

Favorite green, waterside and urban environments, restorative experiences and perceived health in Finland

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SUMMARY

The study investigated restorative experiences in relation to respondents' everyday favorite places and analysed the associations between the use of favorite places, restorative experiences, their determinants and aspects of self-rated health. A simple random sample of 1273 inhabitants, aged between 15 and 75 years, of two major cities in Finland (Helsinki and Tampere) completed a postal questionnaire. A subsample of the answers from inhabitants with a self-reported distance from home to a favorite place of 15 km or less ($n = 1089$) was analysed. Restorative experiences in favorite exercise and activity outdoor areas, waterside environments and extensively managed natural settings (mainly urban woodlands) were stronger than in favorite places in built urban settings or green spaces in urban

settings (mostly parks). The results revealed a link between the need for restoration (worries and stress), the use of environmental self-regulation strategies (favorite places) and restorative outcomes. The more worries about money and work (during the last month) a person had, the more stressed a person had felt during the last year, the less energetic s/he had felt, the lower was the number of visits to the favorite place (during the last 6 months) and the lower the typical level of restorative experiences. Inconsistently, the direct path suggested that the more worries about money and work, the higher the typical level of restorative experiences. The findings increase knowledge of health-enhancing environments and have implications for stress and work recovery research.

Key words: favorite places; restorative experiences; perceived health

INTRODUCTION

Interactions with nature constitute a new challenge for health promotion interventions for populations (St Leger, 2003; Maller *et al.*, 2005). Both the total amount of green space (de Vries *et al.*, 2003) and the amount of agricultural and natural greenery in the living environment (Maas *et al.*, 2006) have been positively related to perceived health, concurring with experimental evidence showing stronger restorative outcomes of natural scenes and settings compared

with urban settings (Ulrich *et al.*, 1991; Hartig *et al.*, 2003). However, the vast variety of settings that comprise 'natural' and 'urban' has not yet been extensively covered, and there is little evidence of the restorativeness of green vs. water environments (Laumann *et al.*, 2001; Berman *et al.*, 2008; Ivarsson and Hägerhäll, 2008). Moreover, the restorative effects of physical environments have been studied experimentally in environments selected by the researcher. Little is known about the restorative experiences in different kinds of everyday

environments which people choose themselves. In this study, a person's favorite place close to their home is used as a setting through which restorative experiences are studied (Korpela and Ylén, 2009). The first aim is to compare self-rated restorative outcomes associated with favorite urban, green and waterside settings.

The second aim is to statistically model in an exploratory effort the connections between the use of favorite places, restorative experiences, their determinants and aspects of self-rated health. These aspects include *general health status*, physical symptoms (*pain in stomach, reported high blood pressure*), *negative affectivity* (a diffuse sense of subjective distress and dissatisfaction (Watson and Pennebaker, 1989) and *feelings of stress* (Hartig et al., 2003; Korpela et al., 2008). Moreover, *feelings of energy and keenness* as facets of subjective vitality can be considered as one marker of self-rated health (Ryan and Frederick, 1997). They have been theoretically linked to restorative experiences (Nix et al., 1999) without subsequent empirical studies.

The relationships between restorative experiences and aspects of self-rated health are

relatively understudied. To our knowledge, only one previous study exists showing that the group visiting favorite places every day for 5 days experienced significantly stronger restorative experiences than the non-visiting and control groups, but the groups did not differ in the amount of head, back or muscle pain reported at the end of each day (Korpela and Ylén, 2009).

Based on emotion regulation and health literature, our hypothetical, 'full' path model (Figure 1; with 18 variables, here in *italics*) to be estimated and modified assumes that *restorative experiences* in favorite places are directly related to all aspects of perceived general health reflecting not only a person's physical condition but also emotional regulation and adjustment (Diener et al., 1999) which typically take place in favorite places. In turn, findings of the determinants of the restorative experiences include variables related to the use of places (*duration of stay and frequency of visiting*), daily hassles (*worries about work and money*), personality characteristics (*nature connectedness, nature hobbies, childhood nature experiences*,

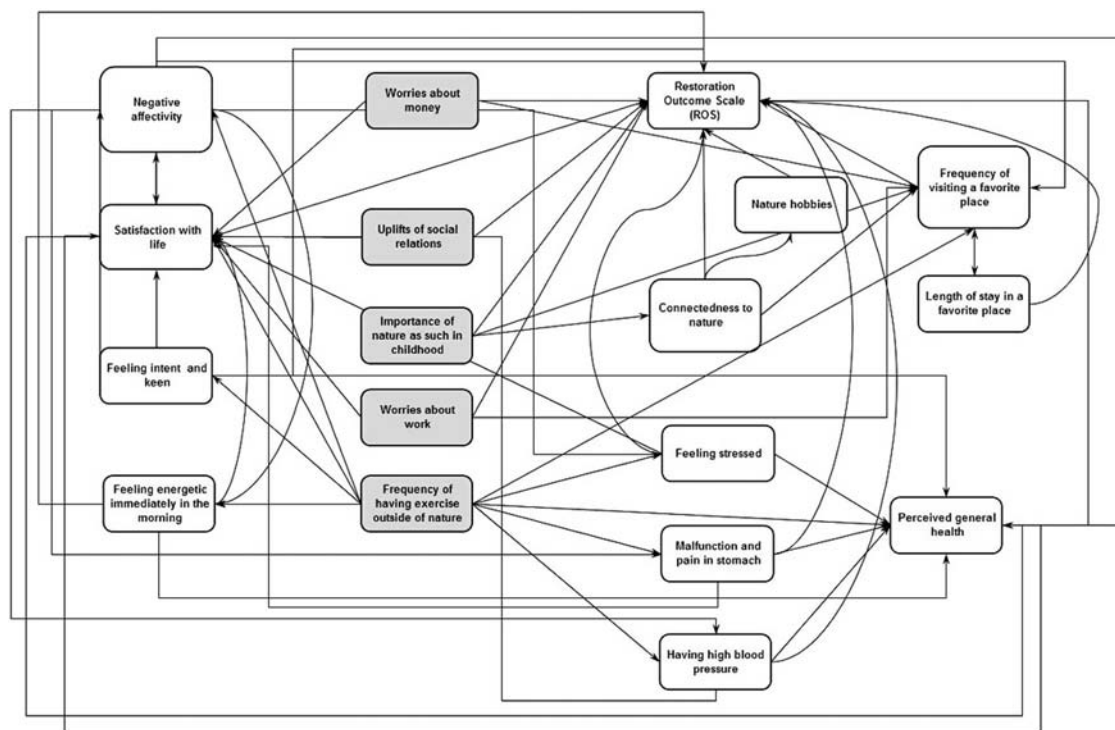


Fig. 1: Initial path model with 18 variables and 59 paths. Shaded boxes are exogenous variables, others are endogenous (dependent) variables.

satisfaction with life) and social relations (*uplifts of social relations*) (Korpela et al., 2008). Furthermore, on the basis of accumulated knowledge of the health benefits of physical activity (Saxena et al., 2005; Warburton et al., 2006) and stress research (Taylor and Stanton, 2007), we suppose that health-related variables are related to each other and to *physical activity elsewhere than in nature*. Five of the variables are set as exogenous variables which are not explained in the model because they relate to the preceding conditions of restoration (worry about work and money, uplifts of social relations) and of frequency of use of outdoor favorite places (childhood experiences and exercise outside nature). The other variables are endogenous (dependent) variables.

METHOD

Sample and procedure

A simple random sample of 3000 (0.5% of the study population) Finnish-speaking inhabitants aged between 15 and 75 years of two major cities in Finland (Helsinki and Tampere) was obtained from the Population Register Center. Helsinki, the capital of Finland, has approximately 564 000 inhabitants and Tampere has 206 000 inhabitants. After two rounds of written reminders, 1273 respondents (37.4% male, 62.6% female) out of 2989 sample members with a known address returned our mailed questionnaire (response rate 42.6%). Statistical χ^2 comparisons of the population showed that 62-year-olds in Helsinki (2.6% in the sample vs. 1.1% in the population) and women in Tampere were over-represented (61.9% in the sample vs. 51.3% in the population) in the subsample of data actually used for the main statistical analyses (a sample of favorite places to which the self-reported distance from home was 15 km or less; $n = 1089$).

Measures

Place preferences (an independent variable in analysis of covariance = ANCOVA)

Respondents were asked to rate 16 types (see Results; first paragraph) of urban and natural places and areas with regard to their personal importance (5-point Likert scale). The range of places was based on the classification of green areas defined in the green space management

system and used for mapping the social values of green areas (Tyrväinen et al., 2004, 2007). The respondents selected one particular type of those 16 environments where their favorite place was located, described that place in an open-ended answer and estimated the distance from their home to the favorite place in meters. No predetermined distance categories were given; the frequency of visiting the favorite place and the length of stay were elicited separately.

Restorative experiences

Restorative experiences in a favorite place ('What changes in your experiences typically take place there?') were measured with six items (Korpela et al., 2008). Three of the items reflected relaxation and calmness (e.g. 'I feel calmer after being here'), one item reflected attention restoration ('my concentration and alertness clearly increase here') and two items reflected clearing one's thoughts (e.g. 'I can forget everyday worries here'). We computed a mean summary score for the Restoration Outcome Scale (ROS) (see Table 1 for the descriptives of all variables).

Determinants of restorative experiences (covariates in ANCOVA)

In the ANCOVA analysis, nine most effective covariates were adjusted for out of 10 variables which were shown to be associated with the restoration (ROS) scores in multiple regression of the current data (Korpela et al., 2008).

Satisfaction with Life Scale was measured on a scale of five items (e.g. 'In most ways my life is close to my ideal', 'I am satisfied with my life') (Pavot and Diener, 1993). The Nature Orientedness Scale included five items (e.g. 'Sometimes I feel compelled to visit nature', 'I enjoy my stay at green spaces and parks more than in the built environment', 'I often feel anxiety in the rush of the city').

Stressful (negative) and uplifting (positive) daily life experiences with money, social relationships and work were measured with the Daily Hassles and Uplifts Scale (DeLongis et al., 1988). Frequency of visiting the favorite place, the length of stay in a favorite place, hobbies involving nature and importance of nature as such in childhood were measured with single items.

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

Measure	Scale	<i>M</i>	SD	<i>n</i>	α	Variable type
Scales						
Typical restoration outcomes (ROS) in favorite place	1 = not at all; 7 = totally	5.1	1.0	1242	0.92	ETA
Satisfaction with life at present	1 = totally disagree; 7 = totally agree	4.8	1.1	1260	0.88	ETA
Nature orientedness at present	1 = totally disagree; 5 = totally agree	3.6	0.79	1265	0.69	ETA
Negative affect during the last month	1 = never; 5 = every day	2.1	0.75	1256	0.79	ETA
Single items						
Importance of nature as such in childhood (be in, go around, observe nature)	1 = not at all; 5 = very important	4.0	1.05	1267		KSI
Worries about work during the last month	3 = not at all; 0 = very much	1.35	0.96	1096		KSI
Worries about money during the last month	3 = not at all; 0 = very much	1.11	1.02	1189		KSI
Uplifts of social relations during the last month	0 = not at all; 3 = very much	2.44	0.64	1232		KSI
Typical frequency of having exercise outside nature	1 = less than 1-3 times per month; 6 = daily	3.78	1.13	886		KSI
Frequency of visiting the favorite place during the last 6 months	1 = daily; 6 = less frequently than 1–3 times per month	3.73	1.55	1249		ETA
Typical length of stay in favorite place	1 = less than 15 min; 6 = over 2 h	3.7	1.49	1239		ETA
Nature hobbies at present	Dichotomous	yes 73%		1251		ETA
Perceived general health at the moment	1 = poor; 5 = excellent	3.83	0.80	1260		ETA
Having high blood pressure during the last month	1 = never; 5 = every day	1.43	0.99	1216		ETA
Malfunction and pain in stomach during the last month	1 = never; 5 = every day	1.72	0.89	1249		ETA
Feeling intent and keen during the last year	1 = never; 7 = every day	5.20	1.09	1254		ETA
Feeling stressed during the last year	1 = never; 7 = every day	4.05	1.54	1245		ETA
Feeling energetic immediately in the morning during the last year	1 = never; 7 = every day	4.65	1.40	1243		ETA

Note: α , Cronbach's alpha, a measure of the internal consistency of a scale; ETA, dependent variable; KSI, independent variable.

Aspects of perceived general health and feelings of energy (included in the path model)

Perceived general health status was measured with a widely used single item 'How is your health in general at the moment?' using a 5-point rating scale ranging from 1 (poor), 2 (quite poor), 3 (neither poor nor good), 4 (quite good) to 5 (excellent) (Singh-Manoux *et al.*, 2006). Malfunction and pain in stomach, reporting of high blood pressure and frequency of taking exercise elsewhere than in nature were measured with single items.

The frequency of the feelings of energy during the previous year was measured with two Likert scale items. The first item ('felt intent and keen') was the counterpoint to mental

fatigue (Kaplan and Kaplan, 1989) and the second one ('felt energetic early in the morning') was the counterpoint to stress (Ulrich *et al.*, 1991) measured with a single item.

Four items of the frequency of negative affect (Watson and Pennebaker, 1989) reflecting nervousness, sleeping difficulty and depression during the last month formed a mean summary score.

Analytical strategy

All the major analyses were conducted with a sample of favorite places to which the self-reported distance from home was 15 km or less in order to focus the analyses on the everyday living environment (excluding culturally specific

summer homes in the rural areas; Sievänen, 2001).

An analysis of covariance with the ROS as an outcome measure, the type of favorite place (five categories) as a fixed factor, adjusted for nine variables (covariates) was performed.

Path analysis instead of a covariance structure model was chosen since the majority of the 18 variables included in the analysis were single items. As assumptions of multi-normality of the distributions were not met, generally weighted least-squares were used as the estimation method with an asymptotic covariance matrix of the correlations as the weight matrix in PRELIS program 8.7.

RESULTS

Restorative experiences in different types of favorite places

Factor analysis (principal axis factoring, oblique Promax rotation) on the items regarding the

importance of the places produced five main place factors/categories (Figure 2), which were (i) extensively managed nature areas (large forest areas, small-scale wooded areas, scenery fields and meadows, small-scale natural state areas such as river valleys, wetlands, bushes and rocks), (ii) built-up green spaces (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), (iii) waterside environments (beaches and harbour areas), (iv) exercise and activity/hobby areas (playgrounds, recreation trails, sports grounds, allotment gardens, dog parks) and (v) indoor and outdoor urban areas (street areas and indoor places within the city center).

Extensively managed natural settings (mainly urban woodlands) were mentioned most often followed by built-up (urban) green spaces and waterside environments. The average distance to the favorite place among those selecting a favorite place not more than 15 km from home was reported as being 1942 m, standard

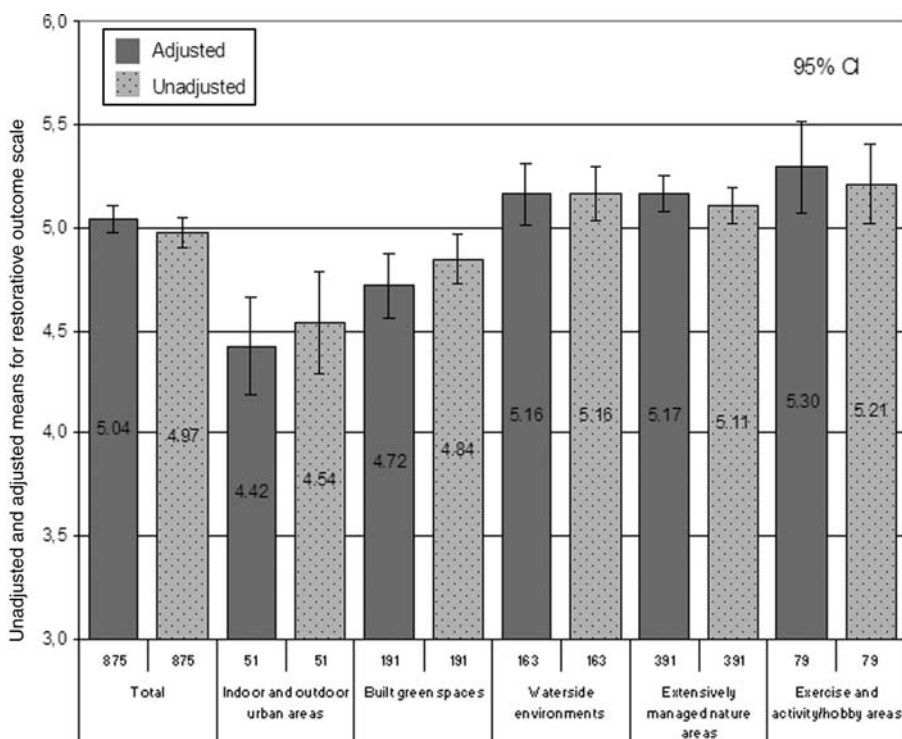


Fig. 2: Adjusted (nine covariates) and unadjusted means of restorative outcomes (ROS) by favorite place type (confidence intervals of the mean are included). Numbers under the bars represent the frequency of mentioning the favorite place type (listwise deletion in ANCOVA).

deviation of distance = 2973 m. The median frequency of visiting these places was once a week.

The assumptions of linearity, homogeneity of variance ($F_{(4,870)} = 1.4, p = 0.23$) and homogeneity of regression (the pooled covariates; $F = 1.3, p = 0.089$) were satisfactorily met for the ANCOVA. The ANCOVA model explained 29% of the variance ($R^2 = 0.30$, adjusted $R^2 = 0.29$) in the restorative experience score. After adjusting for the nine covariates, there was a significant association between type of area in which the favorite place is situated and the ROS scores ($F_{(4,861)} = 8.5, p = 0.000, \eta^2 = 0.038$). The unadjusted solution also revealed a significant association ($F_{(4,1076)} = 16.8, p = 0.000, \eta^2 = 0.06$).

Figure 2 shows that after adjusting for the covariates, the restorative experiences are the strongest in favorite places located in exercise and activity areas, followed by waterside environments and extensively managed natural areas (mainly urban woodlands). Pairwise comparisons (Bonferroni method, SPSS software) reveal no differences in ROS scores between these places ($p = 1.0$ in all comparisons). Restorative experiences in urban favorite places are significantly weaker ($p = 0.000$ in all comparisons) than in all the other places except built-up green spaces ($p = 0.25$). Restorative experiences in built-up green spaces are also significantly weaker than in extensively managed nature areas, waterside environments and exercise and activity areas ($p = 0.008, 0.005$ and 0.013 , respectively). Note that examination of place descriptions revealed that 80% of the outdoor exercise and activity areas were situated in natural surroundings (nature recreation trails).

Path model

Pearson correlations showed that ROS was weakly associated ($r = 0.06$ – 0.29 ; $0.01 < p < 0.05$) with all other variables except negative affectivity and stomach malfunction or pain.

An initial, hypothetical ‘full’ path model (Figure 1) included 59 connections (paths) which are either empirically reported or theoretically plausible postulations.

The initial model did not have a close fit ($df = 89, RMSEA = 0.096_{(90\% CI = 0.09-0.10)}, p = 0.00$ for $RMSEA < 0.05$; $AGFI = 0.91$). Next, all the non-significant paths were dropped from the model and all path connections suggested by LISREL’s modification indexes (MIs) were estimated. An MI value of 15 was chosen as the

lowest acceptable level because it indicated clearly significant connections.

The second estimation led directly to the close fit ($df = 104, RMSEA = 0.036_{(90\% CI = 0.030-0.043)}, p = 1.0$ for $RMSEA < 0.05$; $AGFI = 0.98$). After the second estimation, non-significant connections were removed, but there was no need to estimate new path connections (MIs < 15). The results did not change; a close fit remained ($df = 116, RMSEA = 0.034_{(90\% CI = 0.028-0.040)}, p = 1.0$ for $RMSEA < 0.05$; $AGFI = 0.98$; Figure 3). In Figure 3, all path connections are significant at the level of $p < 0.01$ ($t > 2.6$), denoting a conservative probability value against type I error. Of the 59 path connections included in the initial model, 29 remained and 8 new connections were suggested by LISREL.

Relationships between the determinants, restorative experiences and self-rated health

Thirty percent of the variance of the ROS scale is explained by seven variables. In the order of the strength of association, the variables are length of stay in favorite place ($\beta = 0.29$), connectedness to nature ($\beta = 0.27$), uplifts of social relations ($\beta = 0.23$), nature hobbies ($\beta = 0.14$), worries about money ($\beta = -0.11$; inversed scale, value indicates a positive relationship), frequency of visiting the favorite place ($\beta = -0.12$; inversed scale) and worries about work ($\beta = -0.06$; inversed scale). All these associations are thus interpreted as positive correlations.

There are no direct relations between restorative experiences and the health variables. Only energetic feelings in the morning are positively related to both perceived general health and the frequency of visiting the favorite place. The less energetic a person feels, the less often s/he visits the favorite place and the less healthy s/he feels.

Figure 3 shows a one-way connection from the length of stay to the frequency of visiting. Frequency of visiting favorite places is negatively associated with feeling energetic immediately in the morning. When considering the direction of the rating scales (Table 1), this association means that the fewer the energetic feelings, the smaller the number of visits to favorite places. The frequency of visiting the favorite place is also associated with the restorative experiences (the more often a person visits, the stronger the restorative experiences).

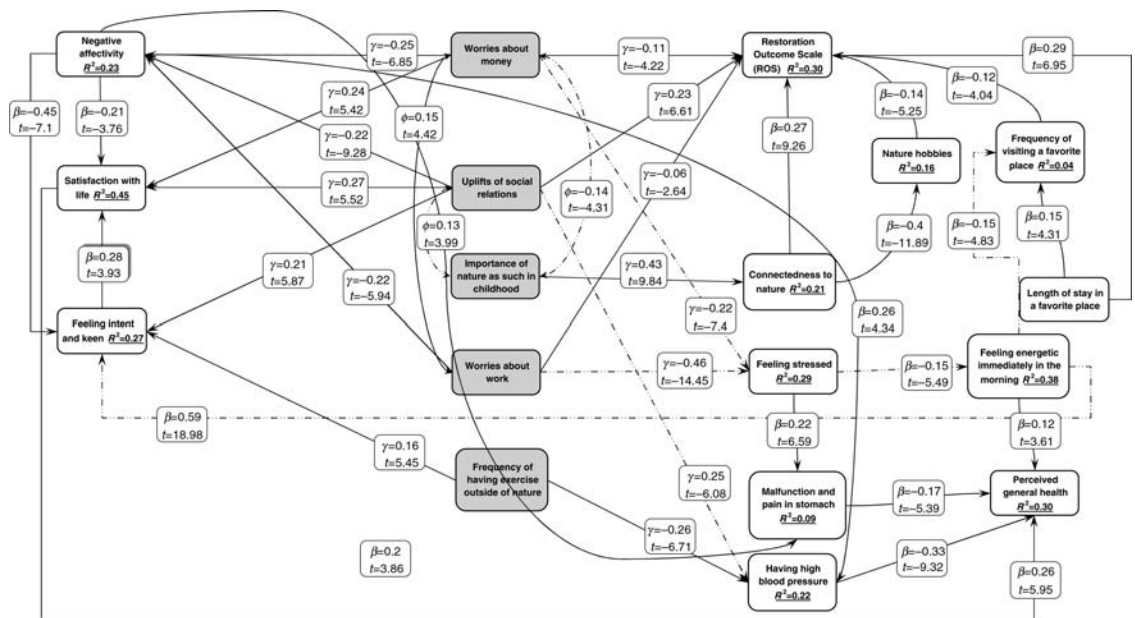


Fig. 3: Refined path model with 18 variables and 37 paths. Shaded boxes are exogenous variables, others are endogenous (dependent) variables. The dash lines represent connections that were not anticipated in the initial model.

Energetic feelings in the morning are negatively associated with the person feeling stressed (during the last 12 months), meaning that the more stressed, the less energetic a person feels. Being stressed, in turn, is negatively associated with worries about money and work (inversed scales), meaning that the more worries, the more stressed a person feels. Worries about money and work are also negatively associated with restorative experiences, meaning that the more worries, the stronger the typical level of restorative experiences.

DISCUSSION

The first aim in this study was to ascertain the differences in the restorative experiences between different kinds of favorite, everyday places including green, waterside and urban areas. The type of favorite place accounted for a notable degree (3.8%) of the variability in restorative experience scores (relaxation and calmness, attentiveness and clearing one's mind) after statistically holding constant the nine covariates (the use of the favorite place, the current and childhood uses and experiences

of natural areas within the residential area, stress, health and personality traits relevant to place experiences) in the analysis of covariance model (explaining 29% of the variance).

The findings show that restorative experiences were the strongest, and of statistically similar strength, in everyday favorite places located in outdoor exercise and activity areas, waterside environments and extensively managed natural settings (mainly urban woodlands). Restorative experiences in urban green spaces (mostly parks) and in built urban indoor and outdoor places were significantly weaker by comparison. We do not know the relative contribution of the physical environments, activities or company within the favorite places to these results, but note that variables related to the use of a favorite place (but not the type of activity) and social relations (but not company while in the place) were controlled for in the analysis of covariance. However, the overall result when considering urban vs. natural places in general concurs partly with earlier research on restorative environments (Ulrich *et al.*, 1991; Hartig *et al.*, 2003; Velarde *et al.*, 2007). It also contributes to the existing knowledge by widening our view of the potentially health-enhancing types of

natural areas which so far have been (i) the amount of agricultural and natural green spaces (Maas *et al.*, 2006), (ii) the total amount of green space (de Vries *et al.*, 2003; Mitchell and Popham, 2008) and (iii) the presence of walkable green streets (Takano *et al.*, 2002). The sample did not include ethnic variation, and further research on this issue is called for. Ethnic variation is related not only to a preference, e.g. for park attributes, and frequency and type of visits but also to the perceptions of the positive and negative effects of parks (Ho *et al.*, 2005). In this study, self-report measures and a cross-sectional design were used, which make additional, culturally and geographically diverse investigations of the restoration differences in favorite places desirable.

The similarity in the strength of restoration between urban favorite places (indoor and outdoor city areas and places) and urban green spaces (mostly parks) is unexpected. The earlier evidence from restorative environment studies suggested that parks provide stronger restorative experiences than built urban environments. The results do not support the possibility that people selecting favorite urban places and having less intensive restorative experiences simply do not have the need for restoration in these places, because this need was controlled in our statistical analyses (daily hassles or worries about work and money, uplifts generated by social relations and satisfaction with life). Thus, favorite city places may provide equally strong restorative experiences as favorite parks in conditions where people select from familiar places according to their own preferences and emotional attachments. In consequence, future theoretical and applied developments should take note that the experimentally proven superior restorativeness of natural places in comparison to urban places does not necessarily hold for all types of urban and natural places in everyday life.

Contrary to expectations but concurring with earlier findings (Korpela and Ylén, 2009), there were no direct relations between restorative experiences and the health variables. The different time schedules of the variables (e.g. the feelings of energy during the previous year, negative affectivity during the last month and current health status) are logical and to our mind do not explain the non-existent correlations.

A path from worries about money and work (during the last month) to typical restoration

experiences was found as follows. Worries about money and work were both directly and indirectly—through stress experiences—associated with restorative experiences. These direct and indirect results were conflicting. The more worries about money and work (during the last month), the more stressed a person had felt during the last year, the less energetic s/he had felt, the smaller the number of visits to the favorite place (during the last 6 months) and the lower the typical level of restorative experiences. Inconsistently, the direct path from worries about money and work suggests that the more worries, the higher the typical level of restorative experiences. Earlier results in this area are very few and inconsistent. Long-term experienced stress was studied in an 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. In a study on forest walking, the more stressed (in the past couple of months) the participants were, the more beneficial the effects of the walk on momentary emotions (depression, boredom, anxiety) were (Morita *et al.*, 2007). Note that these emotions resemble, but are not identical to, restorative experiences.

As the assumed measurement errors (zero) of the single items produce bias in the estimation of the path model's parameters and due to the exploratory approach (without solid earlier studies or theory on the subject), the results must be considered preliminary. Moreover, the paths from worries about money and work to feelings of stress, from those to feelings of energy and from those to the frequency of visiting the favorite place emerged on the basis of statistical criteria in the modification phase of the path model, suggesting tentative results.

The results reveal a link between the need for restoration (worries and stress), the use of environmental self-regulation strategies (favorite places) and restorative outcomes, but the cross-sectional design and time-specified variables do not allow conclusions about the bi-directionality of these associations to be drawn. However, the findings suggest that restorative experiences in favorite places may be importantly linked to worries about and recovery from work, a notion not frequently raised in work recovery research. Indeed, recent findings indicate that Finnish white-collar

workers regard 'entering nature' as one of the most effective strategies of recovery from work (Kinnunen and Mauno, 2009). If this finding proves to be general, it opens up a new field of research and new ideas for work recovery interventions. Moreover, a link between feelings of stress and energy and potential for restorative experiences justifies future, longitudinal studies investigating the use of favorite places in coping with stressful feelings.

In summary, while acknowledging the limitations of the study due to self-report measures, a cross-sectional design and a correlative approach, the findings increase knowledge of the types of health-enhancing environments and of the relationship between the need for restoration, favorite places and restorative outcomes. These results have potential implications not only for restoration and health studies but also for stress and work recovery research.

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