Do the evolution!: Psychosocial impact studies methodology

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The recent worries about the poor quality of the environment due to urban and industrial proliferation, have been in the origins of legislation that gives Environmental Impact Assessment (EIA) an obligation character (see, for an example, the National Environment Policy Act in the 70’s in the USA). Accordingly, Antunes (1990) defines the EIA, as the global process of impact analysis and evaluation: it’s an activity meant to identify and predict the impact of a certain action in the bio-geo-physical environment and in human health and well-being.

Given it’s global character, the EIA is normally based in a team of experts knowledge. The matters of interest are legally presented and it’s positive to notice that the social impact analysis has became part of this list. Unfortunately, in spite of this, in the field, there are many cases where social sciences knowledge is neglected. There is often a “non-social” mentality in a way that some authors think that “...given the methodological difficulties and political susceptibility of the subjects, the inclusion of social, economical, cultural and psychological impacts, might weaken the evaluation of the environmental consequences of the large projects, compromising the main goal of the EIA” (Pinho, p. 239). It’s obvious that given the definition of EIA (that considers the health and well-being impacts in the human being), these kind of positions are extremely naive and with great consequences.

One of the main reasons why social impact assessment (SIA) is underestimated has to do with the belief that it has many methodological problems. According to Vanclay (1999), there is often the belief, between practioners of EIA, that it’s difficult to measure social impacts in a precise way: First, there are worries regarding the large number of variables in consideration and that, because of this, a proper evaluation can’t be possible. Second, there are worries that the abstract nature of many of social concepts are impossible to operationalize adequately. Third, there are worries about the uniqueness of the social impacts in the sense that they vary from individual to individual, making impossible prediction of impacts of a new project in the population. As SIA appear to have these problems, many think that it will never have the accuracy that characterize other components of the EIA. This idea is, in our viewpoint, wrong. Not that it isn’t real in many cases of SIA but because it’s not impossible to create a systematic methodology of social impact evaluation. It’s in this sense that Psychology and in particularly, Environmental Psychology, can have it’s place.

In 1985, Brody spoke about “the new roles for psychologists in EIA”. According to this author, the accident that took place in Three Mile Island showed the world in a definitive way that environmental disasters could cause environmental stress. This had strong repercussions in the way the American government came to consider
psychological aspects in the AIA. More than the traditional socio-economic aspects which were at the time legally taken into account in the EIA, a new role appeared for psychological variables like risk perception or attitudes. Nowadays, this perspective is accepted (although many don’t consider it yet).

There are many strong examples that can be given in defence of the place of Psychology in the EIA. One of them has to do with a very mediatic variable: risk perception. As a matter of fact, many authors have shown that the characterization and evaluation of risks that the experts and the public in general make are very different (Palma-Oliveira, 1996; Palma-Oliveira & Correia dos Santos, 1997; Lima, 1996). Specifically, while the previsions of the experts are based in a simple calculus of the gravity of the situation (e.g. mortality rate) considering the probability of occurrence, the public has other references. In this sense, lay people tend to consider a vaster array of dimensions about risk in a given situation than experts (e.g. the possibility to control it). This general population way of behaving, gives credit to an emphasis on the study of perception. As the way people perceives reality (e.g. with higher risk) has influences in the way people behave (e.g. run away from their home environment) and feel (e.g. anxiety), it’s easy to give credit to psychological interventions in the EIA. Therefore, the emphasis should be given to the way people perceive environmental changes and how this perception translates into psychological impacts (e.g., anxiety). If this perspective it’s not included in the EIA because project managers consider that they don’t have real fundament or that they are too “emotional”, a risk is taken in the sense that it’s probable that the eventual divergences with the population may and will most certainly be increased (ICGPSIA, 1995).

Having all this in consideration, it’s possible to think about the psychological variables that should be taken in consideration. We believe that many critics regarding the great number of variables taken into account in the SIA are, in many cases, correct and that a parsimonious way of looking into reality should be encouraged. In this sense, Environmental Psychology, as it’s defined, can help.

The place of Environmental Psychology…

Born from the ecological crises (among others), it’s clear that Environmental Psychology is adequate to deal with the kind of variables considered in the EIA. These take in consideration, as we’ve seen, the impacts of large constructions projects like roads, incinerators... Those kind of structures that can bring harm into the environment (all of it, including human beings), if impacts are not mitigated. What it’s not at all clear is what should we study in the EIA, from an Environmental Psychology perspective. This matter takes something more in deep consideration that is, in essence, our standpoint in this field. Making this position explicit, we can list the variables of interest, based on a coherent conceptual viewpoint of reference.

To begin with, it’s better to understand what we mean when we speak of Environmental Psychology. We consider it to be the study of the transactions between man and it’s environment (natural or built), trough basic psychological processes (attitudes and perceptions) and behaviour. This definition assumes two distinctive aspects that are related to our position. First, from the kind of variables referred, it’s easy to notice the similarities with Social Psychology. Like in this subject, we assume that in Environmental Psychology, matters the underneath dispositions that guide molar complex behaviour: values and attitudes (see, for example, Gilbert, Fiske & Lindzey (1998) in order to explore the area of Social Psychology). In this perspective, it’s
interesting to study what is stable in the way people construct situations as relevant or not, as a way to establish guides to their behaviour. Besides, also like in Social Psychology we believe that in Environmental Psychology it’s important to seek a level of generalization that it’s between cultural abstractions and individual experiences. The main goal is to discover relationships that are translated in general and fundamental terms (e.g. why do people, in general, do what they do).

The importance of defending this kind of position in the EIA, is that it turns many of the methodological problems referred above invalid. As a matter of fact, to start, the study of variables traditionally studied in Social Psychology (e.g., attitudes), makes possible the use of many of the reliable measure methods developed in this discipline (see, for example, Likert, quoted by Gilbert et al, 1998). For example, if we want to study the way people feel about a new highway built next to their door, we can measure their attitudes, through Likert scales, towards many objects like the project owners, the workers, the stakeholders involved, etc. In turn, we obtain valid and reliable measures that allow impact predictions. Besides this specific methodological gain, by adopting the Social Psychology perspective it’s possible to delimitate some of the variables of interest. In our methodology we consider: attitudes, perceptions and behaviours.

But, what makes, Environmental Psychology unique? It’s applied character, in the form of orientation towards problem resolution, like environmental disasters, for example (Bell et al, 1996). In this discipline, the environment in which the perceiver lives assumes great importance. It’s important to study the way people influence and are influenced by it. This posture as obvious implications towards EIA in the sense that when Psychologists are called to evaluate the impacts of, for example, an ecological disaster like the Three Mile Island, what is wanted is an analysis of the way people react to that particular situation, often with the objective of intervention in this particular case. But, does this mean that all impact evaluations are idiosyncratic and it’s not possible to predict what happens in another situation? Is this critic to SIA, valid, after all? From our social psychological perspective, we assume that it’s not, because we accept that there are stabilities in the way people behave towards it’s environment and that we can study this phenomenon in an objective way. We defend a conceptual external validity in the sense that we share the idea of some authors (e.g. Messick & Brewer, 1983) that the improvement of interventions it’s only possible when it’s based in a solid theory, tested in experimental settings than can be applied to the real world. In this sense, we believe that when certain conditions specified are present, it’s possible to predict, with a certain level of confidence, what will be expected. Note that we consider too many aspects that, although they’ve not been showed in the laboratory, have been replicated many times (using mainly correlational analysis).

Now, is possible to understand our position when we intervene in the SIA process: we believe that theories developed about the way people behave in certain conditions, can serve as simulation models that enable the prediction of existing probable impacts. From this theories, we use those directly related with our social psychological roots (e.g. Olson & Zanna, 1990; Fazio, 1990), and those related with other areas of interest in SIA. These are obviously those that have to be with health and well-being aspects. In this sense, we rely upon many of the theories developed related to stress models in health psychology. These models allows us to predict what kind of damages will be caused by certain situation to the physical and psychological integrity of individuals. We strongly believe these models are excellent ways of integrating all aspects involved in psychological impacts literature. Specifically regarding psychosocial and health and
well-being impact studies, the authors have been using a model that aims to fulfil this objectives, and appears to explain the processes involved in the generation and heightening of this impacts, based on a environmental stress perspective. This model was presented by Mata, Gaspar de Carvalho, Marques, Moreira, Antunes & Palma-Oliveira (in this conference), and is based in an environmental stress model proposed by Palma-Oliveira (1992) and in other general stress models (e.g., Lazarus & Folkman, 1984). This model has been used, for example, to assess impacts associated with road infra-structure development (construction and operation), and allows one to understand the way individuals evaluate a change occurred in their environment, based on their risk assessment and attitude toward the source of this change or a given stimulus (perceived stressor). Also, how can they respond based on this appraisal and the consequences and responses expected to occur, depending on the success of the coping strategies to deal with the perceived situation or stimulus. Furthermore, it permits the distinction between direct (e.g., reduction in perceived control; heightening of perceived risk) and indirect impacts (e.g., increase in anxiety levels; learned powerlessness). Finally, it allows to predict what occurs if the situation maintains (chronic stress) or there are new encounters with stimulus or situations that might elicit stress (for more detail on this description, see Mata et al., this conference). As a result, based on this model, SIA must focus on the minimization and mitigation of the consequences resulting from the stress process, and should be understand as a change management process, involving the affected communities on it (Vanclay, 1999).

The place of Environmental Psychology in EIA…

At this point it’s important to consider that we apply these psychological models following the structure defined in the EIA legislation. We think that it’s important to achieve consistency in the way all subjects study different aspects of the EIA. In this sense, the psychological impacts should be analysed in the frame of reference of the general methodologies used in EIA. Their objective differs in line with the task to perform, and can be divided in: impact identification methods; impact prediction methods; impact evaluation methods (Antunes, 1990). At this moment, it’s important to understand what is involved in these different stages in order to understand how do we act in concrete cases that we have analysed.

As to impact identification methods, the objective is to identify the environmental aspects potentially affected by the proposed action, as well as the relationship with them and the environmental impacts resulting from them. In respect to impact prediction methods, they are the least developed, and are used in order to predict direct (primary) and indirect (secondary) impacts that might result from changes in the identified aspects. Finally, the objective of the impact evaluation methods, is to assess the impacts significance degree, in order to facilitate the decision process, for example, concerning the choice of a project alternative or in the identification of critical zones needing the implementation of impact mitigation measures.

1. Impact identification and impact prediction

How do we propose to do this using our Environmental Psychology knowledge and expertise? Is it possible to adequate our language to our colleges in EIA? We think so. Having in consideration our propensity towards theory application, we think that it’s possible to consider that we follow a methodology based in simulation models. This a concept familiar to “hard” topics presented in all EIA studies, as it is a method traditionally used in impacts analysis relative to aspects like water or air pollution.
dispersion. This methodology is based on the idea that it’s possible to have a “simplified representation of a real and complex system, in which behaviour is conceptually similar to the system behaviour” (Antunes, 1990; pg. 28) and that, based on mathematical and physical simulations, it’s possible to predict what will happen. Having in consideration that these models are created considering the theoretical discoveries of their fields of origin, it’s easy to see why we defend that our methods can be included in this category.

We believe that the theories established in Psychology and Environmental Psychology allow to predict with certain accuracy what impacts to expect and in this sense they act like simulation models similar to those cited above. These, like the ones used by engineers, represent in a simplified way a real and complex system, and allow to identify and predict impacts magnitude. In other words, the purpose of this models is to predict the response of individuals from a given community, to a change that is expected to occur, in the social, built or natural environment (e.g., resulting from an highway construction).

In conclusion, we assume that in order to identify the impacts expected in a certain situation and to predict their magnitude, we should rely on the literature in the area of interest. As we create hypothesis, based this cumulative knowledge of a research area, we consider that is very difficult to criticise these practices as being subjective or not precise.

2. Impact evaluation

In order to evaluate the impacts expected, we use tools often used in Environmental Psychology (with roots on Social Psychology) in particular. Our main focus is, for obvious reasons, the assessment of people affected in the situation under analysis. This assessment must entail a number of techniques and instruments, the most important being the ones that are validated and that their efficacy has been proved. From these, the ones which we use most are the following:

- Surveys- this is the finest technique in the assessment of individuals in the communities affected, because (Marans, 1987): 1) they involve the systematic gathering of information from a population, using standardized instruments; 2) the information gathered is about the population and it’s environment; 3) the information is collected from all individuals in the population or from a sample of this population. Moreover, surveys can be of three types, being used according to the analysis objective and design: Cross-sectional; longitudinal; contrasting sample design. In addition, can be performed based on interviews (structured/semi-structured) or self-administered questionnaires. In SIA we have been using this technique with the main objective to assess perceptions, attitudes and behaviours of individuals in order to analyse their reactions due to the presence of some infrastructure (e.g. roads or incinerators). For example, we believe that we can assess the perceived environmental quality with the following measures: 1) accessibility of the environmental stressors; 2) intensity of the perceived stressors; 3) degree of annoyance associated with the perceived stressors or situation; 4) degree of affectation on the individual resulting from a given stressor or situation.

In our practice, we study mainly a sample of the population (e.g. Psychosocial monitoring of the SECIL factory (to be presented in the next section); Psychosocial monitoring of a solid waste incinerator: ValorSul (Palma- Oliveira, Correia dos Santos, Gaspar de Carvalho, R; Mata, A.; Palma-Oliveira, J.M.; Antunes, D.; Moreira, S. & Marques, S. (2003). Do the evolution!: Psychosocial impact studies methodology. Crossing boundaries- The value of interdisciplinary research. In Tony Craig (Ed.). Aberdeen : The Robert Gordon University.
Lima & Marques, 2002)) and use cross-sectional (e.g., Mata et al, this conference) and longitudinal design (e.g., SECIL). Usually, we use semi-structured interviews.

- **Observation** (participant or non-participant)- this can be used for example to describe in loco the communities behaviour, in respect to the mobility pattern, in order to predict the impacts associated with a change in them. This technique can be performed by means of checklists or other formats of this type of information gathering. We use observation to perform a initial analysis, with the purpose of describing the baseline situation, previous to the development of the project (A2; all of our road studies).

- **Perceptual simulations**- specifically in what concerns the insertion of an infrastructure in the surrounding environment, we can assess the characteristics that the former must have, in order to have a low contrast with the latter. This is of the greatest importance in natural environments, because it has been demonstrated that the negative influence of human elements present in the environment, depends on the perceived degree of their adequacy to the surrounding environment (Parsons, 1991). This assessment uses materials artificially created or manipulated (usually by computer), such as photographs, videos or other instruments. An example of a study using this type of technique carried out by some of the authors, refers to the modernization of the north of Portugal railway structure (SEIA, 1992-1995). Here, were presented photographs where were manipulated the various types of fence along the rail line to be built, and subsequently assessed the nearby residents preferences for them. This permitted to find the type of fence most suited to each zone, because the preferences were not homogeneous.

- **Psychological assessment instruments**- these can include for example Spielberger’s state/trace anxiety index (STAI). This instrument has been important in psychosocial monitoring, in order to determine the anxiety levels resulting from a given infrastructure (e.g., highway), by comparing the state anxiety level (that are part of the individuals personality) with the trace anxiety level (corresponding to the level in the assessment moment). Accordingly, we also use measures of physiological effects (e.g., headaches; insomnia) that individuals perceive to be associated with a certain action.

The techniques and instruments presented, as well as others examples, can be seen in the next table (table 1), grouped in terms of the cited psychological impacts considered.

<table>
<thead>
<tr>
<th><strong>DIMENSIONS</strong></th>
<th><strong>EVALUATION TECHNIQUES AND INSTRUMENTS</strong></th>
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<tbody>
<tr>
<td><strong>Health and well-being</strong></td>
<td>- Psychological assessment instruments (e.g., STAI)</td>
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<td></td>
<td>- Surveys:</td>
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<tr>
<td></td>
<td>1) Comfort scales; quality of life scales</td>
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<td></td>
<td>2) Perceived physiological effects</td>
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<td></td>
<td>3) Others.</td>
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<td>- Performance in cognitive and non-cognitive tasks</td>
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<td>- Clinical interview</td>
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<tr>
<td><strong>Psychological</strong></td>
<td>- Surveys:</td>
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<tr>
<td></td>
<td>1) Attitude scales</td>
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<tr>
<td></td>
<td>2) Perception scales: risk; landscape; environmental</td>
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<tr>
<td><strong>Attitudes</strong></td>
<td>- Surveys:</td>
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</tbody>
</table>

Table 1 - Techniques and instruments for each type of impacts psychological dimension
(adapted from Palma-Oliveira & João, 1999)

<table>
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<tr>
<th>Perceptions</th>
<th>Behaviors</th>
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<tr>
<td>quality; annoyance</td>
<td>- Simulation games</td>
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<tr>
<td>3) Perceived behaviours</td>
<td>- Perceptual simulations</td>
</tr>
<tr>
<td>4) others.</td>
<td>- Cognitive maps</td>
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<tr>
<td>- Simulation games</td>
<td>- Behavior observation and analysis</td>
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The place of Environmental Psychology in the EIA: an example.

To better understand the way how what was previously mentioned comes together in practice, is important to give an example of what we have done. Specifically, we will present what we have done concerning a study of a Portuguese cement factory (SECIL), being an example of this the Social Impact Study (SIS) (Palma-Oliveira, Gaspar de Carvalho, Marques, Mata & Moreira, 2002). Thus, is essential to present the various steps in this kind of studies. But, first, it is important to know something more about the project.

This study was meant to monitorize the activity of this factory – SECIL – in the year of 2003 and compare it with the results obtained in 1998 with a previous study. This factory is located in the city of Setúbal in Portugal and has been one of the candidates to a co-incineration process in 1998, which never occurred due to the struggle of the local (and even national) population against its implementation. Our team was called to assess the population of Setúbal’s image regarding SECIL nowadays. The interest of this company in these kind of studies has to do with an enhanced environmental concern and sensibility. SECIL wants to be well integrated in the surrounding environment; like a real native born in Setúbal, it seeks integration and the support of the population. It’s a new kind of concern that isn’t very common, unfortunately, in Portugal and other countries.

In this study, we began by identifying the target public to be studied, the variables of interest and a way to measure them. As we were interested in the perceptions of all Setúbal inhabitants regarding the factory, we chose to create a representative sample of these and decided that they should respond to a survey, in the form of a questionnaire (n=600). This sample was created considering peoples neighborhoods of origin: seven zones were considered, with representative number of inquiries. This concern regarding the zone variable as to do with findings in the study of 1998, which indicated psychological differences regarding habitants living near or far from the factory (namely, adaptation strategies). As this result replicated the findings reported in the literature of adaptation processes (e.g. Taylor, 1983; Taylor & Brown, 1988) we assumed its importance in the present study.

Various categories of variables were included in the questionnaire. These were chosen according to literature regarding possible impacts associated with proximity to an industry (e.g. Slovic, Fischoff & Lichtenstein, 1982, 1985; Evans & Cohen, 1987) and were similar to those included in the 1998 study. These categories were: attitudes, risk perception, coping strategies, pollutant activities in Setúbal, SECIL activities, social
identity, visibility of the infrastructure and socio-demographic characteristics like age and time of residence. These variables were measured using five point scales (regarding the level of agreement with a specific affirmation). An interesting aspect was introduced, regarding measures of recognise or free-recall of SECIL as the main source of pollution. We aimed to access the level of accessibility of information regarding SECIL in the subject's memory. This was made according to evidences found by different authors (for a review, see Badddeley, 1996) that free-recall is more influenced by information accessibility in memory than recognise. These measures were included because we expected that, due to the media divulgation involving the name of SECIL regarding the co-incineration process in 1998, SECIL would be accessible in the memory of subjects and hence be referred mainly in the free-recall measures.

Having the theoretic aspects in consideration it was possible to create a conceptual framework of impacts expected and it’s predicted results: for example, it was expected more negative attitudes from those with low social identity compared to those with high social identity. In the longitudinal comparison, it was expected that nowadays, comparatively with 1998, as SECIL was more exposed in media as a risky infrastructure and so more influenced by the social amplification of risk effect (Lima, 1996), the perceived risk would be higher. These are some examples of the predicted impacts. However, it’s a good example how the process of impact identification and prediction can be made in a structured and confident way.

The answers given by the inquiries allowed impact evaluation. In this instance, some of the predictions turned out to be correct (e.g., namely that SECIL was least recognised as the main source of pollution then it was free recalled) and some not (e.g. there were no differences regarding the zone where the inquired individuals lived). The results that were not in accord with our predictions were explained with an alternative frame of reference, naturally, found in the Environmental Psychology literature.

We should not be discouraged by this situation, nor should it be a motive to criticize about the methodology’s subjectivity. As a matter of fact, the process followed was, as we’ve been describing, very systematic and fundamented so that the results obtained, similar or not to those predicted, are extremely valid. Besides, in the end, what matters is that the main impacts were evaluated and that it was possible to present them in a explicit way to our client, along with proposed mitigation measures. It was positive to notice the serious way by which this SIA was analysed and the interest showed by the SECIL administrator’s to elaborate more in the way communication of the results could be made to the population.

Besides all this practical aspects, it’s still relevant to say that each unexpected results that are, in general, found in the field, give hints about new ways of looking into reality and are taken into account, as long as they are found in a consistent manner, to the model that is used to impact identification and prediction in the future.

Conclusions

The aim of this paper was to present a conceptual approach to SIA and a set of methodologies that can be used in it. It needs to be said that we could have discussed a greater number of techniques and instruments. However, our objective was to present an example of what our team does, and not all possible and existent techniques. We hope the type of work we and hopefully others are developing, allows an evolution in SIA, in order to reconceptualize it and include a growing number of scientific techniques and methodology that resist the accusations of a nonexistent subjectivity!
Finally, it’s important to notice that our favouritism towards theories that are
generalizable, is shared by many of the Environmental Psychologists who try to
understand in a valid way how people behave in certain conditions. In this sense, we
have the opportunity to rely in these findings and use them to predict psychological
impacts in SIA. We believe that this has advantages to all sides: turns the SIA more
theoretic, more valid and precise and turns the studies of environmental psychologists
useful in solving problematic real life situations.

References
apresentada para obtenção do Grau de Doutor pela Universidade Nova de Lisboa,
Faculdade de Ciências e Tecnologia. Lisboa, Portugal: FCT-UNL.
Antunes, D., Marques, S., Moreira, S., Mata, A., Carvalho, R. (2002). Estudo prévio de
impacte ambiental do IC12 Mira/Santa Comba Dão- Componente social. Lisboa,
Portugal: Palma Consultores.
American psychologist, 40 (9), 1057-1060.
(Eds.), Handbook of Environmental Psychology, (pp.571-610). New York: Wiley.
Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior: The
MODE model as an integrative framework. Advances in Experimental Social
Psychology, 23, 75-109.
Gilbert, S. T. Fiske, & G. Lindzey (Ed.), The handbook of social psychology (4th
Interorganizational Committee on Guidelines and Principles for Social Impact
LIMA, L. (1996). Individual and social determinants of attitudes towards the
construction of a waste incinerator: two case studies. Paper presented to the XI
General Meeting of European Association of Experimental Social Psychology,
Gmunden, Austria.
research. In R. Bechtel, R. Marans and W. Michelson (Eds.). New York, EUA :
Van Nostrand Reinhold Company.
Mata, Gaspar de Carvalho, Marques, Moreira, Antunes & Palma-Oliveira (this
conference). Highway from hell!: A case study on psychosocial impact monitoring.
Personality and Social Psychology (Vol. 4), In L. Wheeler and P. Shaver. Beverly
Hills (Eds.), CA: Sage.
& Winston.
avaliação de impactes ambientais. Lisboa, Portugal: FPCEUL.