The Economics of Warm Glow: A Note on Consumer's Behavior and Public Policy Implications

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Summary

The paper focuses on the ongoing debate on non-market valuation, including the valuation of environmental goods, about the opportunity to use contingent valuation for policy guidance. Contingent valuation critics argue that reported willingness to pay answers do not reflect real economic preferences and, for this reason, should not be used in cost-benefit analysis. This paper focuses on warm glow, which is defined as the feeling of moral satisfaction generated by contributing. The purpose of this paper is twofold. First, it sheds light on the individual warm glow motivational profile, exploring the empirical relationship between individual's socio-economic characteristics and warm glow. Second, it discusses some implications of the presence of warm glow for public policy.

Keywords: Economic value; contingent valuation; willingness to pay; latent factor; consumer motivations; ego driven warm glow; social oriented warm glow; public policy design.

JEL Classification: D11, D12, Q26

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1. Introduction

The paper focuses on the ongoing debate on non-market valuation, including the valuation environmental goods, about the opportunity to use contingent valuation (CV) studies for policy guidance. Within this debate, CV critics argue that reported willingness to pay (WTP) responses do not reflect real economic preferences and, for this reason, should not be used in cost-benefit analysis (see Diamond 1993 and Milgrom, 1993). This position can be interpreted as a "narrow interpretation" of the concept of consumer preferences.

Many economists disagree with this position. Since Kahneman and Knetsch (1992), the idea that CV respondents express only "narrow economic preferences" in their WTP responses has been questioned. According to these authors, individuals' contributions to the public good are explained by two driving forces. The first is that individuals want the provision of the public good. The second is that contributing per se makes individuals feel good, i.e. the 'purchase of moral satisfaction' or warm glow effect (see Andreoni, 1988; 1989; 1990). More recently, Nunes and Schokkaert (2003) empirically tested, and found support for Andreoni's impure altruism theoretical framework.

This paper starts from this stream of research and adds two original contributions: (1) it sheds light on the individual warm glow motivational profile, exploring the empirical relationship between indivudual's socio-economic characteristics and the indvidual's warm glow latent construct; (2) it discusses some implications of the presence of warm glow motivation for public policy. The latter point is very important because is related to the crucial theme about implementation of CV results. We discuss possible answers to several questions: When a typical warm glow profile is identified, and once we have disentangled the warm glow valuation component from the reported WTP responses, what valuation results should be used in cost-benefit exercises? The reported WTP values? Or alternatively, the dry WTP results, which are corrected for warm glow? Or, in a broader context, how should a policy maker behave? Should reported WTP values be respected, or not? And what are the respective implications in terms of public policy design? More in general, what is the role of ethics in environmental economics and valuation? The discussion of these questions will be useful for better understanding and targeting public policy interventions.

The remainder of the paper is organized as follows: section 2 presents an overview on Andreoni's theoretical model on impure altruism. Section 3 reports the methodology that underpins the identification of the latent warm glow motivation. Section 4 reports the empirical results and section 5 contains a discussion regarding the assessment of the profile of the warm glower. Discussion about public policy implications, when considering warm glowers in the provision of the public good is provided in section 6. Section 7 concludes.

2. Theoretical framework: Andreoni's impure altruism model

Andreoni (1989; 1990) developed a general model of private donations to provide public goods that includes impure altruistic considerations derived from giving. This model assumes that individuals contribute to the provision of a specific public good for two reasons: first, because they simply want more of it; second, because they derive some private benefits from giving to the good. The latter reason signals the presence of impure altruistic considerations and it is often interpreted in terms of warm glow or satisfaction derived from the act of giving *per se*. In this perspective, the contribution to the good enters an individual's utility function twice: once as a private good and once as a public good.

In this section, we present an overview of Andreoni's model to provide a theoretical framework for our work. Following Andreoni, individuals may have different preference mappings with respect to private provision of public goods and therefore a number of utility functions can be derived to take account of possible different underlying preferences. Suppose that U_i is the utility function of individual i $(i = 1,...,n)$; x_i is the private goods consumption of individual i, G is the level of provision of (services from) the public good and g_i is the individual's donation to the provision of the public good. The sum of the individual donations equals the total supply of the public good:

$$(1) \qquad G = \sum_{i=1}^{n} g_i$$

From these assumptions, we can distinguish three different types of utility functions, corresponding to three different possible underlying preferences and related psychological profiles:

(2) $U_i = U_i (x_i, G)$

(3) $U_i = U_i (x_i, g_i)$

(4) $U_i = U_i (x_i, G, g_i)$

Equation (2) describes the utility function of a pure altruistic individual, where there are no warm glow benefits from contributing to the public good *G*. For such individual, the private donation g_i only enters the utility function as part of the level of public benefits *G*. Equation (3) describes the utility function of a pure egoistic individual, where private warm glow benefits are the only benefits received by the individual *i*. Such individual does not consider the total level of public good *G*, but only his personal contribution (and benefit) for the provision of *G*. Finally, equation (4) describes the utility function of an impure altruistic individual, where both the level of *G* and the amount of g_i become explicit arguments in individual *i*' s utility function. This latter welfare transmission mechanism can be described and explained in terms of different elements such social pressure, feelings of sympathy and moral satisfaction, or the simply the desire for a warm glow. The present paper focuses on this impure altruistic model formulation. The purpose of our research is twofold. First, we aim at "looking into warm glow", in order to identify the elements affecting such psychological attitude towards private contributing for a public good. Second, we want to get some empirical information about the profile of people having a utility function as described by Equation (4).

3. Identifying the warm glow contributor profile

In this section we provide an explanatory analysis of the individual warm glow motivational profile. In order to do so, we regress warm glow motivation against a series of variables containing information about the respondents' characteristics. In formal terms we propose to estimate the following equation,

(5) $$\hat{f}_{wg,\,i} = a_0 + \sum_k a_k x_{ki} + u_{wg,\,i} \text{ for all } i\text{-respondents}$$

where $\hat{\mathbf{f}}_{wg}$ is the vector with all the individual observations for the level of warm glow motivation, $\mathbf{x}_k$ is a vector with the observations of all individuals for the socio-economic characteristic k, $u_{wg,\,i}$ is a vector with disturbance terms and a's are coefficients to be estimated.

Two steps, however, are preliminary to perform such econometric estimation exercise. Warm glow is not an observable variable and must be "built" in a two-step operational procedure: First, elicit reported WTP responses from the CV study[1], and distinguish the main components of respondent's willingness-to-pay. In particular, respondents' willingness-to pay for the Alentejo Natural Park mainly depends on the possibility to see the wilderness area protected from any human exploitation, the opportunity to exercise recreational activities, and warm glow[2], i.e.,

(6) $$WTP = WTP\, f\,(WA, RA, WG)$$

The second step refers to identify and disentangle warm glow from the *WTP* regression line. In this case, the task is obtaining quantitative data regarding individual warm glow motivation, which give information with respect to the individual preferences related to the psychological motivation of warm glow. Therefore we make the use of a motivational scale that relates respondent's answers to the different attitudinal items, as described in the survey instrument, to an underlying latent motivational structure[3]. In practical terms, individual's motivational factor scores are computed on the basis of his answers using a five point semantic differential scale "I completely agree ", "I agree", "Sometimes I agree, sometimes I disagree", "I disagree" and "I completely disagree"

[1] In the study, reported WTP values are obtained from a nationwide CV to assess the economic value of protecting Alentejo Natural Park from tourism development (see Nunes 2002a). In short, the Alentejo Natural Park, and its environmental benefits, were described in terms of the Wilderness Area (WA) and the Recreational Area (RA). The first refers to the geographical area of Park that is allocated to the protection of the local wildlife diversity. Wilderness Area is not open to visitors. The Recreational Area is open to visitors who can enjoy a set of recreational activities in a natural environment.

[2] For a detailed description of the operationalization of step 1, see Nunes and Schokkaert (2003).

upon a set of different attitudinal items (see appendix for a full description items). From a formal point of view, equation (7) describes the fundamental regression of the econometric latent model,

$$\mathbf{av} = \Lambda\mathbf{f} + \Xi \tag{7}$$

where **av** captures the matrix giving the answers of the sample respondents on the attitudinal items as presented in the instrument survey; **f** captures the matrix of factor scores giving the position of the sample respondents on the three retained motivations; Λ captures the matrix of factor loadings showing the correlations between the answers on the 26 items and the respondents' factor scores and Ξ captures the matrix of the residual terms. Since **f** is not observed, we must estimate them as functions of the observed *av*'s. The most popular approach to estimating the factors is based on regression. Taking into account the computed factor loadings for warm glow and the respondent's answers to the attitudinal questions, we can estimate warm glow motivation scores using a least squares technique,

$$\hat{\mathbf{f}} = \left(\hat{\Lambda}^{*'}\hat{\Lambda}^{*}\right)^{-1}\hat{\Lambda}^{*'}\mathbf{av} \tag{8}$$

where $\hat{\Lambda}^{*}=\hat{\Lambda}\mathbf{T}$ (**T** is orthogonal) and $\hat{\Lambda}$ is the matrix of factor loadings showing the correlations between the answers on the attitudinal questions and the position of the respondents on the warm glow motivation (see Table 1).

4. Estimation results

Individual respondent's variables are derived from the surveys and refer to (1) personal features, (2) recreational-consumption characteristics, (3) ideological profile, (4) charitable behavior, (5) material wealth indicators, and (6) sociological profile.[4] Table 2

[3] For a detailed description of the operationalization of step 2, see Nunes (2002b)

[4] The respondents were asked to provide information about (1) gender, age, marital status; (2) whether they practice surfing, biking, trekking, and camping activities; (3) their political orientation, religious direction,

reports the estimation results. First, we can observe that this model estimation only a small part of the variance of the realized warm glow motivation factor can be explained by these characteristics - the respective R^2 is less 20 percent. From an impure altruistic literature perspective, such a low R^2 is good news. Such an apparent paradoxical result indicates that this motivational factor score, when contrasted to the individual socio-economic characteristics, contain additional empirical information for the characterization of the individual consumer profile. In contrast, a high R^2 would say that most of the individual characteristics influence the individual motivation factor, thus indicating the individual motivation factor *per se* would convey redundant information.

In other words, warm glow factor scores are meant to reflect psychological dispositions, containing additional information that is not fully captured by other socio-economic characteristics as well as indicators. On the other hand, from a strict econometric perspective such a low R^2 signals a weak empirical. For these reasons, we interpret the estimation results carefully as resulting from the first attempt to explore the empirical analysis of the individual warm glow profile and its steering components.

Second, and perhaps unsurprisingly, estimated coefficients of material wealth indicator variables (income level, living in a luxurious apartment etc.) are not to be statistically significant. We might interpret this set of results with the idea that actual contributory/financial capability does not represent the driving force affecting contribution will and warm glow feelings. Other personal features reveal, however, to have a robust econometric role in explaining the individual warm glow profile.

In particular: (a) Personal features variables – being a male has a negative impact on the warm glow motivation. In other words, the feeling of satisfaction provided by the act of giving reveals itself to be stronger among women. In particular, this effect is stronger among young women, given that age has an effect on warm glow too; (b) Recreational-consumption features variables – higher warm glow factor scores occur among the respondents, who present a stronger propensity for recreation, in general, and undertake recreational activities in the Alentejo Natural Park, such as surfers, bikers, and trekkers,

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and their political position regarding different public policy issues; (4) whether they practice donation activities, give blood or are committed in other charitable activities; (5) income level and housing conditions; and (6) education level, job type, and location of their dwelling.

in particular; (c) Ideological variables – this set of variables provides for interesting results. Respondents caring for the implementation of 'Medical Assistance-Social Security' present a stronger warm glow profile. On the contrary, individuals who state a high concern regarding the 'Quality of the public education system' reveal weaker warm glow effect. Both results are statistically significant. Catholics (mainly located in the North area of Portugal) have negative warm glow. Finally, left wing taxpayers, mainly including voters of the Portuguese Communist Party, are associated to lower warm glow profile; (d) Charitable behavior variables – Respondents who report having participated in donation and charity schemes are more likely to have higher warm glow factor scores; (e) Sociological variables – The inhabitants of rural areas present stronger warm glow motivation. This means that the satisfactory feeling derived by the act of contributing to the provision of an environmental good is stronger among those populations leaving in Portugal rural areas. Alentejo local inhabitants present a positive warm glow motivational profile. The nature of the job, held by the respondent, also affects warm glow motivational profile: the feeling of satisfaction provided by the act of giving is weaker among professionals, including lawyers, architects and other liberal professions. Finally, the education level has a negative impact on "warm glow": individuals holding graduat degrees derive less satisfaction from the act itself of contribution for the public good.

Warm glow is a feeling; it has a strong psychological dimension. This characteristic is captured by our estimation results: among all considered variables, mainly psychological and ideological variables matter in the regression line (they are statistically significant), when determining warm glow. The warm glow profile that emerges from the analysis of Table 2 is rather blurred and difficult to bring back to a unified figure. Hence, some "scientific warnings" are due. We analyze data and results that are derived from a study conducted in Portugal, with Portuguese taxpayers. The public good at issue is a national park; the payment scheme is a voluntary contribution. It is important to put forward all these factors since we are aware the institutional setting plays an important role as platform that that underpins the current valuation exercise. Therefore, caution is needed in the interpretation since one could expect that valuation might occur if we had in consideration another range of sociological characteristics, juridical frameworks, and

social norms. Furthermore, the nature of the public good itself (whether a hospital or a bridge or a public park), moreover, might generate different reactions in the respondents, depending on the (personal or social) importance they attribute to the good at issue. Having said this, we now proceed with the identification and analysis of possible types of warm-glow.

5. Interpretation of the estimation results: analysis of the warm glow profile

In this particular setting, and according to our empirical estimates, we can sketch two different types of warm-glow. This distinction comes from an economic interpretation of the empirical results and both classes might overlap. The feeling of satisfaction provided by the act of contributing for a public good is more evident in those respondents who: (1) derive moral satisfaction because they want to obtain a personal advantage or a personal sense of pride from their contribution. We call this category as '*ego driven*' warm-glow; and/or (2) derive moral satisfaction because contributing for the provision of the public good makes them experience a tighter sense or sentiment of social-cohesion. We call this category of '*social-oriented*' warm-glow.

'*Ego driven*' *warm-glow*

In the first situation, the warm glow profile is mainly sketched by looking at the estimation results related to individual ideological variables. Respondents who express strong care for social programs related to medical assistance and social security evidence a personal interest and personal advantage in contributing for the public good and have, therefore, positive warm glow factor scores. This result might be explained by the fact that the social programs under consideration have direct impacts in the personal sphere of the respondents. The efficient working of the medical system, for instance, is a fact that affects society in general and the respondent in particular. When stating he cares for the promotion of such a social program, the respondent is caring and protecting his own interest as a user of the public medical assistance scheme. This is the essence of impure altruism *à la* Andreoni.

If we extend this reasoning to the provision of the public good under consideration, we can infer that the '*ego driven'* warm glow drives the individual to contribute for the protection of the Natural Park in order to satisfy a personal his own interest from the act of giving. In the same direction, they care for social program because they want to derive a personal advantage from the effective working of those policies. The sense of satisfaction derived by the act of giving is, in this case, animated by the desire to get advantages from the good itself. In short, if the public medical assistance system works, it will also work for the '*ego driven*' warm glower; if the public good is provided, it will also be provided for the '*ego driven*' warm glower. Therefore, he is willing to pay for it.

Finally, individuals committed to charitable operations also present an '*ego driven*' type of warm glow. In this case, the satisfaction provided by the act of giving is inspired by the sense of pride, borne by feeling useful to society. Furthermore, respondents who are committed to donation and charity activities might be driven by the desire to feel 'good' towards others, including people in need. This feeling of "personal goodness" can be extended to the case at issue, in order to interpret the econometric results and define the warm glower profile. We might recognise a different source of warm glow: respondents are willing to pay for the public good, simply because the provision makes them feel "good", like when acting in charitable activities.

'Social-oriented' warm-glow

In the second case, warm glow features are, somehow, related to social exclusion elements. In particular, the warm glower belongs to more marginalized categories (caveat: in the Portuguese society as a reflection of a standard Western capitalist democracy). Residents of rural areas, unskilled workers, people holding a low level of education. The feeling of satisfaction generated by the act of contributing for a public good makes is strongly present in such categories. We might explain this as an attempt to feel more active in social activities and in the society as a whole. If we consider high profile jobs or high level of education, for instance, we notice that the warm glow effect has a negative impact on the respondent choice whether to contribute for the public good. These results are statistically significant and can strengthen our thesis that socially

marginalized respondents desire to feel a sense of satisfaction from the contribution, because this might spur them to feel better integrated in the community. Table 3 summarizes our analysis.

According to us, the overlapping effect is strong when considering Alentejo local inhabitants. Respondents, leaving in the Alentejo region (locals) are both *'social oriented'* and '*ego driven*' warm glowers. Local inhabitants, in fact, might derive moral satisfaction because they will feel directly related and responsible for the provision of the public good and, in this way, experience a tighter sense or sentiment of social-cohesion together. At the same time, the feeling of satisfaction derived from the act of giving, can be inspired (and explained) by the fact that the act of contributing for the public good might have a positive impact on the local reputation of the respondent, in terms of personal prestige. This empirical result is well founded and explained by the theoretical literature in signalling (see Laffont and Tirole, 1993). According to such literature, the stated WTP answers for a public good can signal different classes and typologies of contributors. In our, survey, however, we did not specify that, if the respondents were willing to pay for the public good, their name would have been published or made public. In our opinion, such choice renders the result even stronger, when interpreting "local" warm glowers. The personal feeling of satisfaction derived by the act of paying for the public good can be interpreted as driven by the desire to increase the respondent personal prestige in the local community. Even if their name is not rendered public, respondents can communicate their participation in the provision in the local environment in other ways, or feel that the local community acknowledges their contribution.

6. Policy Implications

Our exercise, aiming at the identification of a "warm glower", does not want to be a kind of technical "*art pour l'art*" operation. On the contrary, it offers us the ground for a discussing a very practical implementation problem. In fact, once the warm glow effect is targeted and the warm-glower is identified, what should a policy maker do? In our opinion, such analysis might be useful for critically tackling CV results in a public policy and implementation perspective. By comparing reported WTP estimates and WTP estimates corrected for warm glow effect, i.e. dry WTP, two scenarios are open: (a) the

reported WTP and the dry WTP are larger than the costs of its provision. The CV answers reflect real economic preferences and should, therefore, be used in cost-benefit analysis. In this case, cost-benefit analysis suggests providing the good; (b) the reported WTP is larger than costs. Once corrected for "warm-glow", however, the dry WTP is smaller than costs of the provision. Therefore, providing the public good creates a situation where costs are higher than benefits.

How should a policy-maker behave in the latter situation? Should she provide the public good because most of respondents derive a sense of satisfaction in contributing for it and are, maybe, not interested in having the good itself? This is a rather complicated public policy question, whose answer is related to a better understanding of the black box of preferences and to the nature of the policy maker. In order to discuss the answer to these questions, we propose to reason along the following guidelines: (1) the policy maker does not take into account the warm glow effect and does not provide the public good; and, (2) the policy maker takes into account the "warm glow" effect and provides the public good.

In the first case, a policy maker that is inspired by efficiency principles, which will not pay for the public good, since the public benefits do not cover the public costs of the provision. If costs effectiveness principles inspire the decision maker policy, the "warm glow" effect, will have a final, preponderant weight on the decision whether providing the public good. In particular, such motivational factor, when disentangled from the dry WTP, will have a negative impact on the provision of the public good. In this situation, one might infer that the decision-maker does not respect consumer's preferences (who have expressed a positive willingness to pay for the contribution of a public good). However, the "warm glow" motivational element can be interpreted by an efficiency-oriented decision-maker as an irrelevant valuation effect, not directing expressing the real WTP (only dry WTP matters). If reported WTP consists of two different components: one relating to the value attributed by the respondent to the public good (and to the strict economic preference), the second relating to the psychological feeling of "warm glow", a decision-maker oriented by efficiency criteria, will strictly focus on the stated economic preference and never let the costs of the provision overcome the benefits.

Suppose now that the policy-maker decides to take into account the "warm-glow" valuation mechanism and provides the good. In this case, the identification of the "warm-glower" might create a support in pursuing and targeting public policies, in addition to the provision itself of the public good. By considering the individual consumer's well being related to the individual personal participation in the provision of the public good, the decision-maker can (voluntary or unvoluntary) increase the overall welfare. The decision-maker, for instance, might be willing to provide the public good because, by taking into account "warm-glower of the social oriented type", she can promote social cohesion, support minorities or integration of more emarginated social groups of population. In the study at issue, for instance, the feeling of satisfaction provided by the act of giving is stronger among low educational categories. By contributing to the public good, the warm glowers might feel more socially integrated. Alternatively, in the scenario where the "warm glow" valuation mechanism is mainly due to "ego-driven" profiles, we can interpret the decision about public good provision as signalling the presence and respect of an "invisible hand". Every "warm glowers", by pursuing his/her own personal interest can contribute to achieving Pareto optimal outcomes. Suppose, for instance, that people engaged in charitable activities are mostly driven by the desire to fulfil their own (impurely altruistic) desire to feel good, when helping needy categories of people. By pursuing an egoistic interest, these people, somehow, improve society. If we reason in Pareto principle terms, we might say that the needy person is better off after being helped (for instance because she receives food or clothes that could not afford) and the donor or charity giver is better off because she feels a good person. Let us extend this reasoning to '*ego driven*' warm glowers. Suppose that the respondents are willing to pay for the public good because this strengthens their social reputation. Once again, society might be better off with the provided public good and the '*ego driven*' warm glowers are better off because they fulfil their personal goal.

7. Concluding remarks

We would like to conclude our study, by focusing on some final remarks. First, we are aware that our exercise is, somehow, limited and cannot assume a certain "universal truth" dignity. The survey was implemented in Portugal and was designed for Portuguese

citizens. As already remarked, every national reality differs for socio-economic, institutional, cultural, juridical setting. At the same time, other elements, like the nature and type of the public good to be provided, the payment scheme (voluntary contribution or compulsory tax), the signaling incentives defined in the survey, all matter in influencing the CV respondents. Surely, if the same exercise were performed in Holland or in the United States, we may expect different results, and maybe, a different warm glower profile. Nevertheless, our study wants to represent a starting point for further CV exercises and for the definition and targeting of public policies. We want to stimulate a debate about the understanding of the "black box of preferences". Our study stresses that psychological motivation, driven by impure altruistic forces, finds room in the utility function definition and is strictly related to particular socio-economic profiles (the warm glower). Moreover, the identification of the proper public policy represents another important issue: if the estimated demand function for the public good disregards one of the underlying driving forces – such as the warmglow valuation component – the demand function is misspecified, and the respective value predictions not correct. Moreover, we highlighted how the identification of a warm glower and its consideration when designing a public policy, might be useful in pursuing public objectives, others than the simple provision of the public good.

In addition, nonetheless the above scientific "warnings", in our opinion, when discussing whether to use (or not) reported WTP estimates in policy making and cost–benefit exercises, the survey responses do reflect true WTP responses – the empirical results confirm the validity of the proposed impure public good model formulation – and, in this way, the original WTP responses constituted correct information to be used in the estimation of the demand for the public good. Therefore, warm glow is a legitimate valuation component and the original WTP estimates can (and should) be used in cost-benefit analysis. In our opinion, there are several reasons to believe that the use of the *dry* WTP, i.e. correcting WTP estimates from warm glow, in cost–benefit analysis does not constitute a compelling argument.

First, the statement that (impure) altruism motives are incompatible with economic theory is hardly consistent with the notion of consumer sovereignty, a cornerstone in modern theory of social choice. It violates a long-standing tradition that one takes

people's preferences as one finds them. Modern theory of social choice has always emphasized that it was immaterial whether individual's preferences reflected selfish interest or moral judgement. According to Arrow 'the individual may order all social states by whatever standards he deems relevant'. In a similar vein, we can find the work of Becker, who always defended the premise that 'individuals maximize welfare as they conceive it, whether they be selfish, altruistic, loyal, spiteful, or masochistic'.

Second, since the empirical evidence confirmed Andreoni's impure altruism model formulation, then we could interpret the demand for the public good as characterized by two driving forces; (a) the individual consumer's well-being derived from the provision of the public good; and (b) the individual consumer's well-being related to the individual personal participation in the provision of the public good. Therefore, the correction WTP estimates from warm glow would be associated with a valuation bias when assessing the demand for the public good and thus the use of such a WTP measure in policy decisions or cost–benefit analysis would be associated with a misleading allocation of resources.

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Appendix: The complete list of attitudinal items as stated in the original CV survey

1. *My family and I would have great pleasure in knowing that the SIC, RTP and TVI together have agreed in introducing in their TV schedule more documentary films about wildlife and its natural habitats.* ('use')
2. *My family and I think that the preservation of the Alentejo coast line is important because this is a place which all of us can visit and where we can see very beautiful natural landscapes.* ('use')
3. *My family and I like to see the Portuguese government giving more support to the national organizations that are promoting work in the field of environment conservation.* ('warmglow')
4. *My family and I think that the preservation of the Parks is important because these are privileged places where everybody may enjoy a walk or a picnic in a relaxed environment.* ('use')
5. *My family and I take great satisfaction in knowing that it is today guaranteed that our children, and future generations, will continue to have the possibility of observing wildlife in its natural habitat.* ('use')
6. *Despite the fact that my family and I may never see an otter in its natural habitat, we would be very worried if the total population of otters in Portugal became extinct.* ('existence')
7. *My family and I like to spend the weekends at home or going to the movies rather than going out for a walk in the countryside or by the beach.* ('use')
8. *Our family admires the individuals who, on voluntary basis, participate in collecting donations for national programs for social aid and solidarity.* ('warmglow')
9. *My family and I take great pleasure in knowing that we are still able to visit villages in Alentejo which keep their true identity and their typical houses, facades and streets.* ('use')
10. *Despite the fact that my family and I may never see an Iberian lynx in its natural habitat, we are very happy to know that we have the guarantee that the lynx is kept safe from extinction in Portugal.* ('existence')
11. *My family and I think that the preservation of the natural areas is important since they are privileged sites for recreational activities like sightseeing or biking in a natural environment.* ('use')
12. *There are some funding campaigns to which my family and I feel very close and therefore we do not hesitate to contribute a donation.* ('warmglow')
13. *Despite the fact that my family and I may never visit a Natural Park, we are very happy to see these natural areas protected so that other Portuguese citizens may also have the possibility to observe wildlife in its natural habitat.*('use')
14. *My family and I think that the preservation of the Alentejo coast line is important because this is a privileged place where all of us may enjoy going to the beach in a relaxed environment and being in contact with nature.* ('use')
15. *It is difficult for me to decline my help to other individuals who, either in the streets or at my door, beg for charity.* ('warmglow')
16. *Whenever I am approached by identified personnel, it is not difficult for me to refuse to make a financial contribution to a national fund raising campaign.* ('warmglow')
17. *The protection of the forests is very important because for Portugal they are a very important source of wealth.* ('use')
18. *With the increasing use of the media in our elementary schools as well as an increasing number of school visits to the Zoo, it will no longer be important to take the children on educational trips to the Natural Areas.* ('use')
19. *Sometimes our help in national fund raising campaigns is explained because we come under observation and feel "socially-pressed" to contribute, and therefore we do not decline to make a contribution.* ('warmglow')
20. *I am happy with myself whenever I give a financial contribution to national fund raising campaigns.* ('warmglow')
21. *With the Portuguese participation in the EU, the preservation of our national diversity is no longer so important since we are constructing a common and shared European culture.*('existence')
22. *Despite the fact that my family and I may never observe an eagle in nature, we take great pleasure in knowing that the eagles are kept safe from extinction.* ('existence')
23. *My family and I like to contribute to good causes such as the protection of the environment, and whenever we can afford it, we do not decline our help to such fund raising campaigns. (warmglow)*
24. *Giving blood is giving life.* ('warmglow')
25. *During the holidays, my family and I prefer to stay home or to go to the beach rather than travelling around Portugal visiting our traditional villages.* ('use')
26. *My family and I think that the preservation of the Alentejo coast line is important because in this way we are protecting a typical lifestyle of the local inhabitants, which belongs to our national identity.* ('use')

Source: Nunes and Schokkaert (2003)

Table 1: Warm glow factor loadings after varimax rotation

Estimate	Survey motivational question
0.56	Our family admires the individuals who, on voluntary basis, participate in collecting donations for national programs for social aid and solidarity.
0.60	There are some funding campaigns to which my family and I feel very close and therefore we do not hesitate to contribute with a donation.
0.47	It is difficult for me to decline my help to other individuals who, either in the streets or at my door, beg for charity.
0.57	I am happy with myself whenever I give a financial contribution to national fund raising campaigns.
0.58	My family and I like to contribute to good causes such as the protection of the environment, and whenever we can afford it, we do not decline our help to such fund raising campaigns.

Source: Nunes (2002b)

Table 2: Warm glow estimation results

Variables	Parameter estimate	Standard error	*p* value
Intercept	– 0.2746	0.142	0.054**
Personal features			
Gender = male	– 0.2114	0.050	0.001*
Age	– 0.1244	0.066	0.059**
Recreational consumption features			
Recreationists	0.1317	0.030	0.001*
Ideological features			
Catholics	– 0.0646	0.023	0.005*
Medical assistance and social security	0.0669	0.038	0.084**
Taxpayers with a left wing orientation	– 0.0714	0.053	0.043*
Quality of public education system	– 0.0385	0.023	0.013*
Charitable behavior			
Financial donation (via organizations)	0.3172	0.067	0.001*
Charity (on the streets)	0.5293	0.070	0.001*
Sociological features			
Household dimension	– 0.0233	0.021	0.183
Rural areas	0.1684	0.102	0.101**
Unskilled workers	0.1497	0.140	0.136
Professional workers	– 0.2153	0.096	0.025*
Education level	– 0.5903	0.019	0.002*
Local inhabitants	0.3205	0.101	0.001*
R^2	*0.183*		

Note: The estimated results are computed in SAS®. The model was estimated by the use of the STEPWISE procedure in SAS®. Variables are included in the equation if the probability associated with the F test for the hypothesis that the coefficient of the entered variable is statistically significant at 15%. Other model specifications are available upon request.

*(**) Significant at 5% (10%)

Table 3: The profile of warm glow and respective inspiration factors

***"Ego Driven"* Warm Glow**	***"Socially Oriented"* Warm Glow**
Inspiration factors	Inspiration factors
Derive a personal advantage or satisfy a personal interest. Derive a feeling of usefulness or goodness towards society and himself. Strengthen personal reputation in the local community.	Feel more socially integrated; feel more cohesion with society as a whole, feel less social marginalized.

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