



UNIVERSITY OF TAMPERE

This document has been downloaded from
Tampub – The Institutional Repository of University of Tampere

Post-print

Authors: Korpela Kalevi, Ylén Matti, Tyrväinen Liisa, Silvennoinen Harri
Name of article: Determinants of restorative experiences in everyday favorite places
Year of publication: 2008
Name of journal: Health & Place
Volume: 14
Number of issue: 4
Pages: 636-652
ISSN: 1353-8292
Discipline: Social sciences / Psychology
Language: en

URN: <http://urn.fi/urn:nbn:uta-3-683>

DOI: <http://dx.doi.org/10.1016/j.healthplace.2007.10.008>

All material supplied via TamPub is protected by copyright and other intellectual property rights, and duplication or sale of all part of any of the repository collections is not permitted, except that material may be duplicated by you for your research use or educational purposes in electronic or print form. You must obtain permission for any other use. Electronic or print copies may not be offered, whether for sale or otherwise to anyone who is not an authorized user.

Determinants of Restorative Experiences in Everyday Favourite Places

Running title: Determinants of Everyday Restorative Experiences

Date of resubmission: October 10, 2007

Abstract

The study was based on the answers to a mailed questionnaire of a simple random sample of respondents from two cities (Helsinki, Tampere) in Finland. Ten determinants of restorative experiences in favourite places (≤ 15 km from home; $n = 1,089$) were effective. These determinants included “immediate” use of the favourite place (duration and frequency), personal background of nature experiences (nature orientedness, nature hobbies, childhood nature experiences), and situational factors in life which were related to stress (hassles at work and with money, satisfaction with life) and to social relations (uplifts of social relations, visiting alone vs. in company). Different variables were associated with restorative experiences in different favourite settings (extensively managed nature areas, built-up green spaces, waterside environments, exercise and activity / hobby areas, and indoor and outdoor urban areas). The concept of “favourite place prescriptions” is introduced as an analogy to “exercise prescriptions” in primary healthcare.

Key words: favourite places; restorative experiences; stress-regulation; restoration outcome scale; favourite place prescriptions

Determinants of restorative experiences in everyday favourite places

Date of resubmission: October 10, 2007

INTRODUCTION

Experimental evidence shows that visiting or seeing natural environments – typically parks or woods - alleviates both attentional fatigue and emotional stress (Hartig, Evans, Jamner, Davis & Gärling, 2003; Kaplan, R., 2001; Parsons, Tassinary, Ulrich, Hebl & Grossman-Alexander, 1998). This alleviation involves renewal of directed attention capacity, physiological changes from tension and stress toward relaxation, and positive mood change. These positive changes in activity are called restorative outcomes and are explained in the two prominent theories of restoration (Kaplan & Kaplan, 1989; Ulrich 1979, 1983).

The psychophysiological stress reduction framework (Ulrich et al., 1991; Parsons et al., 1998) assumes a negative antecedent condition of psychophysiological stress, defined as a process of responding emotionally, physiologically, and behaviourally to a situation in which well-being is challenged. Consequences of stress include negative emotions and heightened autonomic arousal. Restoration is brought about efficiently and rather quickly in a visual encounter with a scene including natural contents and moderate complexity. In comparison, the attention restoration theory (Kaplan & Kaplan, 1989) posits a negative antecedent condition of directed attention fatigue, which is incurred in any prolonged mental effort requiring the exercise of the inhibitory mechanism assumed to render directed attention possible. Among the consequences of directed attention fatigue are irritability and increased likelihood of errors in

performance. Restoration can proceed when the person–environment interaction helps to gain (a) psychological or geographical distance from one’s usual context, (b) immersion in a coherent physical or conceptual environment, (c) a good match between personal purposes, environmental supports and demands for action, and (d) fascination, i.e., effortless attention. These characteristics typically recur more in natural environments than in urban environments and more in favourite than in unpleasant places (Korpela & Hartig, 1996). Given a restorative experience where the four factors are present over an extended period of time, restoration may proceed through several phases. Clearing away random thoughts and recovering directed attention capacity may ultimately enable a contemplative state of mind. After that, it may become possible to confront difficult personal matters and reflect on one’s self and one’s priorities in life. To summarise, these two theories differ in the description of the antecedent conditions leading to restoration and the time required for restorative outcomes (for a review, see Hartig & Evans, 1993). However, an integrated view of these theories adopted in the present study (and in our measure of restorative outcomes including basic aspects of both theories) holds that attentional and stress-related components of restoration can be seen as conceptually distinct but interacting benefits of restorative experiences (Kaplan, 1995).

The present study was motivated by the gap in the knowledge of the determinants of restorative outcomes in everyday life. It is important to understand restorative outcomes more deeply, because they provide one potential explanatory mechanism for the positive relationship between the amount of green spaces and perceived health (de Vries, Verheij, Groenewegen & Spreeuwenberg, 2003; Maas, Verheij, Groenewegen, de Vries & Spreeuwenberg, 2006), and between walkable green streets and longevity (Takano, Nakamura & Watanabe, 2002; Tanaka, Takano, Nakamura & Takeuchi,

1996). Thus, although restorative outcomes related to green space are well documented, there is very little knowledge about the situational, personality, or demographic factors associated with these experiences in everyday life and leisure. For example, concerning gender as a determinant of restorative experiences Hartig, Lindblom, and Ovefelt (1998) found in a purposive sample of 26 married couples that the near-home area served as a place for restoration and relaxing leisure activities similarly for women and men. The couples responded to a questionnaire investigating perceived stress, domestic and leisure activities, and restoration outcomes at home and in the near-home residential area of a small town in Sweden. In a study of the association between environmental preference and demographic determinants, 6 to 76-year-olds (N = 417) imagined different mood states related to stress and restoration and reported their opinions about where they would like to go in these moods (Regan & Horn, 2005). Having nature hobbies and liking nature holidays were both associated with mentioning green nature or water environments. Living in nature-dominated areas was associated with a desire to be around green nature but not around water environments.

Consistent with our earlier research, our purpose in this study was to investigate the determinants of restorative experiences using favourite place as a window or unit of analysis. Favourite place studies refer to investigations in which the participants typically describe the use and meaning of their real-life favourite (important, valued) places in their everyday surroundings (Chawla, 1992; Jorgensen, Hitchmough, & Dunnett, 2006; Korpela & Hartig, 1996; Korpela & Ylén, 2007; Newell, 1997; Tyrväinen, Mäkinen & Schipperjin, 2007). Natural settings, such as parks, beaches (lakeshores) or forests have constituted the largest category among the favourite places in these studies. Restorative outcomes, i.e., forgetting worries, clearing away random thoughts, recovering attentional focus, facing matters on one's mind, relaxation, and

decrease in negative feelings and increase in positive feelings have characterized visits to natural favourite places, in particular, suggesting that these places are used in emotion- and self-regulation (Korpela, Hartig, Kaiser & Fuhrer, 2001). Self- and emotion-regulation refer to mental activity through which the psychological influence of external factors - be they social, physiological or physical - are processed (Korpela et al., 2001). Self- and emotion-regulation enable an individual to function adaptively in situations that are, for example, emotionally arousing (on motivational and cognitive principles of self-regulation see Epstein, 1991). In the “environmental self-regulation hypothesis”, it is assumed that the regulation proceeds with the application of not only mental, physical, and social strategies but also *environmental strategies* (Korpela, 1989, 1992, 2002; Korpela et al., 2001). Environmental strategies of self- and emotion-regulation imply extension beyond inner homeostatic processes to exchange with the environment, and involve the use of (favourite) places and place cognitions and affects in the service of self- and emotion-regulation.

In this study, we wanted to identify important determinants of restorative experiences in everyday favourite places and to eliminate variables that are superfluous in order to tighten up future research. We wanted to investigate this issue with a larger sample representative of the resident population and with a wider range of potential determinants than in earlier studies along these lines. More specifically, we wanted to find out whether the level of restorative experiences in a *favourite* place as such regardless of the type of the place (urban vs. natural) can be reliably associated with some important determinants. Secondly, we wanted to investigate the determinants of restorative experiences in different types of favourite places including green, waterside and urban settings.

Potential determinants of restoration experiences

Our choice of the potential determinants was guided by the theories of restoration, emotion and self-regulation in favourite places, the relationship between personality traits and niche-building, and the top-down perspective of well-being. The last two theories are described underneath when describing the six main groups of variables potentially relevant to the restorative experiences in favourite places in the vicinity.

Firstly, the need for restoration in a person's life situation is, by definition, a preceding deficiency rendering restoration possible (Hartig et al., 1998). Thus, we wanted to examine (1) stress- and health-related variables and measures. The idea of niche-building led us to measure (2) personality traits related to place experiences in urban and natural areas. Niche-building posits that people tend to create, seek out, or end up in physical and social environments that are correlated with their personal needs, dispositions, values, and abilities (Caspi, Roberts & Shiner, 2005; Tesser, 2002; see also the concept of person-environment fit, Roberts & Robins, 2004). This view of the relationship between personality traits and niche-building processes is analogical to the view that people express preferences for places to regulate their mood and self-experience when feeling stressed or psychologically threatened (Korpela, 1989; Korpela & Ylén, 2007). However, the former (niche-building) is concerned with more or less enduring personality traits or dispositions whereas the latter (self- and emotion-regulation) refers mainly to the momentary regulation of self-esteem, mood, and feelings. The top-down perspective of well-being served as a broad theoretical perspective leading us to examine (3) personality traits relevant to stress and health. The top-down perspective assumes that people have a predisposition to interpret life experiences in either positive or negative ways, and this predisposition in turn colours one's evaluation of satisfaction in specific domains (Feist, Bodner, Jacobs, Miles & Tan,

1995). It is assumed that general well-being dispositions (e.g., well-being, optimism, and negative affectivity) can filter perception of daily experience. A recent addition to research on restorative environments is the (4) social context of restorative experiences (Staats & Hartig, 2004). The main hypothesis in this line of research is that the social aspects of outdoor activities may influence the degree to which restoration is achieved and we had to consider these considerations. Current (5) use of the favourite place and experiences of residential natural areas, and common (6) background measures were quite obvious and logical variables to be included.

Several potential determinants (56 in all) of restorative experiences within these main categories were available in the existing literature (see Table 2) and we will review the empirical findings concerning the majority of our variables in the following sections. However, without previous research evidence we could not make hypotheses of the order or the importance of different types of determinants.

The need for restoration (1)

In line with an earlier study (Bodin & Hartig, 2003) we used the concept of daily hassles and uplifts (DeLongis, Folkman & Lazarus, 1988) as a measure of stress (reflecting a need for restoration). This was also due to our earlier findings suggesting that recent, momentary feelings and symptoms are most likely regulated in a favourite place (Korpela & Ylén, 2007). More global, long-term experienced stress (PSS, Cohen, Kamarck & Mermelstein, 1983) has been studied also in an earlier, preliminary investigation of restoration opportunities in the residential area (Hartig et al., 1998). In that study, perceived stress related significantly and negatively to a form of restoration involving cognitive reflection while at home. To improve our understanding in this issue, we also investigated the number of working hours per week as an indication of

the amount of workload. As an extension of measures of the need for restoration, we included satisfaction with life (Diener, Emmons, Larsen & Griffin, 1985; Pavot & Diener, 1993) reasoning that, for example, high satisfaction with life motivates a person to experience everyday settings more positively regardless of the characteristics of the settings.

Personality and situational factors relevant to place experiences, restoration, and health (2,3)

Regarding personality dispositions relevant to place experiences, there is evidence to suggest that an individual's trait levels of feeling emotionally connected to the natural world are potentially related not only to place preferences but also to life satisfaction and ecological behaviours (Mayer & McPherson Frantz, 2004). Both having nature hobbies and liking nature holidays have been associated with mentioning green nature or water environments as potential places to visit in different imagined mood states related to stress and restoration (Regan & Horn, 2005). Following up on work on the use of a near-home area for restoration (Hartig et al., 1998) we assumed that a sense of insecurity based on actual experiences or vicarious experience from the media may prevent people – and women more than men – from having restorative experiences in natural areas by limiting being outdoors (see also Brown, Perkins & Brown, 2003; Ryan, 2005).

Sensitivity to noise may also affect the choice of favourite place. In a preliminary study in need of further corroboration, Korpela (2001) found that respondents with high sensitivity to noise were more likely to seek out favourite natural settings in their residential area and to benefit more in emotional terms from their visit than those with low sensitivity to noise. Noise sensitivity is

generally regarded as a personality trait, or a personal variable predicting noise annoyance reactions (Heinonen-Guzejev, Vuorinen, Kaprio, Heikkilä & Mussalo-Rauhamaa, 2000), perceived stress (Zimmer & Ellermeier, 1999), and reported health problems (for a review, see Job, 1996).

Moreover, in line with the top-down perspective of well-being it is known that self-report health measures may reflect a pervasive mood disposition of negative affectivity, which is a diffuse dimension of subjective distress, and dissatisfaction that subsumes a variety of aversive mood states (Watson, Clark & Tellegen, 1988; Watson & Pennebaker, 1989; Williams & Wiebe, 2000). In our view, self-reports of restorative experiences may resemble self-reports concerning one's health and the quest for determinants of restoration needs to account for the disposition of negative affectivity when measuring our dependent variable.

Social context of restorative experiences (4)

Studies on the social context of restorative experiences suggest that attentional fatigue increases preference for the natural over the urban environment but company increases preference for the urban environment but not for the natural environment. Being in company enhances the pleasure of walking in an urban environment, but not because it enhances restoration but for some other, so far unknown reasons (Staats & Hartig, 2004). In the natural environment, company enables restoration by providing safety, but when safety is not a concern, the absence of company enhances restoration. In our earlier study, those who visited the favourite place alone or with passers-by only were more likely to select a natural favourite place but not more likely to gain emotionally than those visiting with friends or relatives (Korpela & Ylén, 2007). On the other hand, for individuals living in inner-city apartment buildings, well-used, urban green spaces

have been linked to stronger ties to neighbours (Kuo, Sullivan, Coley & Brunson, 1998; Kweon, Sullivan & Wiley, 1998) and a greater sense of safety (Kuo et al., 1998; Sullivan, Kuo & dePooter, 2004). Thus, physical environments and nature, in particular, may contribute not only to restoration and stress alleviation but also to the sense of community (Kim & Kaplan, 2004; Puddifoot, 1996). Thus, we included being out alone or in company, sense of security, and sense of community in our variables.

Current use of the favourite place and the experiences of residential natural areas (5)

Frequency of visiting and the length of stay in the favourite place, or other green spaces (during free time and at work), the frequency of visiting the summer cottage, and the frequency of physical exercise and activity (alone, in the company of humans or a pet; see Cutt, Giles-Corti, Knuiiman & Burke, 2007) may obviously affect the total amount and thus the quality of restorative experiences. There is preliminary evidence that the amount of green space within a 1 - 3 km radius from the home is more closely related to self-reported health indicators than the amount of green space within 1 km of the respondents' home (de Vries et al., 2003). Therefore, we decided to include the distance to a favourite place in our measures.

Moreover, a mere window view of nature may have notable restorative effects (cf. Hartig et al., 1998; Ulrich, 1984) and should be acknowledged as a potential substitute for restoration outside home. For example, nearby trees and grass visible from apartment buildings were shown to enhance residents' effectiveness in facing their major life issues by reducing mental fatigue (Kuo, 2001).

Background measures (6)

Earlier research does not suggest large gender differences in the selection of natural favourite places (Korpela & Ylén, 2007) or the use of near-home area as a place for restoration (Hartig et al., 1998). Retrospective studies have shown the importance of childhood nature experiences to adult environmental attitudes and preferences (Ward Thompson, Aspinall, Bell & Findlay, 2005; Wells & Lekies, 2006). Thus, we considered it important to include the importance of childhood experiences of nature to our potential determinants of restorative experiences.

Examples of the effects of some potential determinants

To summarise, our broad theoretical starting points and the empirical findings from the literature suggested several potential determinants of the restorative experiences in the favourite places in the vicinity. To provide a concrete example of our expectations about the determinants, we reasoned that, for example, if someone is a happy person in general or s/he is satisfied with his or her life it means that these positive feelings tend to generate more positive feelings and thoughts regardless of the characteristics of the place itself. The same applies vice versa if negative affectivity is a predominant personality character. If someone is a “nature lover”, has nature hobbies and has positive experiences of nature even from the childhood, this may enhance her or his restorative experiences. This may be vice versa if a person is a “city lover” or feels insecure while outdoors. The more often a person visits and the longer she/he stays in the favourite place the more time the physical features of the place will have to exert a positive influence. S/he may lack company at that moment or s/he may be a noise sensitive person being more tuned to the outer environment than s/he would otherwise be. Perhaps s/he is stressed (long working hours per week, trouble with money and work) and fatigued so that s/he has more potential to feel restored for a while. Negative

mood, unsatisfactory self-rated health and minor health symptoms, such as headaches, may more likely lead a person to feel stronger restoration outcomes. Alternatively, her/his spirits may be briefly elevated (for example, good relationships with the neighbours, sense of community, good relations with loved ones) and s/he is inclined to stay in that mood, to keep that feeling up.

METHOD

Sample and procedure

We obtained a simple random sample of 3,000 (0.5% of the study population) Finnish-speaking inhabitants aged between 15 and 75 years in 2 major cities in Finland (Helsinki and Tampere) from the Population Register Centre. Helsinki, the capital of Finland, has approximately 564,000 inhabitants and Tampere 206,000 inhabitants. The share of green areas in Helsinki is 29 percent and in Tampere 38 percent of the total administrative land area of the city. Helsinki and Tampere are among the five European cities (from 26 cities investigated) where the inhabitants have large amounts of green area, at least 100 square metres per capita, at their disposal (Urban Ecosystem Europe 2006). We calculated that an effect size of .05 (conventions: small = .02, medium = .15, large = .35) with alpha = .05, and power = .95 would require 789 respondents with 56 independent variables in a multiple regression (Gpower software; Erdfelder Faul, & Buchner, 1996).

After two rounds of written reminders 1,273 (37.4 % male, 62.6 % female) respondents out of 2,989 with a known address returned our mailed questionnaire (response rate 42.6 %). Statistical χ^2 -comparisons to the population showed that the sample was representative of age cohorts with the exception that two age cohorts in Tampere, 62-year-olds (2.8 % in the sample vs. 1.0 % in the population) and 67-year-

olds (3.5 % in the sample vs. 1.1 % in the population) were somewhat overrepresented. Men from Helsinki (39.7 % in the sample vs. 46.6 % in the population) were underrepresented whereas women from Tampere were overrepresented (59.0 % in the sample vs. 51.3 % in the population). As a whole, the sample represents the population well. A similar conclusion applies to the data used for statistical analysis (see Results; all the major analyses were conducted with a sample of favourite places to which the self-reported distance from home was equal to or less than 15 km (n = 1,089). In this sample, 62-year-olds from Helsinki (2.6 % in the sample vs. 1.1 % in the population) and women from Tampere were overrepresented (61.9 % in the sample vs. 51.3 % in the population)

Ten months later, 710 volunteers from the first sample were mailed another, shorter questionnaire to obtain reliability data for our main measurements. Four hundred twenty seven (32.1 % male, 67.9 % female) respondents returned the questionnaire (response rate 60.1 %). Men from Helsinki (30.3 % in the sample vs. 46.6 % in the population) and Tampere (35.7 % in the sample vs. 48.7 % in the population) were underrepresented. For the comparisons between the sample and population, we had to categorize age cohorts into 5-year categories (e.g., those born between 1941 and 1945 etc.) and use a combined data of both cities (Helsinki + Tampere). The category of 56-60-year-olds was overrepresented (13.3 % in the sample vs. 9.4 % in the population).

Questionnaire

The questionnaire included 74 major questions or measures (some of them including several items) grouped in the themes of residential area preferences, the meaning of nature, the use of and experiences in the green spaces in the residential area, the feelings

of security and community, well-being and perceived health, health habits and background data.

Restoration Outcome Scale - the outcome variable

General restorative experiences in a favourite place were measured with six items (see Table 1 for descriptives of all of the multi-item scales). In accordance with the previous measures and findings of restorative outcomes (Kaplan, Bardwell & Slakter, 1993; Hartig et al. 1998; Staats, Kieviet & Hartig, 2003), three of the items reflected relaxation and calmness (“I feel calmer after being here”, “After visiting this place I always feel restored and relaxed”, “I get new enthusiasm and energy for my everyday routines from here”), one item reflected attention restoration (“my concentration and alertness clearly increase here”), and two items reflected clearing one’s thoughts (“I can forget everyday worries here”, “visiting here is a way of clearing and clarifying my thoughts”). Based on factor analysis (one factor, principal axis factoring, oblique promax-rotation, factor loadings .74 - .86) we computed a mean summary score for the Restoration Outcome Scale (ROS).

Place types

Respondents were first asked to rate 16 types of urban and green/ natural places and areas with regard to their personal importance (“How important are the following places or areas to you?”; 5-point Likert scale) (see Table 2). The range of places was based on the classification of green areas developed for mapping the social values of green areas in Helsinki and can be applied to the city of Tampere also (Tyrväinen, Mäkinen & Shipperijn, 2007). Then they were requested to select one particular type of those sixteen environments where their favourite place was located (by marking the

letter of that type in a box) and briefly describe that favourite place in an open-ended answer. The importance of the area and the favourite place selection were consistent: 87.6% of the respondents in the first survey regarded the area where the favourite place was situated as quite or very important (values 5 and 4) and 10% as moderately important (value 3). To achieve sufficiently large place categories for further statistical analyses, we performed factor analysis (principal axis factoring, oblique promax rotation) on the 16 items regarding the importance of the area. The analysis produced five main place categories which were 1) extensively managed nature areas (n = 466; large forest areas, small-scale wooded areas, scenery fields and meadows, small-scale natural state areas such as river valleys, wetlands, bushes, and rocks), 2) built-up green spaces (n = 253; large green lots, green areas within housing blocks, decorative plantations and glorious flowers, traffic green areas such as wind-breaks, green lanes, and tree avenues, parks including grass, and plantations), 3) waterside environments (n = 203; beaches, and harbour areas), 4) exercise and activity / hobby areas (n = 99; playgrounds, recreation trails, sports grounds, allotment gardens, dog parks), and 5) indoor and outdoor urban areas (n = 68; street areas and indoor places within the city center; on the basis of the open-ended answers the places in these two main categories (provided in the questionnaire) were most frequently the city center in general, pedestrian streets, squares, cafés, restaurants, and shops or malls).

Sixty four percent of the respondents in the second survey selected the same favourite place main type as 10 months earlier, which is more than might be expected by chance (*Cohen's Kappa* = .48; *N* = 411, *p* = .000).

Scales used as independent variables

In this section, we describe the main independent variables; mostly the multi-item scales analyzed through factor and item analytic methods (see Table 1). In the first questionnaire, feelings of energy during the previous year (Grahn & Stigsdotter 2003) were measured with two items (e.g., “have felt energetic already in the morning”). Feelings of distress during the previous year (Grahn & Stigsdotter 2003) were measured with four items (e.g., “have felt irritated). Noise sensitivity was measured with four items (e.g., “I get annoyed when my neighbours are noisy) adopted from Weinstein’s (1978) noise sensitivity scale. Sense of security scale was computed of three items (e.g., “I avoid certain areas because I feel insecure there”) (Koskela & Pain, 2000, Zani, Cicognani & Albanesi, 2001). The sense of community (SOC) scale included four items. Three of the items measured social relations (e.g., “I feel that it is easy to approach my neighbours if I needed help”) and one identification with the residential area (“given the opportunity, I would like to move out of this neighbourhood”) (Buckner, 1988; Cantillon, Davidson & Schweitzer, 2003; Chipuer & Pretty, 1999; Kim & Kaplan, 2004).

We had reliability data over time (10 months) of the following measures. Satisfaction with life that was measured with an SWLS scale consisting of five items (Diener et al., 1985; Pavot & Diener, 1993). We computed Nature and Urban Orientedness scales for purposes of the present study with reference to several earlier ideas (cf. Kyle, Mowen & Tarrant, 2004; Mayer & McPherson Frantz, 2004; Ryan, 2005; Schultz, Shriver, Tabanico & Khazian, 2004). The Nature Orientedness scale included five items (e.g., “sometimes I feel compelled to visit nature”). The Urban Orientedness scale included four items (e.g., “I enjoy hanging around the city”). Four items of the frequency of negative affect (Watson et al., 1988; Watson & Pennebaker, 1989) reflecting nervousness and depression during the last month formed a mean

summary score. We computed a summary score for the physical symptoms scale (Derogatis, Lipman, Rickels, Uhlenhuth & Covi, 1974; Emmons, 1991) by including cases with responses to six items measuring aches or discomfort in muscles, stomach and head.

Attachment to a favourite place (cf. Hammitt, Backlund & Bixler, 2004; Kaltenborn, 1997; Kyle, Bricker, Graefe & Wickham, 2004; Williams, Patterson, Roggenbuck & Watson, 1992) was measured with two items (“I would long for this place if I moved elsewhere”, “even continuous visiting here does not feel boring”). Frequency of visiting the favourite place, length of stay in favourite place, hobbies involving nature, and importance of nature as such in childhood were measured with single items.

Two items (“In the last month, how often have you felt a) confident about your ability to handle your personal problems b) difficulties were piling up so high that you could not overcome them” from the Perceived Stress Scale (PSS) (Cohen et al., 1983) were used separately. Stressful daily life experiences at work and with money (hassles) and uplifts in social relationships were used as separate items and measured with the format of the Daily Hassles and Uplifts scale (DeLongis et al., 1988; Feist, Bodner, Jacobs, Miles & Tan, 1995). Perceived general health at the present moment was measured with a single item (Chandola & Jenkinson, 2000; Manderbacka et al., 1998).

Table 1 here

RESULTS

All the major analyses (including test-retest reliabilities) were conducted with a sample of favourite places to which the self-reported distance from home was equal to or less than 15 km ($n = 1,089$). After this distance, summer homes began to appear as favourite places. Summer cottages are a distinctive feature of Finnish culture with more than 470,000 second homes (the population of Finland being 5.2 million) in the rural areas (Sievänen 2001). We wanted to exclude these culturally specific places and focus our analyses on the level of the everyday living environment.

First, we wanted to relate the restorative experiences in favourite places to as many theoretically interesting variables as possible. We wanted to find out whether we can reliably associate the variables with the level of restorative experiences in a *favourite* place as such, regardless of the type of place (urban vs. natural, green vs. waterside). In accordance with this reasoning, attachment to the favourite place (and thus favouriteness) was indeed high in all types of favourite place (on a 7 –point scale: extensively managed nature areas, $M = 5.2$, $SD = 1.2$; built-up green spaces, $M = 5.0$, $SD = 1.3$; urban areas, $M = 5.3$, $SD = 1.3$; exercise / hobby areas, $M = 5.0$, $SD = 1.4$; waterside environments, $M = 5.5$, $SD = 1.3$) and differed significantly in pairwise comparisons (Bonferroni) only between built green spaces and waterside environments ($F_{(4, 1070)} = 4.2$, $p = .002$, partial $\eta^2 = .015$, power = .924). Note that we report differences in the strength of restorative experiences between place types elsewhere (Korpela et al., submitted).

Several considerations were important before carrying out the statistical analyses. As our aim was to rule out less important variables for purposes of making future research more precise, we did not choose standard multiple regressions where all the variables are entered into the model. Due to a lack of earlier research, we could not reasonably deduce hypotheses (which are theoretical deductions not simple guesses)

about the order or the importance of different determinants. Thus, it was not convenient to perform sequential (hierarchical) multiple regression investigating, for example, the restoration-need-variables first and then investigate whether the place-use-variables, personality variables etc. in turn add something to the explanatory power of the model. We also wanted to investigate specific (single item) independent variables such as the frequency of use of the favourite place and the length of stay in it and thus did not always use multi-item scales. We had to take into account the above-mentioned considerations when deciding about our statistical model. Firstly, we investigated the correlations of 56 independent variables to restorative experiences (ROS scores) (Table 2).

Table 2 here

We carried out a statistical regression analysis (forward) with ROS as a dependent variable and 56 main variables as independent variables (Table 3). A further consideration in favour of this analysis was that due to, e.g., suppression effects (MacKinnon, Krull, & Lockwood, 2000) low zero order correlations may change when the variables are included in a larger regression model where other variables are controlled for. Thus, we included important variables although their zero order correlations to ROS appeared to be low.

The collinearity diagnostics did not reveal problems of multicollinearity (see Table 3); assumptions of the normality, linearity and homoscedasticity of residuals were met. The highest correlation (distance limit ≤ 15 km) was between green area visits during summer and winter ($r = .75$, $p = .000$, $n = 1096$), all the other correlations were

under $r = .71$, the median correlation being .06 thus showing the generally low level of intercorrelations.

Ten variables remained as significant determinants of the ROS scores (Table 3) in the favourite place ($F_{(10, 926)} = 34.2, p = .000$, estimated power of the F-test with α and effect size set at .05 (also with $\alpha = .05$ and effect size = .10) is 1.0; Gpower software; Erdfelder Faul, & Buchner, 1996). The model explained 26 % (adjusted $R^2 = .26$) of variance. It is to be noted that we also performed a similar statistical regression analysis (forward) with only those 22 variables, which had a correlation $r \geq .09$ to ROS. The analysis revealed that the first six variables in Table 3 were reliably related to the ROS scores.

Table 3 here

We observe a pattern of determinants firstly related to the “immediate” use of the favourite place (duration and frequency), secondly, to the personal background of nature experiences (nature orientedness, nature hobbies, childhood nature experiences), and thirdly, to situational factors in life which are related to stress (hassles at work and with money, satisfaction with life) and to social relations (uplifts of social relations, visiting alone vs. in company, satisfaction with life). Variables of all these three major groupings emerge among the four best determinants of ROS scores.

The strongest determinant positively related to restorative experiences was length of stay in the favourite place followed by nature orientedness and frequency of visiting the favourite place. These three variables account for 18 % of the variance in ROS scores. On the basis of B-coefficients we can say that a change of one scale point in the length of stay in the favourite place from 30 min -1 hour to 1- 1.5 hours would change

the strength of restorative experiences .20 points on a 7-point scale (1 = not at all, 7 = completely). In our interpretation, the need for restoration was measured by uplifts of social relations, hassles related to work and money as well as satisfaction with life. The results indicate that the more worries a person has about money or work the more restoration s/he experiences while in the favourite place. The more satisfied s/he is with life the more restoration s/he experiences while in the favourite place. Nature hobbies, childhood nature experiences and being alone in green areas all correlate positively with restorative experiences. The determinants of the model are reasonably independent, as the strongest correlation between the determinants was |.36| (satisfaction with life and hassles with money), and the median correlation was .06.

As a second major analysis, we wanted to identify the best possible determinants of restoration experiences within each favourite place category. Thus we carried out a statistical regression analysis (forward) with ROS as a dependent variable and all 56 determinant variables as independent variables separately in different places. Collinearity diagnostics did not show problems of multicollinearity; assumptions of the normality, linearity and homoscedasticity of residuals were met. We excluded urban favourite places due to low frequency of mentioning ($N = 68$). In accordance with our exploratory aim, these analyses allowed us to collect all potential and important determinants of restorative experiences from our initial set of variables.

 Table 4 here

Table 4 shows that quite different variables are related to restorative experiences when the different kinds of favourite settings are analysed separately. The models explain 19 – 31 % of the variance in ROS scores. Note that the statistical power of our

model is quite low in exercise and activity areas (.39) and in waterside environments (.65). Only length of stay, frequency of visiting the place, nature orientedness, and importance of nature experiences in childhood and adolescence are positively associated with ROS scores in more than one place, in two types of places. Length of stay in the favourite place, frequency of visiting it and nature orientedness were efficient positive determinants both in extensively managed nature areas and built-up green spaces. The importance of nature in childhood was important in both extensively managed nature areas and waterside environments.

Surprisingly, connectedness to urban environment relates positively to restoration experiences in a favourite extensively managed nature area. This would mean that for city-oriented people (who nevertheless visit near-home natural places) restorative experiences are likely only in extensively managed nature areas such as forests or scenery fields but not in, for example, built-up green spaces such as parks. However, zero order correlation between urban orientedness and ROS is -.10 and between nature orientedness and ROS $r = .30$, and between urban and nature orientedness $r = -.47$ ($p = .000$, $n = 1116$), suggesting that this result may also be technical due to the correlation between these two determinant variables.

In exercise and hobby-related areas, the more a person usually visits outdoor nature areas alone and the more recent uplifts s/he has experienced in her/his social relationships the stronger restorative experiences s/he tends to have. Increase in the feeling of security (indexed by a choice of well-lit routes with good views to the surroundings and by avoidance of moving outdoors in unsafe areas or in the evenings) tends to be associated with stronger restorative experiences. Logically, the presence of a handicap restricting the possibilities of movement tends to be associated with low restorative experiences in exercise areas.

The high frequency of visits to natural areas (including waterside environments) in the residential area is related to stronger restorative experiences in favourite waterside environments. The presence of a hobby related to nature also is associated with stronger restorative experiences. The hobbies mentioned in this group were both water-related hobbies like swimming, boating, or fishing and other nature hobbies such as walking, jogging, cross-country skiing, orienteering, and berry-picking.

DISCUSSION

We observed a pattern of ten determinants of restorative experiences in favourite places in the vicinity. The determinants explained a reasonably large share, 26%, of the variance in restorative experience scores (cf. Jeffs, Godsland, & Johnston, 2006). The determinants included the “immediate” use of the favourite place (duration and frequency), the personal background of nature experiences (nature orientedness, nature hobbies, childhood nature experiences), and situational factors in life related to stress (hassles at work and with money, satisfaction with life) and to social relations (uplifts of social relations, visiting alone vs. in company). Variables of all these three major groupings emerged among the four strongest determinants of restorative experience scores. Thus, the most powerful determinants did not appear in the model neatly as clusters forming one main group after another (as we would suppose in hierarchical regression). Instead, the determinant variables appeared alternately from different main groups. The results indicate that the increase in the strength of the restorative experience is associated with the increased time in the restorative environment (= favourite place) which is in accordance with the postulates of the attention restoration theory (Kaplan & Kaplan, 1989). The relationship between restoration, nature orientedness and childhood nature experiences is in accordance with the view of the mutuality of personality traits

and the tendencies to seek out or end up in compatible environments (niche-building; Caspi, Roberts & Shiner, 2005; Tesser, 2002).

As with all studies, this one has its methodological limitations. Typically for empirical studies in social and medical sciences (cf. Jeffs, Godsland, & Johnston, 2006), a large share of variance in the dependent variable (ROS) could not be explained with our models (19% - 31% in different place types). This suggests that new important determinants might be found in the future even though we have tried to focus on the potential ones. More sophisticated use of theories than in the current study and/or qualitative studies using in-depth interviews may help this search. However, we also note that the interactions between independent variables were not included in the customary regression analyses and they may explain part of the remaining variance. Concerning our methodology, we examined the relationship of restorative experiences to several self-rated variables using regression analyses. Critics might call this approach “statistical fishing” but in agreement with some statisticians (Tabachnick & Fidell, 2007) we consider it a legitimate use of regression analysis when the aim is to advance the research field by trying to limit the group of potential determinants for future research.

We must assume that the significance of the determinants of restorative experiences with the lowest coefficients in our model, visiting natural areas alone versus in company, in particular, may easily change in a different model. We also acknowledge that every regression solution is sensitive to the combination of the variables included in it. However, we also note that we found ten quite independent determinants as the highest correlation between the variables was $|.36|$, the median being $.06$. Thus, we conclude that the robustest group of determinants for future research include frequency of using the favourite place and the length of stay, and nature orientedness. These

determinants of restorative experiences were first in the overall model and efficient in two place types (extensively managed nature areas and built green spaces) where the statistical power of our models was the best. However, the power of the model in built green spaces (.74) is already cautionary low and further research is called for. In that endeavour, the theories of restoration, emotion regulation and niche-building might fruitfully complement each other.

We also noted that different variables were associated with restorative experiences in different favourite settings. Thus, the determinants of restoration may not be a homogeneous set of phenomena acting similarly in all kinds of favourite residential settings. Adding to our list of ten main determinants, self-reports of frequency of visiting (not only the favourite place but also residential green spaces), and illness or handicap restricting movement were determinants of restoration in certain favourite place types although the low statistical power renders these results and speculations unreliable. However, at this early stage of the research they suggest that physical activity (indexed in our questionnaire by frequency of visiting, amount of exercise elsewhere than in nature, the existence of a pet which requires walking outdoors, and an illness or a handicap restricting movement) is among the potential determinants of restorative experiences, as well as the sense of security and experiences of nature at work. Orientedness to green nature as a personality disposition was related to restorative experiences, particularly in extensively managed nature areas such as large forests and in built green spaces such as parks but not in other favourite places. Thus, environmental education, which increases nature orientedness, might lead to stronger restorative experiences. However, as our results are correlational not causal, the direction of this relationship may also be the opposite.

Daily hassles or, rather, irritating worries about money and work (indicating the need for restoration) were significantly positively related to restoration. The more worries there were, the more intensive the restorative experiences were. At the same time, however, the uplifts of social relationships and satisfaction with life were also significantly positively related to restoration. Studies of favourite places and affect regulation (Korpela, 2002, 2003; Korpela & Ylén, 2007; Regan & Horn, 2005) have quite consistently recorded self-reports of *improvement* of stressed mood but also of *continuation* of positive mood while in the favourite place. To repeat, we found evidence of the stronger need for restoration (worries) being related to stronger restorative experiences in favourite places suggesting self-regulation of negative mood (worries) toward a positive one (restoration). Moreover, there is evidence of the continuation of positive mood (uplifts) and/or of the effect of the general well-being dispositions (e.g., satisfaction with life) filtering perceptions of restoration. In the latter case (reflecting the top-down view of well-being), it is interesting and puzzling that negative affectivity was not related to restoration but daily hassles were. Clearly, more research is needed in this area in the future.

Many potential variables (46 altogether) correlated very marginally with restorative experiences in our sample. Thus, neither negative affectivity, noise sensitivity, feelings of community, perceived health status or symptoms nor any of the background variables, such as age or level of education, were significant determinants of the restorative experiences in the favourite place. Although some variables had moderate zero-order correlations with restorative experiences in favourite places, such as gender, the level of knowledge of residential natural areas, or the importance of green areas for satisfaction with housing, the correlations disappeared when the effect of other variables was controlled for in the regression model. We measured many of the

excluded variables with single items but it is not easy to believe that many of them could have been measured more reliably with multi-item scales. If that had been possible, it might also have affected our results. Objective data on the distances or frequencies of visits to different places, and the amount of physical exercise would be an advantage in future studies.

Lastly and perhaps most importantly, our results provide for the first time information about how the increase in the duration of the stay in the everyday favourite place might affect restoration experiences. For example, when the duration of stay in the favourite place increases from 30 min - 1h to 1h - 1.5h we would expect the change in the strength of restorative experiences be .20 points, on average, on the scale using integers from 1 to 7. Such knowledge complements the findings regarding the fairly short time-frames (approximately 40 minutes) used in laboratory investigations so far. Moreover, the more frequently during the week a person visits the favourite place the more probably she or he will achieve higher levels of restoration experiences. For example, the change from visiting once a week to visiting 2 to 3 times per week would increase the strength of restorative experiences by .11 points, on average. This information could be used for health education and counselling purposes by psychologists and physicians and in designing field experimental work in this field.

For counselling purposes, we are tentatively proposing an analogy to “exercise prescriptions” in primary healthcare (Sørensen, Skovgaard & Puggaard, 2006) based on our results. We call these “*favourite place prescriptions*”. In health counselling, people could be advised to seek out and visit a favourite place or several favourite places from their everyday surroundings including both natural and built environment. Knowing that in adult samples from different countries, natural settings, such as parks, beaches or forests have constituted 50%-60% of favourite places (Korpela & Hartig, 1996; Korpela

et al., 2001; Newell, 1997, Sommer, 1990) these prescriptions resemble but are not identical with the British concept of “health walks” (Bird, 2004). The idea of health walks includes local access to safe natural green space, which can help individuals sustain levels of physical activity. In favourite place prescriptions, people might be advised to reflect on their place experiences, preferences, and memories. They might be asked to visit the place at certain frequencies per week and be as experientially open as possible to their favourite environment. The experiences before, while visiting the favourite place and after the visit could be recorded with a structured diary. By diverting the focus of counselling and discussion away from physical exercise per se, these prescriptions might serve as an indirect method of increasing physical activity and well-being in population groups who are inactive and insensitive to exercise prescriptions or health education. Moreover, they might work as a method for raising the population’s awareness of the environment and its quality. Obviously, longitudinal studies investigating the relationship between restorative experiences and repeated visits to the favourite places using various population groups are needed to verify the usefulness of our proposition. So far, there is evidence that even short bouts of walking (10-15 min.) are associated with shifts toward increased activation and positive affect among young, health, and physically active individuals (Ekkekakis, Hall, VanLanduyt & Petruzzello, 2000).

REFERENCES

Bird, W., 2004. Natural fit. Can green space and biodiversity increase levels of physical activity? Report for the RSPB. Available: <http://www.mmu.ac.uk/academic/mispa/docs/Outdoor%20&%20Environment/05%20Natural%20Fit.pdf> [accessed 19.09.2007].

- Bodin, M., Hartig, T., 2003. Does the outdoor environment matter for psychological restoration gained through running? *Psychology of Sport and Exercise*, 4, 141-153.
- Brown, B., Perkins, D. D., Brown, G., 2003. Place attachment in a revitalizing neighborhood: individual and block levels of analysis. *Journal of Environmental Psychology*, 23, 259-271.
- Buckner, J.C., 1988. The development of an instrument to measure neighborhood cohesion. *American Journal of Community Psychology*, 16, 771-791.
- Cantillon, D., Davidson, W. S., Schweitzer, J. H., 2003. Measuring community social organisation: sense of community as a mediator in social disorganization theory. *Journal of Criminal Justice*, 31, 321-339.
- Caspi, A., Roberts, B. W., Shiner, R. L., 2005. Personality development: stability and change. *Annual Review of Psychology*, 56, 453-484.
- Chandola, T., Jenkinson, C., 2000. Validating self-rated health in different ethnic groups. *Ethnicity & Health*, 5, 151-159.
- Chawla, L. 1992. Childhood place attachments. In Altman, I., Low, S. M. (Eds), *Place Attachment*. Plenum Press, New York, pp. 63-86.
- Chipuer, H. M., Pretty, G. M. H., 1999. A review of the sense of community index: current uses, factor structure, reliability, and further development. *Journal of Community Psychology*, 27, 643-658.
- Cohen, S., Kamarck, T., Mermelstein, R., 1983. A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396.

- Cutt, H., Giles-Corti, B., Knuiaman, M., Burke, V., 2007. Dog ownership, health and physical activity: a critical review of the literature. *Health & Place*, 13, 261-272.
- DeLongis, A., Folkman, S., Lazarus, R.S., 1988. The impact of daily stress on health and mood: psychological and social resources as mediators. *Journal of Personality and Social Psychology*, 54, 486-495.
- Derogatis, L., Lipman, R., Rickels, K., Uhlenhuth, E., Covi, L., 1974. Hopkins Symptom checklist (HSCL): a self-report symptom inventory. *Behavioral Science*, 19, 1-15.
- de Vries, S., Verheij, R. A., Groenewegen, P. P., 2003. Natural environments – healthy environments? An exploratory analysis of the relationship between greenspace and health. *Environment and Planning A*, 35, 1717-1731.
- Diener, E., Emmons, R. A., Larsen, R. J., Griffin, S., 1985. The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71-75.
- Ekkekakis, P., Hall, E.C., VanLanduyt, L.M., Petruzzello, S.J., 2000. Walking in (affective) circles: Can short walks enhance affect? *Journal of Behavioral Medicine* 23:245-275.
- Emmons, R. A., 1991. Personal strivings, daily life events, and psychological and physical well-being. *Journal of Personality*, 59, 453-472.
- Epstein, S., 1991. Cognitive-experiential self-theory: an integrative theory of personality. In: Curtis, R. C. (Ed), *The Relational Self. Theoretical Convergences in Psychoanalysis and Social Psychology*. Guilford Press, New York, pp. 111-137.
- Erdfelder, E., Faul, F., Buchner, A. 1996., GPOWER: a general power analysis program. *Behavior Research Methods, Instruments, & Computers*, 28, 1-11.

- Feist, G.J., Bodner, T.E., Jacobs, J.F., Miles, M., Tan, V., 1995. Integrating top-down and bottom-up structural models of subjective well-being: a longitudinal investigation. *Journal of Personality and Social Psychology*, 68, 138-150.
- Grahn, P., Stigsdotter, U., 2003. Landscape planning and stress. *Urban Forestry & Urban Greening*, 2, 1-18.
- Hammit, W. E., Backlund, E. A., Bixler, R. D., 2004. Experience use history, place bonding and resource substitution of trout anglers during recreation engagements. *Journal of Leisure Research*, 36, 356-378.
- Hartig, T., Evans, G. W., 1993. Psychological foundations of nature experience. In: Gärling, T., Golledge, R. G. (Eds), *Behavior and Environment: Psychological and Geographical Approaches*. North-Holland, Amsterdam, pp. 427-457.
- Hartig, T., Evans, G. W., Jamner, L. D., Davis, D. S., Gärling, T., 2003. Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*, 23, 109-123.
- Hartig, T., Lindblom, K., Ovefelt, K., 1998. The home and near-home area offer restoration opportunities differentiated by gender. *Scandinavian Housing & Planning Research*, 15, 283-296.
- Heinonen-Guzejev, M., Vuorinen, H. S., Kaprio, J., Heikkilä, K., Mussalo-Rauhamaa, H., 2000. Self-report of transportation noise exposure, annoyance and noise sensitivity in relation to noise map information. *Journal of Sound and Vibration*, 234, 191-206.
- Jeffs, J. A. R., Godsland, I. F., Johnston, D. G., 2006. Less than 50% of variation in HDL cholesterol between and within individuals, is explained by established predictors. *Atherosclerosis*, 184, 178-87.

- Job, R. F. S., 1996. The influence of subjective reactions to noise on health effects of the noise. *Environment International*, 22, 93-104.
- Jorgensen, A., Hitchmough, J., Dunnett, N., 2007. Woodland as a setting for housing-appreciation and fear and the contribution to residential satisfaction and place identity in Warrington New Town, UK. *Landscape and Urban Planning*, 79, 273-287.
- Kaltenborn, B. P., 1997. Nature of place attachment: a study among recreation homeowners in southern Norway. *Leisure Sciences*, 19, 175-189.
- Kaplan, S., 1995. The restorative benefits of nature: Toward an integrated framework. *Journal of Environmental Psychology*, 15, 169-182.
- Kaplan, R., 2001. The nature of the view from home: psychological benefits. *Environment & Behavior*, 33, 507-542.
- Kaplan, R., & Kaplan, S. 1989. *The Experience of Nature: A Psychological Perspective*. Cambridge, Cambridge University Press.
- Kaplan, S., Bardwell, L.W., Slakter, D.B., 1993. The museum as a restorative environment. *Environment & Behavior*, 25, 725-742.
- Kim, J., Kaplan, R., 2004. Physical and psychological factors in sense of community. *New Urbanist Kentlands and Nearby Orchard Village*. *Environment & Behavior*, 36, 313-340.
- Korpela, K. M., 1989. Place-identity as a product of environmental self-regulation. *Journal of Environmental Psychology*, 9, 241-256.
- Korpela, K., 2001. Koettu terveys ja asuinalueen mieluisat ja epämieluisat ympäristöt (Perceived health and residential favourite and unpleasant places). In Finnish Ministry of Environment: *Melukylä vai mansikkapaikka? (A noisy village or a safe haven?)*. *Suomen ympäristö 467* (pp. 123-141).

- Korpela, K., 2002. Children's environment. In Bechtel, R. B., Churchman, A. (Eds),
Handbook of Environmental Psychology. John Wiley, New York, pp. 363-373.
- Korpela, K. M., 2003. Negative mood and adult place preference. *Environment & Behavior*, 35, 331-346.
- Korpela, K. M., Hartig, T., 1996. Restorative qualities of favourite places. *Journal of Environmental Psychology*, 16, 221-233.
- Korpela, K. M., Hartig, T., Kaiser, F., Fuhrer, U., 2001. Restorative experience and self-regulation in favourite places. *Environment & Behavior*, 33, 572-589.
- Korpela, K., Ylén, M., 2007. Perceived health is associated with visiting natural favourite places in the vicinity. *Health & Place*, 13, 138-151.
- Korpela, K., Ylén, M., Tyrväinen, L., Silvennoinen, H., submitted. Differences in stress-alleviating experiences between types of favourite green, waterside and urban environments and their relation to perceived health.
- Koskela, H. Pain, R., 2000. Revisiting fear and place: women's fear of attack and the built environment. *Geoforum*, 31, 269-280.
- Kuo, F. E., 2001. Coping with poverty: impacts of environment and attention in the inner city. *Environment & Behavior*, 33, 5-34.
- Kuo, F.E., Sullivan, W.C., Coley, R.L., Brunson, L., 1998. Fertile ground for community: inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26, 823-851.
- Kweon, B.-S., Sullivan, W. C., Wiley, A. R., 1998. Green common spaces and the social integration of inner-city older adults. *Environment & Behavior*, 30, 832-858.
- Kyle, G., Bricker, K., Graefe, A., Wickham, T., 2004. An examination of recreationists' relationships with activities and settings. *Leisure Sciences*, 26, 123-142.

- Kyle, G. T., Mowen, A. J., Tarrant, M., 2004. Linking place preferences with place meaning: an examination of the relationship between place motivation and place attachment. *Journal of Environmental Psychology*, 24, 439-454.
- Maas, J., Verheij, R. A., Groenewegen, P. P., deVries, S., Spreeuwenberg, P., 2006. Green space, urbanity, and health: how strong is the relation? *Journal of Epidemiology & Community Health*, 60, 587-592.
- MacKinnon, D. P., Krull, J. L., Lockwood, C. M., 2000. Equivalence of the mediation, confounding and suppression effect. *Prevention Science*, 1, 173-181.
- Manderbacka, K., Lahelma, E., Martikainen, P., 1998. Examining the continuity of self-rated health. *International Journal of Epidemiology*, 27, 208-213.
- Mayer, F. S., McPherson Frantz, C., 2004. The connectedness to nature scale: a measure of individual's feeling in community with nature. *Journal of Environmental Psychology*, 24, 503-515.
- Newell, P. B., 1997. A cross-cultural examination of favourite places. *Environment & Behavior*, 29, 495-514.
- Parsons, R., Tassinary, L. G., Ulrich, R. S., Hebl, M. R., Grossman-Alexander, M., 1998. The view from the road: implications for stress recovery and immunization. *Journal of Environmental Psychology*, 18, 113-140.
- Pavot, W., Diener, E., 1993. Review of the satisfaction with life scale. *Personality Assessment*, 5, 164-172.
- Puddifoot, J. E., 1996. Some initial considerations in the measurement of community identity. *Journal of Community Psychology*, 24, 327-336.
- Regan, C. L., Horn, S. A., 2005. To nature or not to nature: associations between environmental preferences, mood states and demographic factors. *Journal of Environmental Psychology*, 25, 57-66.

- Roberts, B.W., Robins, R.W., 2004. A longitudinal study of person-environment fit and personality development. *Journal of Personality*, 72, 89–110
- Ryan, R. L., 2005. Exploring the effects of environmental experience on attachment to urban natural areas. *Environment & Behavior*, 37, 3-42.
- Schultz, P. W., Shriver, C., Tabanico, J. J., Khazian, A. M., 2004. Implicit connections with nature. *Journal of Environmental Psychology*, 24, 31-42.
- Sievänen, T. (Ed.) (2001). *Luonnon virkistyskäyttö 2000 [Outdoor recreation 2000]*. Research reports of the Finnish Forest Research Institute (Report No. 802). Vammalan kirjapaino: Metla, Vantaan tutkimuskeskus.
- Sommer, B., 1990. Favorite places of Estonian adolescents. *Children's Environmental Quarterly*, 7, 32-36.
- Sørensen, J.B., Skovgaard, T., Puggaard, L., 2006. Exercise on prescription in general practice: a systematic review. *Scandinavian Journal of Primary Health Care*, 24, 69-74.
- Staats, H., Hartig, T., 2004. Alone or with a friend: a social context for psychological restoration and environmental preferences. *Journal of Environmental Psychology*, 24, 199-211.
- Staats, H., Kieviet, A., Hartig, T., 2003. Where to recover from attentional fatigue: an expectancy-value analysis of environmental preference. *Journal of Environmental Psychology*, 23, 147-157.
- Sullivan, W. C., Kuo, F. E., Depooter, S. F., 2004. The fruit of urban nature: vital neighborhood spaces. *Environment & Behavior*, 36, 678-700.
- Tabachnick, B. G., Fidell, L. S., 2007. *Using Multivariate Statistics*. Pearson, Boston.

- Takano, T., Nakamura, K. Watanabe, M., 2002. Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *Journal of Epidemiology & Community Health*, 56, 913-918.
- Tanaka, A., Takano, T., Nakamura, K. Takeuchi, S., 1996. Health levels influenced by urban residential conditions in a megacity – Tokyo. *Urban Studies*, 33, 879-894.
- Tesser, A., 2002. Constructing a niche for the self: a bio-social, PDP approach to understanding lives. *Self and Identity*, 1, 185-190.
- Tyrväinen, L., Mäkinen, K., Schipperijn, J., 2007. Tools for mapping social values of urban woodlands and other green areas. *Landscape and Urban Planning*, 79, 5-19.
- Ulrich, R. S., 1979. Visual landscapes and psychological well-being. *Landscape Research*, 4, 17-23.
- Ulrich, R. S., 1983. Aesthetic and affective response to natural environment. In: Altman, I., Wohlwill, J. F. (Eds), *Human Behavior and Environment: Advances in Theory and Research. Behavior and the Natural Environment (Vol. 6)*. Plenum Press, New York, pp. 85-125.
- Ulrich, R. S., 1984. View through a window may influence recovery from surgery. *Science*, 224, 420-421.
- Ulrich, R. S., Simons, R., Losito, B. D., Fiorito, E., Miles, M. A., Zelson, M., 1991. Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11, 201-230.
- Urban Ecosystem Europe 2006. Available: http://www.ambienteitalia.it/chisiamo_eng/pdf/Urban%20Ecosystem_EU2006.pdf/ [accessed 29 January 2007].
- Ward Thompson, C., Aspinall, P., Bell, S., Findlay, C., 2005. “It gets you away from everyday life’’: local woodlands and community use — what makes a difference? *Landscape Research*, 30, 109 – 146.

- Watson, D., Clark, L. A., Tellegen, A., 1988. Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063-1070.
- Watson, D., Pennebaker, J. W., 1989. Health complaints, stress, and distress: exploring the central role of negative affectivity. *Psychological Review*, 96, 234-254.
- Weinstein, N. D., 1978. Individual differences in reaction to noise: a longitudinal study in a college dormitory. *Journal of Applied Psychology*, 63, 458-466.
- Wells, N.M., Lekies, K. S., 2006. Nature and the life course: pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments*, 16, 1-24. Retrieved from <http://www.colorado.edu/journals/cye/>
- Williams, D. R., Patterson, M. E., Roggenbuck, J. W., Watson, A. E., 1992. Beyond the commodity metaphor: examining emotional and symbolic attachment to place. *Leisure Sciences*, 14, 29-46.
- Williams P. G., Wiebe D., J., 2000. Individual differences in self-assessed health: gender, neuroticism and physical symptom reports. *Personality and Individual Differences*, 28, 823-835.
- Zani, B., Cicognani, E., Albanesi, C., 2001. Adolescents' sense of community and feeling of unsafety in the urban environment. *Journal of Community and Applied Social Psychology*, 11, 475- 489.
- Zimmer, K., Ellermeier, W., 1999. Psychometric properties of four measures of noise sensitivity: a comparison. *Journal of Environmental Psychology*, 19, 295-302.

Table 1. Descriptives of the main multi-item scales and single items (with test-retest reliability data) of the study.

Table 1.

Measure	Scale	M	SD	n ₁	α	r _{test-retest}	n ₂	p
<i>Scales</i>								
Restoration Outcome Scale (ROS)	1 = not at all 7 = totally	5.1	1.0	1242	.92	.60	384	.000
Feelings of energy	1 = never 7 = every day	4.9	1.1	1256	.65			
Feelings of distress	1 = never 7 = every day	3.7	1.3	1256	.85			
Noise sensitivity	1 = totally disagree 7 = totally agree	4.2	1.2	1257	.75			
Sense of security	1 = totally disagree 5 = totally agree	2.8	1.3	1256	.83			
Sense of community	1 = totally disagree 5 = totally agree	3.5	.90	1266	.75			
Satisfaction with life	1 = totally disagree 7 = totally agree	4.8	1.1	1260	.88	.69	386	.000
Nature orientedness	1 = totally disagree 5 = totally agree	3.6	.79	1265	.69	.74	388	.000
Urban orientedness	1 = totally disagree 5 = totally agree	3.1	1.0	1263	.83	.81	417	.000
Negative affect	1 = never 5 = every day	2.1	.75	1256	.79	.65	421	.000
Physical symptoms	1 = never 5 = every day	1.8	.65	1259	.77	.71	423	.000
Attachment to a fav. place	1 = not at all 7 = totally	5.2	1.3	1241	.63	.42	421	.000
<i>Single items</i>								
Freq. of visiting fav. place	1 = daily 6 = less frequently than 1-3 times per month	3.73	1.55	1249		.31	384	.000
Length of stay in favorite place	1 = less than 15 min 6 = over 2 hours	3.7	1.49	1239		.35	380	.000
Nature hobbies	dichotomous	yes 73%		1251		.53	379	.000
Importance of nature as such in childhood	1 = not at all 5 = very important	4.0	1.05	1267		.54	387	.000
Confidence in handling problems	1 = never 5 = every day	2.8	1.47	1242		.34	414	.000
Difficulties piling up	1 = never 5 = every day	1.57	.86	1244		.56	417	.000
Worries about work	0 = not at all 3 = very much	1.35	.96	1096		.49	356	.000
Worries about money	0 = not at all 3 = very much	1.11	1.02	1189		.63	390	.000
Uplifts of social relations	0 = not at all 3 = very much	2.44	.64	1232		.34	411	.000
Perceived general health	1 = poor 5 = excellent	3.83	.80	1260		.59	385	.000

Note: α = Cronbach's alpha, a measure of the internal consistency of a scale; $r_{\text{test-retest}}$ = correlation between the first and second (10 months later) survey; n_1 = the number of respondents in the first survey; n_2 = the number of respondents in the second survey (10 months later); p = significance of $r_{\text{test-retest}}$.

Table 2. Variables (self-reported) related to restorative experiences in the favourite place and entered to the regression model (* = inversed scale).

Table 2. To be continued

USE OF FAVOURITE PLACE (5)	ROS	SITUATIONAL FACTORS IN LIFE (2, 3) &	ROS
	r	NEED FOR RESTORATION (1)	r
		Hassles / uplifts related to	
Frequency of visiting the favourite place*		social relations,	.01/.17
		work,	.10/.12
	-.14	money,	.10/.05
		domestic work,	.01/.16
		news,	.08/.11
		tobacco and alcohol	.04/.03
Typical length of stay in the favourite place	.27	Perceived stress: difficulties piling up	.03
		confidence in handling problems	.01
		Perceived health status	.09
Distance from home to the favourite place		Energy 1 yr.	.11
	.06	Distress 1 yr.	.03
		Symptoms	-.01
		Blood pressure	-.06
		General discomfort	-.006
EXPERIENCES OF NATURAL AREAS (4, 5)		Amount of exercise elsewhere than in nature*	.003
Freq. of visiting nature areas*, summer & winter	.19 .19	Sense of security when walking in the neighbourhood*	.10
Experiences of nature at work*	.03	Number of working hours per week	-.01
Pet which requires walking outdoors *	.08	Illness or handicap restricting movement in the neighbourhood *	-.02

Continued

Amount of window views from home: green, water, no proper view, 1 = no, 3 = from several windows	-.01 -.01 -.04	Satisfaction with life	.09
Frequency of visiting home yard, balcony, roof terrace	.07 .04 .07	PERSONALITY TRAITS RELEVANT TO HEALTH & PLACE EXPERIENCES (2, 3)	
Visiting residential nature areas alone (= 1) vs. in company (= 2)	-.04	Nature orientedness	.30
Level of the knowledge of residential natural areas	.18	Urban orientedness	-.10
Importance of green spaces to residential satisfaction	.27	Noise sensitivity	.03
Nature-related hobbies*	.22	Sense of community	.05
Freq. of visiting summer cottage, summer & winter	.01 .04	Negative affectivity	-.03
Importance of nature experiences as such, in exercise, in advantage use under 16 yrs. of age	.23 .20 .14	BACKGROUND MEASURES (6)	
		Age	.00
		Gender 1 = female, 2 = male	-.11
		Level of education 1 = basic, 2 = higher	-.02
		Length of residence in the area	.04

Table 3. Predictors of restoration experiences with ROS as a dependent variable and 56 variables as initial independent variables, statistical regression analysis (forward).

Table 3.

	Unstandardized		Standardized		t	Sig.	95% Confidence		Correlations		Collinearity	
	Coefficients		Beta				Interval for B		Zero-order		Statistics	
	Std.						Lower	Upper	order	Partial	Tolerance	R^2_{ad}
	B	Error	Beta				Bound	Bound				
<i>(Constant)</i>	2.711	.372			7.282	.000	1.980	3.443				
Length of stay	.202	.027	.286		7.567	.000	.149	.254	.272	.314	.976	.08
Nature orientedness	.269	.052	.214		5.146	.000	.166	.371	.291	.219	.806	.15
Frequency of use	-.114	.025	-.173		-4.560	.000	-.163	-.065	-.135	-.195	.964	.18
Uplifts, social	.185	.064	.118		2.903	.004	.060	.310	.173	.126	.835	.21
Nature hobbies	-.255	.088	-.115		-2.886	.004	-.429	-.081	-.216	-.125	.881	.22
Nature as such (< 16 yrs.),	.115	.039	.118		2.938	.003	.038	.191	.233	.127	.859	.23
Hassles, work	-.105	.040	-.099		-2.588	.010	-.184	-.025	-.096	-.112	.945	.24
Hassles, money	-.112	.040	-.112		-2.780	.006	-.191	-.033	-.101	-.120	.855	.24
Satisfaction with life	.097	.039	.108		2.483	.013	.020	.173	.089	.108	.735	.25
Alone vs. in company	-.163	.076	-.081		-2.135	.033	-.313	-.013	-.044	-.093	.960	.26

Table 4. Predictors of restoration experiences within each favourite place –category, statistical regression analysis (forward). N(mean) is the mean N when including 56 variables in the analysis.

Table 4.

	Extensively managed nature areas N _(mean) = 438			Built green spaces N _(mean) = 233			Exercise and activity/hobby areas N _(mean) = 94			Waterside environments N _(mean) = 189					
	B	Beta	R ² _{ad}	B	Beta	R ² _{ad}	B	Beta	R ² _{ad}	B	Beta	R ² _{ad}			
Length of stay in fav. place	.19	.29 ***	.08	Length of stay in fav. place	.27	.37 ***	.13	Security	.17	.24 *	.06	Nature hobbies (1 = yes, 2 = no)	-.41	-.20 *	.09
Nature orientedness	.40	.27 ***	.14	Nature orientedness	.45	.33 ***	.23	Visiting nature areas alone vs. in company (1 = yes, 2 = no)	-.71	-.36 **	.12	Frequency of visiting nature areas	.17	.25 **	.13
Urban orientedness	.17	.18 **	.16	Experiences of nature at work	.21	.23 **	.28	Uplifts from social relations	.46	.32 **	.19	Nature as such under 16 yrs.	.18	.20 *	.16
Frequency of visits in fav. place	.10	.15 *	.18	Freq. of visits in fav. place	.13	.21 **	.31	Illness or handicap (1 = yes, 2 = no)	-.65	-.24 *	.23	Uplifts from domestic work	.23	.19 *	.19
Nature as such under 16 yrs.	.16	.15 *	.20												
F(5,207) = 11.7, p = .000, power = .95				F(4,109) = 13.9, p = .000, power = .74				F(4,54) = 5.4, p = .001, power = .39				F(4,92) = 6.7, p = .000, power = .65			

Note: * p < .05, ** p < .01, *** p < .001