaluations (see also Armitage, 2003).

<sup>5</sup> The same items were used to assess regional identity but this variable was not used in subsequent analysis since the Regional identity index ( $r=.81$ ;  $M=4.65$ ;  $SD=.68$ ) presented low variability.

<sup>6</sup> Percentages aggregate answers in the points 4 and 5 of the scale.

<sup>7</sup> Neither sex nor previous knowledge about the regional protected area are significantly related to the remaining variables. Age is related to Residence time ( $r=.690$ ,  $p<.01$ ) and Education level ( $r=-.626$ ,  $p<.01$ ). Residence time and Education level are also correlated ( $r=-.554$ ,  $p<.01$ ). In predominantly rural areas, residents are older ( $r=.200$ ,  $p<.05$ ), they have been living for a longer period in the counties ( $r=.203$ ,  $p<.05$ ) and have lower education levels ( $r=-.356$ ,  $p<.01$ ).

<sup>8</sup> The findings also reveal that agreeing with the pro-conservation beliefs about protected areas increases the support for regional protected areas by incrementing the general agreement with protected areas ( $\text{Adj.}R^2=.21$ ;  $R^2\text{Change}=.13$ ;  $F(2,152)=20.698$ ,  $p<.000$ ). Mediation analyses show that the significant effect of Pro-conservation beliefs became non-significant when Global attitudes were included in the regression, indicating full mediation (Sobel test  $z=3.72$ ,  $p<.000$ ).