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**Healthy (and not so healthy) spaces - The importance of psycho-social variables**

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**Abstract**

Health promotion strategies often focus on changing individual behavior. However, a growing literature shows that there is an important part of our physical and mental health status that is dependent on the space where we live. In this paper we analyze research that illustrates both the negative impacts of the environment (e.g., noise, air pollution) and the positive ones (e.g., contact with nature). Based on studies conducted in Portugal, we present evidence of the negative psychological consequences of the exposure to air pollution or to living close to an incinerator, and the positive consequences of living near the forest or walking in the nature. The paper also stresses the importance of the social psychological variables that allow us to understand this process, including mediators (e.g., environmental annoyance, outdoor behaviors) and moderators (e.g., risk perception, local identity). In a whole, the paper tries to illustrate how the consideration of objective and subjective factors associated with the environment may influence key health outcomes.

**Healthy (and not so healthy) spaces – the importance of psycho-social variables**

We live in a society that values health and the promotion of well-being. Often, the strategies proposed to prevent diseases and foster health focus mainly on an individual component: changing eating habits, encouraging walking or cycling. In fact research has shown that being more physically active every day and choosing a healthy lifestyle can help reduce the risk of developing chronic diseases (such as diabetes, cardiovascular disease, various cancers and osteoarthritis) besides those associated with stress (Taylor, Repetti & Seeman, 1997). However, a growing literature is showing that there is an important part of our physical and mental health status that is dependent on the space where we live. On one side there is robust evidence that the experience of what is a typical urbane environment (with crowding, traffic, environmental pollution or noise) increases the level of stress and stress related disorders. On the other side there is an increasingly stronger set of research that shows the positive impacts of the contact with natural environment. In this chapter we will analyze these two literatures and, in the second part of this paper we will review some of the social psychological variables that mediate or moderate these effects.

**The health impacts of good and bad environments**

Environmental psychology has shown the health consequences of being exposed to polluted or noisy environments. The classical studies by Cohen on the impact of airport noise on children blood pressure and academic performance (Cohen et al., 1980) were pioneer in this domain. At present time, there is no doubt in the literature that the exposure to noise leads to much more than hearing loss. In a recent WHO study, Babisch & Kim (2011) estimated the environmental burden of disease caused traffic noise in Europe. Their research, based on the review of the evidence available for cardiovascular effects, shows that

there are 4.8 myocardial infarcts and 30.1 ischemic heart disease cases per 100 000 population caused by traffic noise. Taking together different sources of environmental distress, some evidence suggest that higher urbanization rates are related with environment-related morbidity both in low income (von Shirnding, 2002) and advanced countries (Sclar, DArch, & Carolini, 2005). For instance, in support of this prediction, Haynes and Gale (1999) showed clear differences in mortality and deprivation in health among rural and urban residents in England. The results of this study showed that rural wards had mean values of mortality and morbidity lower than national average values, while those in Inner London and other metropolitan cities were less healthy. Some studies have also presented compelling evidences that the level of *industrialization* (and not merely urbanization) is also related to poorer health (Downey & Van Willigen, 2005; Evans & Kantrowitz, 2002). A good example of research showing the effect of industrial contexts on health is the large-scale study conducted by Boardman and colleagues (Boardman, et al., 2008). In this study, and in agreement with expectations, results showed a positive correlation between living close to industrial activities and stress levels, even after controlling for the effect of several demographic variables such as gender and level of income.

Studies that explore the relationship between industrial activities and health are especially important because there seems to be an unequal distribution of physical sites according with several demographic variables. In this sense, some studies suggest that poorer people, from underprivileged minorities, are the ones who end up living in the most industrialized and polluted places (Adeola, 1994; Brulle & Pellow, 2006; Lima, 2008). For instance, in one recent study conducted in England, Walker and colleagues (2005) showed an unequal distribution of industrial sites in England, with sites disproportionately located in deprived areas and near deprived population. In a similar vein, other evidence showed that industrial and hazardous areas are particularly occupied by Blacks and Hispanics (Szasz & Meuser, 1997). This kind of “social injustice” has been particularly explored in the US,

covering several issues such as ethnicity, class, income, age and population density (Bryant, 2003; Davidson, 2003). Evidences showing that living in more industrial sites may have a significant and direct effect on one's psychological health clearly emphasize the type of social injustice that some individuals in our societies are exposed to.

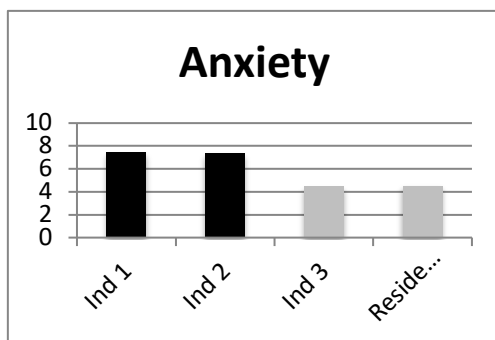
In Portugal we do not know any epidemiological study that estimates the health effects of exposure to urban or industrial environments. However, in a recent study (Marques & Lima, 2011) we could explore the consequences for psychological health of living in industrial versus non-industrial areas. Using a vast array of health measures, we have shown that the neighborhood's level of industrialization is associated with a much broader array of psychological impacts than has been traditionally assumed. To measure psychological health we included several indexes widely used as measures of psychological health in the psychological literature, including anxiety, depression and psychiatric comorbidity. Our hypothesis is that, in agreement with previous studies (Boardman, et al., 2008) living in industrial areas will be associated with anxiety and depression rates as well as higher susceptibility to psychiatric problems.

In that study (Marques & Lima, 2011) we compared individuals living in four different areas. Three of these areas are objectively classified as industrial, whereas one is classified as a non-industrial neighborhood. The three industrial areas vary in the type of industrial activity: one area is occupied by a mixture of several type of industries and is especially affected by air quality issues (odor) (Ind 1); the second area is characterized by the activity of chemical industry and is affected mostly by air pollution (smoke and particles) (Ind 2); and the last areas is occupied by textile industry and is affected mostly by water quality issues (Ind 3). The less industrialized sample (Residential) is mostly a residential neighborhood. 402 participants took part in the survey distributed across the four areas, and we did not find significant differences between the four samples regarding gender, age, marital status and level of education. According with expectations, results showed general

lower psychological health in individuals living in areas officially classified as industrial than in areas officially classified as non-industrial. Figure 1 shows the differences for anxiety and depression scores. In fact, we found worst results in some types of industrial areas (mainly related with air pollution) regarding negative health outcomes such as anxiety, depression and psychiatric comorbidity. We believe that this study reinforces the importance of taking into consideration the impacts that physical surroundings may have on individual's psychological health.

*Figure 1.*

*Industrial environment and mental health: average values for the values of depression and anxiety in the residents of three industrial areas and a comparison sample (Marques & Lima, 2011).*



*Note:* Bars in a different color correspond to statistically significant differences between the groups for  $p < .01$ .

On the other side, there is increasing evidence that living close to natural spaces is associated with lower mortality and morbidity rates, even when other social predictors are controlled for. For example, Michell & Popham (2008) classified the population of England into groups on the basis of income deprivation and exposure to green space. Based on the individual mortality records they analysed the association between income deprivation, mortality and exposure to green space, with control for potential confounding factors. Their result shows that those exposed to the greenest environments also have lowest levels of health inequality related to income deprivation. They conclude that physical environments that promote good health might be important to reduce socioeconomic health inequalities.

The same pattern of results was found more recently by White, Alcock, Wheeler, Fleming & Depledge (2014), that used a longitudinal panel study to analyse the mental health impacts over time of moving to greener or less green areas. The samples were participants in the British Household Panel Survey with mental health data for five consecutive years, and who relocated to a different residential area between the second and third years. Compared to premove mental health scores, individuals who moved to greener areas had significantly better mental health in all three postmove years; on the contrary, individuals who moved to less green areas showed significantly worse mental health in the year preceding the move but returned to baseline in the postmove years. Moving to greener urban areas was associated with sustained mental health improvements. White, Alcock, Wheeler & Depledge (2013) have also shown a similar result for the effects of living close to the sea. In a longitudinal study controlling for the social demographic characteristics of the inhabitants, they could show that those living close to the sea had better subjective health, in particularly those with lower socio-economic status.

In Portugal, some of the data on this topic is starting to appear. Lima, Marques & Moreira (2011) analysed the attitudes and behaviours towards the forest in a national sample of inhabitants in the interior part of the country. 1206 persons (46% men) living close to forests participated in this study. The sample included residents from the areas where there is more forestry activity in Portugal, and included residents either from the North (49.9%) and the South (50.1%) of Portugal. In this study (Figure 2) we could show that living close to forests was associated with higher levels of subjective well-being, after the control for social demographic confounders, such as age, sex and education ( $F(2,64)=5.16, p<.006$ ). Although these results were obtained with self-report measures and correlational data, it clearly goes in the same line with the epidemiological data reviewed above about the positive effects of the green environments.



*Figure 2.*

*Natural environment and well-being: estimated marginal means for the value of well-being in residents living in different distance from the forest (Lima, Marques & Moreira, 2011).*

However, we could produce evidence similar from a quasi-experimental study. In that research (Aragonez, Olivos, Lima & Loureiro, 2012) we tried to understand if the positive effects of the contact with nature were associated only with the direct contact (a walk in the nature) or also with the visual experience of nature (watching a video with natural scenes). A total of 64 university students participated in the study, with a 2 (between subjects: direct contact with nature vs. no direct contact with nature) x 2 (within subjects: before vs. after measurement) design. In the contact with nature group, participants (N=15) did a 1 hour walk through a natural park, while the other one only watched a nature video in the classroom. All participants completed the questionnaires in a first moment, three weeks before the intervention. Results show significant differences between the groups after the intervention both for subjective well-being ( $t=-6.87$ ;  $gl=46,4$ ;  $p<0.001$ ) and psychological well-being ( $t=-5.62$ ;  $gl=53,2$ ;  $p<0.001$ ): the impacts are stronger for the direct contact with nature condition than for the video condition.

This cumulative evidence about the negative impacts of urban and industrial spaces and the positive effects of these green and blue environments challenge psychologists to understand what are the psychological variables that mediate these effects, and how can we use them to promote health.

**The psychological mediators and moderators of the impacts of good and bad physical environments on health**

The impacts of environment on health are often mediated by cognitive or behavioral processes. In other words, the impacts are dependent on the way people perceive the objective situations to which they are exposed; in fact, although perception is associated with reality, research shows that the perceived attributes of a situation are better predictors of their impact than the objective attributes alone.

Let us consider the impacts of noise and air pollution on health. Annoyance is a psychological concept related to the “feeling of dissatisfaction associated with any condition or agent that we believe affects individuals in an adverse way.” (Steinheider and Winneke, 1993, pp. 353). Hence besides the direct influences of exposure to noise and air pollution, the nuisance, disturbance and unpleasantness (Guski et al., 1999) associated with these agents or conditions are important in understanding their consequences (Evans & Cohen, 1987). Noise annoyance is related to symptoms of arousal and stress (e.g., Bronzaft, 2002 for a review), and technical noise measures only predict part of it (e.g., Ouis, 2001). For air quality, the mediator role of annoyance is also evident in the work of several authors (e.g., Bullinger, 1989, Chattopadhyay & Mukhopadhyay, 1995, Shusterman, 1992). Our own research shows the importance of annoyance due to noise and odor on mental health (Lima, 2004). In a sample of residents living close to a waste incinerator, we could show that environmental annoyance could predict mental health symptoms (stress, anxiety and depression) over and above traditional social demographic factors (age, sex and education).

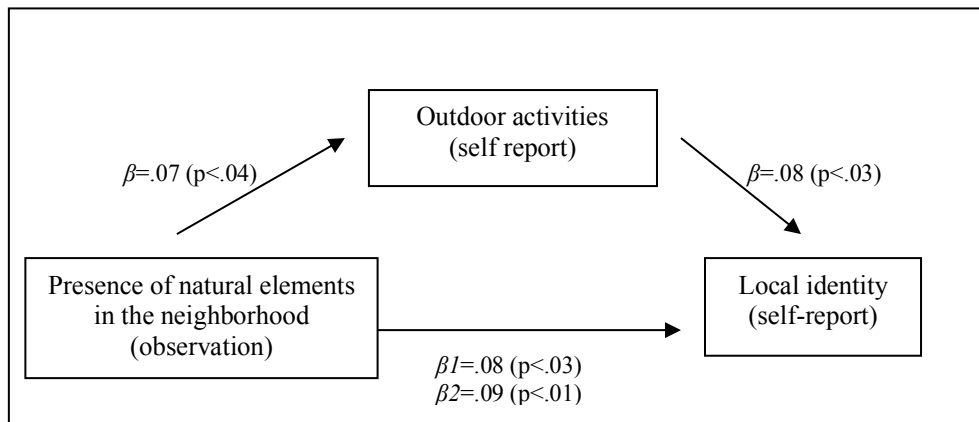
Other studies on the positive impact of the contact with nature often stress the mediating role of social behavior. Persons living close to natural spaces areas do more physical exercise (Giles-Corti et al., 2003; Tanaka et al., 1996; Taylor, Kuo e Sullivan, 2001), have more sociability habits (Ashbullby, Pahl, Webley, & White, 2013; Sullivan, Kuo, & DePooter,

2004) and thus develop a stronger sense of community (Kweon, Sullivan & Wiley, 1998), all these important variables to enhance health and well-being.

Similar results were found by our team. In a study that we could perform in 25 different neighborhoods in the Center of Portugal (Andrade, Lima, Moreira, Marques & Pereira, 2009; Batel, Andrade, Lima, Moreira & Marques, 2010) we had observers identifying the characteristics of these locations in terms of the existence of leisure resources. Using an observation grid based on Caughy, O'Campo e Patterson (2001), we could identify resources such as public spaces, gardens or playgrounds that included the presence of natural elements (trees, for example). The results of this observation were then related with the survey responses of the inhabitants in those neighborhoods. Our results showed that perceived environmental quality, local identity and sense of community were significantly higher in localities where these natural and leisure resources were present. More than that (see Figure 3), the relationship between the resources of the neighborhood identified in the observation and local identity is partially mediated by the frequency of the engagement in open air activities (such as walking, going to cafes, going with children to parks, doing physical exercise). Our results are thus compatible with the ones that show that the impacts of the green environment on health are mediated by a “green experience”: active social behavior that is often part of a better social capital and well-being.

*Figure 3.**Natural environment and well-being: the mediating role of outdoor behavior*

(Andrade, Lima, Moreira, Marques &amp; Pereira, 2009; Batel, Andrade, Lima, Moreira &amp; Marques, 2010).



These results are very appealing for intervention: “greening” the environmental attributes of the spaces is the type of change that can positively affect lots of users. However, evidenced based interventions, after understanding “what” are the effects and “how” they work, often ask for “when”: under what conditions do these interventions work better? Psychosocial research has also been important to define the variables that enhance the conditions.

In the research conducted by our team that was described above, social psychological mediators were tested. Some effects of the environment seem to be dependent on psychological attributes. For example, the impact of a walk in the nature on psychological well-being was stronger for participants with a strong feeling of connectedness with nature (Aragonez, Olivos, Lima & Loureiro, 2012). This is not a very surprising result, but some other moderating effects have more important consequences for intervention.

In the study of the impacts of living close to an incinerator, environmental annoyance was identified as an important predictor of (poor) mental health among the residents (Lima, 2004). However, this effect was moderated by risk perception. If the environmental annoyance was associated with risk perception, a sense of threat was added to the environment and the negative impacts on mental health were stronger. A focus group

conducted with these residents showed that, since the incinerator started to operate, the local inhabitants were more attentive to their environment, and they interpreted every change as an effect of the incinerator, although there are more industries in the area. “Now I notice that the plants are different (...) they get mildew, I don’t know, they become brown, with little brown spots. Potatoes appear to be deformed (...). Yes, I think that there has been a change in the plants” (W1). “My mother has now some respiratory problems. She had never had bronchitis. Some years ago, she started to have bronchitis. I don’t know. It can be a consequence of her age. But the incinerator can also have aggravated it” (W2). The statements in the focus-group show that residents tend to connect the changes in air quality with several negative consequences in the environment or in their health. Extracts like these allowed us to interpret the interaction effect found in the regression analyses: risk perception amplifies the effects of annoyance, as it introduces a suggestion of danger to environmental changes. Besides being more attentive to these changes, residents interpret them as connected to the incinerator and as being hazardous. These results show, then, that even if the incinerator has no negative consequences for those who live close to the site, the suspicion of threat produces augmented annoyance, which is related to symptoms of psychological discomfort. These results show an important function of the moderating social psychological variables: sense making.

Our studies also point also to another important moderator of environmental impacts on health: local identity. Local identity, as a form of social identity, can be defined as the aspects of an individual’s self-image that derive from the social environmental categories to which he perceives himself as belonging (Tajfel & Turner, 1986, p. 16). Hence, local identity is the conscience of belonging to a defined group based on the place of residence and the emotional and evaluative significance resulting from that membership (Lima, 1997). Within environmental psychology domain, several studies have extensively demonstrated the role of strong local identity in coping with negative aspects of the environment

(Bonaiuto, Breakwell, & Cano, 1996; Duarte & Lima, 2005; Lima, 1997) in line with broader results within social psychology (e.g. O'Brien & Hummert, 2006; Marques, 2009). In general, these studies explore the way high and low identifiers react when they are faced with a threat to their identity: when faced with threats to their identity, high-identifiers tend to stick with the group whereas low-identifiers tend to more easily leave the groups they do not like (e.g., Terry and Hogg, 1996). Our research has also found evidence for the important role of local identity as a moderator of the effects of annoyance on mental health symptoms (Lima & Marques, 2005). Participants with higher levels of local identity present less negative health consequences of the exposure to environmental annoyances associated with the nearby waste incinerator than those with lower identification with their locality. This important result calls our attention to the protective effect of local identity in the processes of adaptation to local environmental changes.

## **Conclusions**

Any thought and reflection on interventions to improve health and well-being requires a multi-dimensional perspective (WHO, 1948). In this paper, our goal was to show how the consideration of objective and subjective factors related with physical and social aspects may influence key health outcomes. In this regard, we showed that the level of industrialization or green exposure is a fundamental predictor of health dimensions such as the level of depression, anxiety and subjective well-being. These results are important and in line with other evidences in wider epidemiological studies in this domain. Moreover, we also showed how the nearby presence of industrial facilities, such as for instance, a solid waste incinerator has important consequences for individuals living in its neighborhood. Hence, these and similar type of results based on other international studies prove, no

doubly, the value of considering this more *physical spaces* effects on the health of individuals.

However, also important from our perspective, is to consider the fundamental role played by more subjective, psychosocial variables. Environmental Psychology has been very influential in this domain showing how attitudes, perceptions and emotions may play a fundamental role in the explanation of individual's quality of life (Moser, 2009; Guiford, 2014). In this paper we showed how important psychosocial moderators and mediators – such as place identity – influence in a significant way individual's health levels, thus proving the need to consider also this level of explanation. Understanding of these factors is fundamental in order to propose proper interventions that consider all these factors in conjunction (Lima, Moreira & Marques, 2012). Hence, we think it is fair to say that a truly H4A (“health for all”) approach needs to articulate these several levels of explanation in order to properly address the health challenges and needs of individuals in our societies.

## References

- Adeola, F. O. (1994). Environmental hazards, health and racial inequity in hazardous waste distribution. *Environment and Behavior*, 26, 99-126. DOI: <http://dx.doi.org/10.1177/0013916594261006>
- Andrade, C., Lima, M.L., Moreira, S., Marques, S., & Pereira, C. (2009, January). Preditores ambientais da Ligação ao local . Paper presented at *X Congresso de Psicologia Ambiental*. Lisboa, Fundação Calouste Gulbenkian.
- Aragones, J.I., Olivos, P., Lima, M.L., & Loureiro, A. (2012). Connectedness, well-being and nature. Poster presented to the *22th IAPS International Conference*, Glasgow.
- Ashbullby, K.J., Pahl, S., Webley, P., & White, M.P. (2013). The beach as a setting for families' health promotion: A qualitative study with parents and children living in coastal regions in Southwest England. *Health & Place*, 23, 138–147. DOI: 10.1016/j.healthplace.2013.06.005
- Babisch, W., & Kim, R. (2011). Traffic noise exposure and ischaemic heart disease. In. M. Braubach, D.E. Jacobs, & D. Ormandy, *Environmental burden of disease associated with*

- inadequate housing. Methods for quantifying health impacts of selected housing risks in the WHO European Region* (pp. 97-111). Copenhagen: WHO Regional Office for Europe.
- Batel, S., Andrade, C., Lima, M. L., Moreira, S., & Marques, S. (2010, July). The relation between psychological meaning and physical characteristics in local environments. Paper presented at *IAPS 2010. Leipzig, Germany*.
- Boardman, J. D., Downey, L., Jackson, J. S., Merrill, J. B., Saint Onge, J. M., & Williams, D. R. (2008). Proximate industrial activity and psychological distress. *Population and Environment*, 30, 3-25. DOI: <http://dx.doi.org/10.1007/s11111-008-0075-8>
- Bonaiuto, M., Breakwell, G. M., & Cano, I. (1996). Identity processes and environmental threat: The effects of nationalism and local identity upon perception of beach pollution. *Journal of Community & Applied Social Psychology*, 6(3), 157-175.
- Bronzaft, A.L. (2002). Noise and mental health. In R. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 499-510). New York: Wiley and Sons.
- Brulle, R.J., & Pellow, D.N. (2006). Environmental Justice: Human health and environmental inequalities. *Annual Review of Public Health*, 27, 103-124. DOI: <http://dx.doi.org/10.1146/annurev.publhealth.27.021405.102124>
- Bryant, B. (2003). History and issues of the environmental justice movement. In G. Visgilio & D. M. Whitelaw (Eds.), *Our Backyard: a quest for environmental justice*. USA: Lanham, Rowman & Littlefield.
- Bullinger, M. (1989). Psychological effects of air pollution on healthy residents: a time series approach. *Journal of Environmental Psychology*, 9, 103-118. DOI: [http://dx.doi.org/10.1016/S0272-4944\(89\)80002-7](http://dx.doi.org/10.1016/S0272-4944(89)80002-7)
- Caughy, M.O., O'Campo P., & Patterson J. (2001). Neighborhoods and health: A brief observational measure for urban neighborhoods. *Health and Place*, 7, 225-236.
- Chattopadhyay, P.K., & Mukhopadhyay, P. (1995). Air pollution and health hazards in human subjects: psychiological and self-report indexes. *Journal of Environmental Psychology*, 15, 327-351. DOI: 10.1006/jevp.1995.0029
- Cohen, S., Evans, G.W., Krantz, D.S., & Stokols, D. (1980). Physiological, motivational and cognitive effects of aircraft on children: moving from the laboratory to the field. *American Psychologist*, 35, 231-243. DOI: <http://dx.doi.org/10.1037//0003-066X.35.3.231>
- Downey, L., & Van Willigen, M. (2005). Environmental stressors: the mental health impacts of living near industrial activity. *Journal of Health and Social Behavior*, 46(3), 289-305. DOI: <http://dx.doi.org/10.1177/002214650504600306>
- Duarte, A. P., & Lima, M. L. (2005). Análise dos conteúdos da identidade associada ao lugar [Analysis of place identity contents]. *Psicologia*, 19(1-2), 193-226.



- Evans, G. W., & Jacobs, S. (1982). Air pollution and human behavior *Environmental Stress*. USA: Cambridge University Press.
- Evans, G.W., & Cohen, S. (1987). Environmental stress. In D. Stokols & I. Altman (Eds.), *Handbook of Environmental Psychology* (pp. 571-610). New York: Wiley.
- Giles-Corti, B., & Donovan, R.J. (2003). Relative influence of individual, social environmental and physical environmental correlates of walking. *American Journal of Public Health*, 93, 1583–1589. DOI: <http://dx.doi.org/10.2105/AJPH.93.9.1583>
- Guifford, R. (2014). Environmental psychology matters. *Annual Review of Psychology*, 65, 541-579. DOI: 10.1146/annurev-psych-010213-115048. DOI: <http://dx.doi.org/10.1146/annurev-psych-010213-115048>
- Guski, R., Schuemer, R., & Felscher-Suhr, U. (1999). The concept of noise annoyance: how international experts see it. *Journal of Sound and Vibration*, 223, 513-527. DOI: <http://dx.doi.org/10.1006/jsvi.1998.2173>
- Haynes, R., & Gale, S. (1999). Mortality, long-term illness and deprivation in rural and metropolitan wards in England and Wales. *Health & Place*, 5, 301-312. DOI: [http://dx.doi.org/10.1016/S1353-8292\(99\)00020-9](http://dx.doi.org/10.1016/S1353-8292(99)00020-9)
- Kweon, B-S., Sullivan, W.C., & Wiley, A.R. (1998). Older Adults Green Common Spaces and the Social Integration of Inner-City. *Environment and Behavior*, 30, 832-858. DOI: <http://dx.doi.org/10.1177/001391659803000605>
- Lima, M. L. (2004). On the influence of risk perception on mental health: Living near an incinerator. *Journal of Environmental Psychology*, 24(1), 71-84. DOI: [http://dx.doi.org/10.1016/S0272-4944\(03\)00026-4](http://dx.doi.org/10.1016/S0272-4944(03)00026-4)
- Lima, M. L. (2008). Percepção de riscos e desigualdades sociais. In J. Madureira Pinto & V. Borges Pereira (Orgs.), *Desigualdades, desregulação e riscos nas sociedades contemporâneas* (pp. 267-290). Porto: Afrontamento
- Lima, M.L. (1997). Earthquakes are not seen in the same way by everyone. Cognitive adaptation and social identities in seismic risk perception. In O. Renn (Ed.) *Risk Analysis and management in a Global Economy*, vol2 (pp. 181-201). Baden-Wurttemberg: Center of Technology Assessment.
- Lima, M.L., Marques, S., & Moreira (2011). "A House in the Woods". Values, Attitudes and Behaviours towards Forests. *PsyEcology*, 2(1), 87-100. DOI: <http://dx.doi.org/10.1174/217119711794394662>
- Lima, M.L., Moreira, S., & Marques, S. (2012). Participatory Community Involvement in Planning Processes of Building Project -A Social Psychological Approach. *Umweltpsychologie*, 16, 68-87.

- Marques, S. (2009). *Is it age...or society? The effects of aging stereotypes on comparative optimism towards health risks in older persons* (Ph.D Thesis). ISCTE-IUL
- Marques, S., & Lima, M.L. (2011). Living in grey areas: Industrial activity and psychological health. *Journal of Environmental Psychology*, 31 (4), 314-322. DOI: <http://dx.doi.org/10.1016/j.jenvp.2010.12.002>
- Mitchell, R., & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: an observational population study. *Lancet*, 372, 1655–60. DOI: [http://dx.doi.org/10.1016/S0140-6736\(08\)61689-X](http://dx.doi.org/10.1016/S0140-6736(08)61689-X)
- Moser, G. (2009). Quality of life and sustainability: Toward person–environment congruity. *Journal of Environmental Psychology*, 29, 351–357. DOI: <http://dx.doi.org/10.1016/j.jenvp.2009.02.002>
- O'Brien, L. T., & Hummert, M. L. (2006). Memory performance of late middle–aged adults: Contrasting self–stereotyping and stereotype threat accounts of assimilation to age stereotypes. *Social Cognition*, 24, 338-358. DOI: 10.1521/soco.2006.24.3.338
- Ouis, D. (2001). Annoyance from road traffic noise: a review. *Journal of Environmental Psychology*, 21, 101-120. DOI: <http://dx.doi.org/10.1006/jevp.2000.0187>
- Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.
- Sclar, E. D., DArch, G., & Carolini, G. (2005). The 21st century health challenges of slums and cities. *The Lancet*, 365(9462), 901-903. DOI: [http://dx.doi.org/10.1016/S0140-6736\(05\)71049-7](http://dx.doi.org/10.1016/S0140-6736(05)71049-7)
- Shusterman, D. (1992). Critical review: the health significance of environmental odour pollution. *Archives of Environmental Health*, 47, 76-87.
- Steinheider, B., & Winneke, G. (1993). Industrial odours as environmental stressors: exposure-annoyance associations and their modification by coping, age and perceived health. *Journal of Environmental Psychology*, 13, 353-363. DOI: [http://dx.doi.org/10.1016/S0272-4944\(05\)80257-9](http://dx.doi.org/10.1016/S0272-4944(05)80257-9)
- Sullivan, W.C., Kuo, F.E., & DePooter, S. (2004). The fruit of urban nature: Vital neighborhood spaces. *Environment & Behavior*, 36, 678-700. DOI: <http://dx.doi.org/10.1177/0193841X04264945>

- Szasz, A., & Meuser, M. (1997). Environmental inequalities: literature review and proposals for new directions in research and theory. *Current Sociology*, 45(3), 100–120. DOI: <http://dx.doi.org/10.1177/001139297045003006>
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In *Psychology of intergroup relations* (pp. 7-24). Chicago: Nelson-Hall.
- Tanaka, A., Takano, T., Nakamura K, et al. (1996). Health levels influenced by urban residential conditions in a megacity — Tokyo. *Urban Studies*, 33, 879–945. DOI: <http://dx.doi.org/10.1080/00420989650011645>
- Taylor, A.F., Kuo, F.E., & Sullivan, W.C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment & Behavior*, 33, 54-77. DOI: <http://dx.doi.org/10.1177/00139160121972864>
- Taylor, S.E., Repetti, R.L., & Seeman, T (1997). Health Psychology: What is an unhealthy environment and how does it get under the skin? *Annual Review of Psychology*, 48, 411-47. DOI: <http://dx.doi.org/10.1146/annurev.psych.48.1.411>
- von Shirnding, Y. (2002). Health and sustainable development: can we raise to the challenge? . *The Lancet*, 360, 632-637.
- White, M.P., Alcock, I., Wheeler, B.W., & Depledge, M.H. (2013). Coastal proximity, health and well-being: results from a longitudinal panel survey. *Health & Place*, 23, 97-103. DOI: <http://dx.doi.org/10.1016/j.healthplace.2013.05.006>
- White, M.P., Alcock, I., Wheeler, B.W., Fleming, L.E., & Depledge, M.H. (2014). Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas. *Environmental Science and Technology*, 48 (2), 1247–1255. DOI: 10.1021/es403688w