

The effects of urban inhabitants' nearby outdoor recreation on their well-being and their psychological resilience



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ABSTRACT

With the shift to a service based society, providing opportunities for outdoor recreation that enables mental and physiological self-regulation has become an increasingly important landscape function. Recent research has provided considerable evidence that visits to near-natural everyday landscapes promote psychological and physical health. However, little is so far known about the effects of people's regular outdoor recreation in their local natural environment on their well-being and, in particular, on their psychological resilience. In our project we address this research gap by investigating nearby outdoor recreation behaviour in three urbanized regions in Switzerland, each of which has a different predominant culture and language (German, French and Italian speaking). A standardized questionnaire was sent to a random sample of residents ($N=1200$) in each region. Stepwise regression supported the hypothesis that regular nearby outdoor recreation has a significant but rather marginal effect on respondents' reported well-being and their psychological resilience, even when systematically controlled. However, similar effect sizes, in particular in terms of psychological resilience, were found with other leisure activities. More generally, we found that well-being and psychological resilience were influenced by different factors, and that increasing psychological resilience mainly required a long duration of recreation or leisure activities.

MANAGEMENT IMPLICATIONS

This paper provides robust evidence that urban inhabitants' regular outdoor recreation in the nearby natural environment has positive effects on their emotional well-being and their psychological resilience. The findings suggest that the quality of the nearby recreation area is at least as important a condition for these benefits as the easy access to these areas. Inhabitants' satisfaction with the recreation area, their activity level within the recreation areas as well as the time spent in the recreation areas appeared to be more relevant predictors for these benefits than the frequency of visits in these areas. Accordingly, managers should invest as much resources in increasing the quality of the recreation areas as in improving their accessibility.

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1. Introduction

Recent literature has emphasized the role of people's regular outdoor recreation in the natural environment near to their place of residence, to not only increase well-being and health, but also to better cope with work strains such as mental fatigue, emotional exhaustion, or stress (Coleman & Isoahola, 1993; Degenhardt & Buchecker, 2012; Degenhardt, Frick, Buchecker, & Gutscher, 2011).

The natural environment around urban settlements is often under high pressure from competing land uses such as housing, transport or commercial recreation; therefore environmental managers need robust research-based evidence that nearby outdoor recreation in natural environments is truly relevant for residents' well-being, which also includes their work performance. Such information is becoming ever more crucial because nearby outdoor recreation so far is not recognized as a land use in its own right, and is therefore typically neglected in the spatial planning processes of smaller cities (Buchecker, Kienast, Degenhardt, Widmer, & Moritzi, 2013). The goal of our study was to provide such evidence based on empirical evidence derived from the relevant

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target group, namely urban residents. In our study, we defined nearby outdoor recreation areas as the natural environment around cities or settlements that residents can easily access during their leisure time, including leisure time on workdays. Nearby outdoor recreation includes all nature-based activities in these areas.

2. Outdoor recreation and well-being

Systematic and comprehensive research on the function of outdoor recreation in urban regions for residents' long-standing well-being is so far lacking. However, evidence is now mounting that exposure to nature, and in particular in the form of activities in natural settings, increases urban residents' health and well-being (Korpela, Borodulin, Neuvonen, Paronen, & Tyrvaainen, 2014). Most of the existing studies, however, refer to short-term effects of visits to green spaces for individuals' physiological, cognitive and emotional recovery and are mainly based on experiments (e.g. Bowler, Buyung-Ali, Knight, & Pullin, 2010; Hartig, Evans, Jamner, Davis, & Garling, 2003; Martens, Gutscher, & Bauer, 2011; van den Berg, Koole, & van der Wulp, 2003; Ulrich et al., 1991). Studies considering the effects of long-term exposure to nature have been mainly conducted in the context of (therapeutic) garden activities (Haluza, Schonbauer, & Cervinka, 2014; Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2011; Kim, Lim, Chung, & Woo, 2009) and several longitudinal studies have analysed the role of access to green spaces to reduce epidemics (Mitchell & Popham, 2008; Takano, Nakamura, & Watanabe, 2002; Villeneuve et al., 2012). However, only very little is known about the long-term effects of direct exposure to nature on well-being. Some recent studies have considered the mediating effects between greenness of the local environment and residents' physical and mental health (Sugiyama, Leslie, Giles-Corti, & Owen, 2008; Villeneuve et al., 2012; de Vries, Verheij, Groenewegen, & Spreeuwenberg, 2003) and found clear main effects but no consistent mediating effects of outdoor activities. One study that has tried to measure the effect of residents' regular outdoor recreation on their well-being during a longer period is that of Korpela et al. (2014) who found a moderate but significant association between leisure time spent on nature-based recreation and emotional well-being among the Finnish population.

The findings of the few existing studies on long-term effects of exposure and visits to natural settings are subject to two main limitations: (a) most of these studies did not control for major potentially confounding factors these effects might have, such as the general state of health of respondents (which might influence the time spent in green areas) or their work strains (that might for example limit the energy for participating in outdoor recreation) (Degenhardt et al., 2011); and (b) hardly any of these studies compared the effects of outdoor recreation with effects of other leisure activities, which means that the relative importance of outdoor recreation remains unclear. One of our contributions to this line of research in this paper is to overcome these two limitations by including relevant influencing factors of well-being, and by considering the effects of alternative leisure activities.

Studies on the effects of leisure activities revealed that physical leisure activities have similar (and not necessarily higher) effects on wellbeing compared to social activities (Trainor, Delfabbro, Anderson, & Winefield, 2010). Such studies have increased in recent years (Hung & Lee, 2013), but have not considered outdoor recreation in detail. Doerksen, Elavsky, Rebar, and Conroy (2014) found that weekly (short-term) fluctuations of well-being at a within-person level were mainly influenced by social activities, whereas physical activities only showed effects on well-being at a between-person level. This finding suggests that longer-term

effects of outdoor recreation are more relevant for wellbeing than short-term effects.

Well-being can be conceived as a complex and synergistic phenomenon that is composed of a considerable number of dimensions and components (Russell et al., 2013). Similar to most authors of comparable studies, we focused on subjective, and in particular emotional, well-being because these subjective aspects of well-being enable us to embrace well-being in an integrative way (Nisbet, Zelenski, & Murphy, 2011).

3. Psychological resilience as a complementary dimension of well-being

A further contribution of our study entails the measurement of the outcomes of nearby outdoor recreation. Most existing studies focused on the three dimensions of well-being: positive and negative emotions, and life satisfaction (Korpela et al., 2014). Other measured outcomes have included place attachment (Kil, Holland, Stein, & Ko, 2012), community attachment (Arnberger & Eder, 2012), social interaction (Wood & Giles-Corti, 2008) and reported general health (van Herzele & de Vries, 2012). An essential, but not yet considered capacity that might be increased by outdoor recreation is psychological resilience, which is very relevant for personal coping with stress and difficulties at work and in private life (Fletcher & Sarkar, 2013). Masten (2001) defines psychological resilience as the "individuals' capacity to cope with stress and adversity". This capacity includes constitutional traits and abilities to cope with stressors (Campbell-Sills et al., 2006), and is considered to be protected and promoted by factors such as positive affect, self-esteem and self-efficacy (Fletcher & Fletcher, 2005), perceived control and optimism (Major et al., 1998), as well as self-reliance, independence, determination, mastery, resourcefulness and perseverance (Leppert, Koch, Brähler, and Strauss (2008). Lee, Sudom and Zamorski (2013) differentiated between intrapersonal factors of psychological resilience such as agreeableness, conscientiousness, extraversion, emotional stability, openness, positive effects and mastery; and interpersonal factors such as social support and social interaction. A more recent longitudinal analysis of psychological resilience in military personnel with combat experience revealed that mental health was mainly promoted by emotional stability, mastery and positive social interactions (Lee, et al., 2013). Emotional stability, and in particular self- or identity-related capacities, have also been found to be regulated and increased by people's active interaction with their (natural) environment (Twigger-Ross & Uzzell, 1993; Buchecker, 2009). In the international research literature, however, no studies could be found in the context of peri-urban recreation that had evaluated the effect of exposure to nature on psychological resilience.

Given the abovementioned gaps in the literature, we pursue our research goal by focusing on two main research questions: (a) what are the effects of residents' regular nearby outdoor recreation on their long-term well-being and long-term psychological resilience while controlling for their state of health and workloads as potential confounding factors, and (b) how do these effects compare with the effects of other leisure activities.

4. Method

4.1. Sample and procedure

The data for this study were collected in the context of a larger project on nearby outdoor recreation in peri-urban regions of Switzerland (Buchecker, Degenhardt & Kienast, 2012). The standardized questionnaire used for data collection built on qualitative

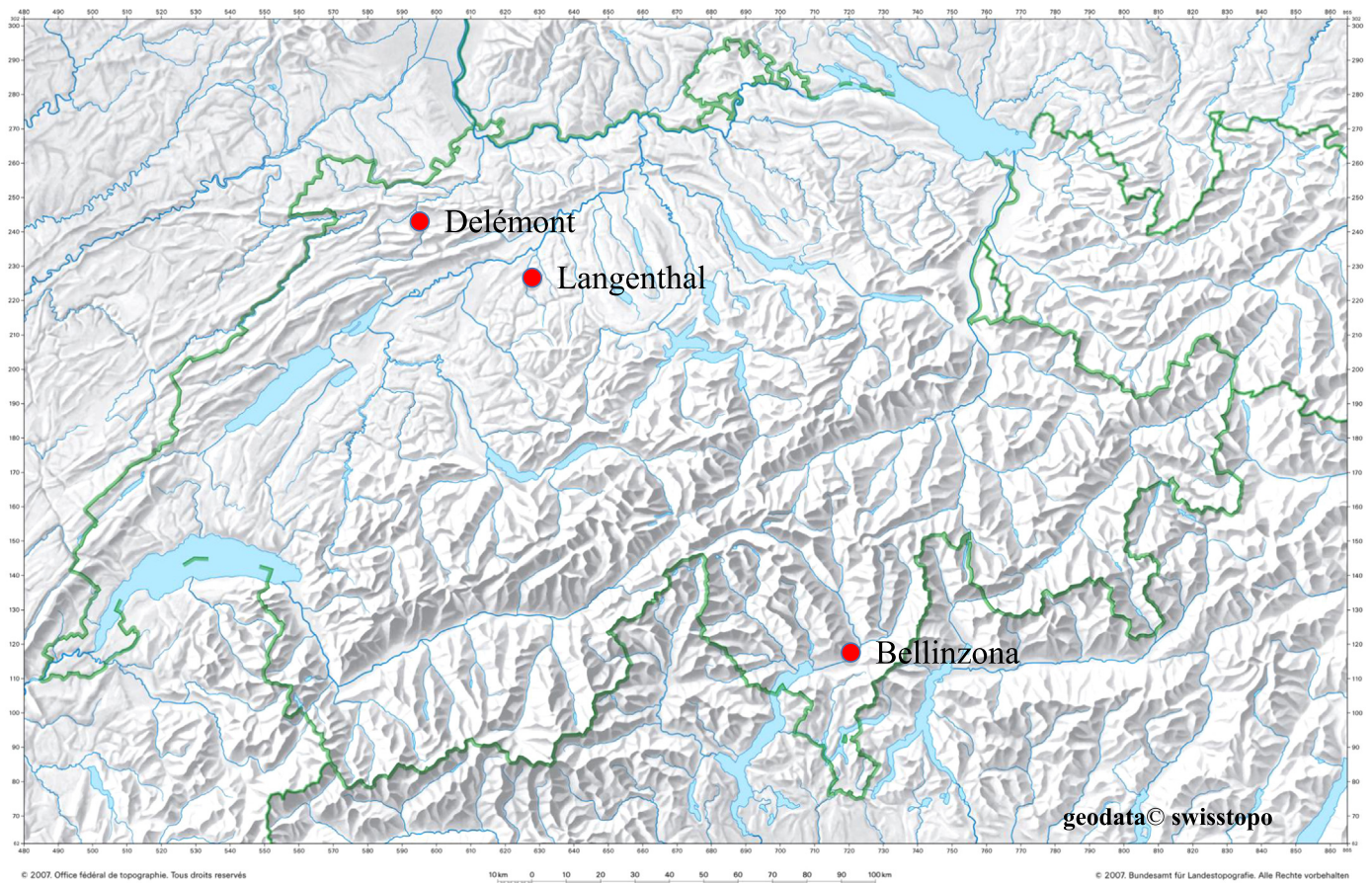


Fig. 1. : Topographic map of Switzerland showing the locations of the three study areas.

Table 1
The selected study areas and the sample sizes.

	Langenthal	Delémont	Bellinzona
Main language	German	French	Italian
Inhabitants	15,000	12,000	18,000
Survey date	May 2010	May 2010	Nov. 2010
Random sample (N)	1200	1200	1200
Return rate	32.8%	22.8%	20.9%
Respondents (n)	392	273	251

Table 2
Socio-demographic characteristics of the three sub-samples and the respective population data (as far as provided by the last population census in 2000).

	Langenthal		Delémont		Bellinzona	
	Sample	Pop.	Sample	Pop.	Sample	Pop.
Female (%)	55.0	51.3	52.2	51.5	50.4	53.4
Age (years)	53.2	42.1	51.6	45.4	50.7	46.2
Households with children < 10 years (%)	14.9	25.6 ^a	14.6	26.4 ^a	20.9	24.2 ^a
Residence > 10 years (%)	84.0	82.2	79.3 ^b	77.5 ^b	50.2 ^{**}	78.3 ^b
In pension (%)	35.2		31.0		28.2	
Work 3rd sector (%)	78.7 ^{**}	76.5	70.3 ^{**}	77.1	81.0 ^{**}	90.5
Income > 5000 CHF (%)	55.2		64.5		57.9	

^a Households with children < 18 years (BFS, 2000).

^b Born in the same municipality (BFS, 2000).

^{**} $p < 0.01$.

interviews and a standardized survey of an earlier study on the interaction between workloads and nearby outdoor recreation in the city of Frauenfeld (Degenhardt & Buchecker, 2012; Degenhardt

Table 3
Descriptive statistics of outdoor recreation behaviour in the full sample (Tt; $n=917$), and in the sub-samples of Langenthal (L), Delémont (D) and Bellinzona (B).

Outdoor recreation behaviour	Mean Tt	Std Tt	Mean L	Mean D	Mean B
Frequency of visits ^a	2.21	0.65	2.14 ^{**}	2.37 ^{**}	2.02 ^{***}
Duration of visits ^b	2.88	0.93	3.03 [*]	2.78 ^{**}	2.84
Persons accompanying the visit ^c	1.87	0.74	1.85	1.83	1.93
Intensity of activity ^d	2.11	0.64	2.14	2.09	2.11
Satisfaction with recreation area ^e	3.96	0.80	3.99	4.10	3.67
Time spent: green around the house ^f	3.05	0.99	2.88	3.21 ^{***}	2.98 ^{**}
Time spent: green space in city ^f	2.21	0.94	2.12 ^{**}	2.19	2.34
Time spent: nearby outdoor recreation area ^f	2.74	0.99	2.76 ^{**}	2.88	2.47 ^{***}
Time spent: recreation area outside region ^f	2.29	0.99	2.30	2.28	2.30

Answer scales:

^a 1 = seldom, 2 = moderately often, 3 = very often (aggregated from original week day and weekend scales).

^b 1 = less than 30 min, 2 = 30 min up to nearly 1 h, 3 = 1 h to nearly 2 hours, 4 = 2 h up to nearly 3 h, 5 = more than 3 h.

^c 1 = alone, 2 = 2 persons, 3 = 3–5 persons, 4 = 6 or more persons.

^d 1 = low intensity of activity, 2 = middle intensity of activity, 3 = high intensity of activity.

^e 1 = very unsatisfied, 2 = rather unsatisfied, 3 = neither, nor, 4 = rather satisfied, highly satisfied.

^f 1 = no time, 2 = little time, 3 = half of my leisure time, 4 = much time, 5 = virtually my whole leisure time.

^{***} Significance levels of F -test: $p < 0.001$.

^{**} Significance levels of F -test: $p < 0.005$.

^{*} Significance levels of F -test: $p < 0.05$.

et al., 2011) as well as on a validation study in the city of St. Gallen that tested a standardized questionnaire focused on outdoor recreation behaviour (Irngartiner, Degenhardt, & Buchecker, 2010). The final questionnaire was sent to random samples of the residents of three middle-sized cities ($N=1200$ per city) that were considered typical for the peri-urban regions of the three national language cultures (see Fig. 1 and Table 1). This sampling design was selected to gain representative data for peri-urban regions in Switzerland and also to allow measurement of inter-regional differences. In total, 916 completed questionnaires were returned, with a return rate ranging from 21% to 33%. The three sub-samples appeared to be rather homogenous in terms of the demographic criteria of gender, age and income, and their proportions matched well with the actual demographic situation in the respective cities (see Table 2). Furthermore, the high variation in the main variables of outdoor recreation behaviour clearly indicated that a wide range of behaviour patterns were represented in the data (see Table 3).

4.2. Questionnaire and measures

The standardized questionnaire comprised 11 pages and included questions on a wide range of outdoor recreation parameters (activities, frequency of visits, duration of visit, time needed for access to the area, social companionship, recreational motives, infrastructure used, area preferences, satisfaction with the recreation area, spatial use of the area), on further leisure activities, on physical health, on work-loads and on individual socio-demographic characteristics. Two different versions of the questionnaire were sent to two sub-samples in each city, with one version referring to nearby outdoor recreation on workdays and the other referring to nearby outdoor recreation on weekends. Unless otherwise stated, the respondents were asked to use a reference period of the previous three months when answering the questions. The spatial extent of the nearby outdoor recreation area was described at the beginning of the questionnaire with a definition and a local map. The following variables were of particular relevance for this study.

Well-being was measured using selected items of the well-being scale of Bullinger (1995). It included three items of positive emotions (happy, calm, full of verve) and three items of negative emotions (depressed, nervous, sad). The respondents were asked to indicate, how often in the previous four weeks they had experienced the respective emotion. The items were measured using a 6-point scale (6=always, mostly, rather often, sometimes, seldom, 1=never). The values of the 6 items were aggregated using a mean score (Cronbach alpha $\alpha=0.81$).

Psychological resilience was recorded in a similar way using selected items of Wagnild and Young's (1993; RS-25) existing scale, which had been retested and reduced in a German translation by Leppert et al. (2003, RS-13) and Schumacher, Leppert, & Gunzelmann, (2005, RS-11). We further reduced the items of the short scale due to the limited space of the questionnaire; keeping the subscales "personal competence", "acceptance of self and life", "discriminatory power" and "exposure to social desirability" as selection criteria. The variable included five statements that described aspects of psychological resilience: I maintain my interest in many things; I won't be easily thrown off course; I can convince myself to do things I actually do not feel like doing; I like myself; and when I am in a difficult situation I normally find a way out. The respondents were asked to indicate the extent to which these statements reflected their recent thinking and behaviour. The statement items were measured using a 7-point Likert scale (1=does not apply at all to 7=fully applies). The mean score of this variable achieved a just sufficient $\alpha=0.70$.

The frequency of visits to the nearby outdoor recreation area was

measured using a 8-point scale for workdays (1=less than once in two months to 8=several times a day) and a 5 point scale for weekends (1=more seldom than once in two months to 5=each or nearly each weekend). Respondents were asked, "How often have you visited your nearby outdoor recreation area in leisure time during work days or on the weekends in the last three months?" To aggregate weekdays and weekend data, an interval scaled variable with only three use frequency levels was calculated (3=high frequency, i.e. every or almost every day or weekend, 2=middle frequency, i.e. once to three times per week or once a month up to every second weekend, 1=low frequency, i.e. less than once per month up to once to two times per month or up to every second month.). The rationale of aggregation was to conceptually ensure similar distances between the 3 frequency manifestations although the data stems from different time frames (i.e., workdays, weekends).

The leisure time spent in green areas was recorded in terms of four items referring to four spatial domains or scales: green area around the house; in the neighbourhood or city; the nearby outdoor recreation area; and in the recreation areas outside the local region. The amount of time was measured using a 5-point scale (1=no time, little time, half of the time, much time, 5=the whole leisure time).

The leisure time used for leisure activities (weekend/work days) was identified by asking the respondents to select, from a list, the three leisure activities they had performed most often in the previous three months. This list comprised 12 items of often-performed leisure activities in Switzerland (see Table 3).

The intensity of outdoor recreation was operationalized in two steps. In a first step, the respondents were asked to select their most often performed outdoor recreation activity from a list of 11 activities (including an item "other activity"). In a second step, the variable was recoded assigning the activities to three (ordinal) categories of different physical intensity levels: high intensity (jogging, biking, horse riding), medium intensity (walking, walking the dog, collecting berries or mushrooms, swimming) and low intensity (pick-nicking, accompanying children, lingering). The classification was oriented both at the CDC (2003) categorization of the physical intensity levels of various activities and of the leisure activity classification by Gobster (2005).

The workloads of the daily tasks were measured using a short version of the scales developed by Semmer et al. (1999) as a stress-oriented job analysis instrument. The potentially most relevant workloads were selected including long sitting, working outdoors, contact with other people, noise, and conflicts with colleagues, customers or household members. The respondents were asked to assess how typical these aspects were in the context of their daily tasks during the previous four weeks (five point scale: 1=very untypical, rather untypical, medium, rather typical, 5=very typical).

The physical health state was operationalized based on two selected items of the short questionnaire on the health state by Bullinger and Kirchberger (1998), with mid-grade (difficulty=35.0) physical activity, such as shifting a table or playing golf and a less demanding (difficulty=20.0) physical activity, such as going up several flights of stairs. The respondents were asked to assess the extent to which their health state limited them in performing these activities. The physical health state was measured using a 3-point scale (3=yes, considerably limited; 2=yes, to some degree limited; 1=no, absolutely not limited).

All items were thoroughly translated into French and Italian using in a first step forward translation by a professional translator native in the target language and in a second step backward translation by a bilingual translator (Swiss native in the target language and native in the source language). The special challenge in the second step was to critically reflect not just whether the

back-translated terms were identical with the source terms, but also whether the translated terms were really common in the Swiss context. In all official Swiss languages, many terms are differently used from how they are used in the national languages of the neighbouring states.

4.3. Statistical analyses

Based on a correlation analysis between the dependent index variables of well-being and psychological resilience, a hierarchical regression analysis was used to explore the association between these variables and parameters of regular nearby outdoor recreation as well as time spent with other relevant leisure activities (Fromm, 2010). In a first step, a regression model that only included variables on various aspects of nearby outdoor recreation behaviour was calculated. In a second step, variables characterizing outdoor recreation activities in other spatial scales (e.g. the green around the house) as well as participation in other leisure activities were included in the regression model. In third and fourth steps, control variables in terms of respondents' physical health state, work-loads, and socio-demographic characteristics were added.

5. Results

Descriptive analyses of the data confirmed that nearby outdoor recreation was a very relevant leisure activity for the respondents (Tables 3 and 4). Outdoor recreation appeared to be the second most often performed leisure activity after meeting friends and family members. For more than 50% of the respondents, outdoor recreation belonged to the three most often performed leisure activities. Among the spatial scales of outdoor recreation that were considered, the nearby outdoor recreation area ranked second. The respondents were found to spend less time for outdoor recreation in this area than in the green around the house, but clearly more than in the green spaces of the city and in the recreation areas outside the region.

The bivariate correlation analysis revealed a moderate but significant association between the respondents' well-being and psychological resilience and their nearby outdoor recreation behaviour (Table 5). The two dependent variables appeared to correlate with different aspects of nearby outdoor recreation behaviour. We found a high correlation between nearby outdoor recreation behaviour in terms of use frequency, access mode, and satisfaction with the area and both well-being and the leisure time spent in the nearby outdoor recreation area but no significant relationship was found between nearby outdoor recreation behaviour and psychological resilience. In terms of the other scales of

Table 4
Percent of respondents for whom the indicated leisure activity belonged to the three most often performed leisure activities. N=917.

Leisure activities	%
Spending the time with the family/relatives/friends	54.4
Bicycling, walking, jogging	53.5
Reading (newspapers, journals, books)	51.4
Watching TV, using internet, listening to the radio	48.9
Fibre crafting, handicrafting, gardening	30.4
Shopping	15.7
Going for excursions outside of the region	12.8
Doing sports indoors/on the sports grounds	12.5
Doing voluntary work	11.7
Lazing, doing nothing	9.8
Personal/professional further education	5.9
Other activities	5.8

Table 5

Bivariate correlations (Pearson) between the dependent variables (well-being and psychological resilience) and the influence factors (nearby outdoor recreation behaviour, outdoor recreation in other spatial scales, leisure activities) as well as the control variables (workloads, physical health state, socio-demographic variables).

		Well-b.	Psy. Res.
Dependent variables	Well-being	1	0.361**
	Psychological resilience	0.361**	1
Outdoor recreation behaviour	Frequency of visits	0.117**	n.s.
	Transport mode to recreation area	-0.148**	n.s.
	Time needed for access of area	-0.157**	n.s.
	Use of narrow paths	0.093*	0.109**
	Use of the same routes	0.073*	0.086*
	Satisfaction with recreation area	0.152**	n.s.
Time spent in green areas	Intensity of main activity	0.135**	0.085*
	In the green around the house	0.110**	0.119**
	In the green space of the city	n.s.	n.s.
	In the nearby outdoor recreation area	n.s.	0.100**
Leisure activities	In the recreation areas outside of region	n.s.	0.108**
	Outdoor recreation	0.094**	n.s.
	Excursions outside region	0.069*	0.102**
	TV, internet, radio	n.s.	-0.109**
	Doing sports indoors/sports grounds	-0.079*	-0.083*
	Shopping	-0.093**	n.s.
Workloads	Fibre craft, handicraft, gardening	0.089*	0.101**
	Time with family, relatives, friends	n.s.	n.s.
	Long sitting	-0.150**	n.s.
	Working outdoors	n.s.	0.124**
State of physical health	Contact with other persons	n.s.	0.139**
	Noise	-0.087*	n.s.
	Conflicts with colleagues/customers	-0.310**	-0.216**
	Mid-grade physical activities	-0.261**	-0.136**
Socio-demographical variables	Going up some landings of the stair	-0.249**	-0.143**
	Age	0.130**	0.097**
	Gender	n.s.	n.s.
	Children under 10 years in household	n.s.	n.s.
	Income	0.130**	n.s.

* Significance levels (two sided): $=p < .05$.

** Significance levels (two sided): $=p < 0.01$.

outdoor recreation, the time spent in recreation areas outside the region was also correlated with psychological resilience only, whereas the time spent in the green around the house appeared to be highly related to both dependent variables. Social activities, such as meeting friends, did not appear to be relevant for either dependent variable.

A number of other leisure activities showed correlations to well-being and psychological resilience of a similar size as the correlations with the nearby outdoor recreation parameters (Table 5). Most of these variables appeared to have a privileged highly

Table 6

Hierarchical regression models of well-being, by including relevant nearby outdoor recreation variables (step 1), relevant leisure activities variables and outdoor recreation variables of additional spatial levels (step 2), relevant physical health and work load variables (step 3) and relevant socio-demographic variables (step 4).

	β	t	p
Step 1 $R^2=0.076$			
Transportation to recreation area	-0.160	-3.59	0.000
Satisfaction with recreation area	0.128	2.85	0.005
Intensity of main activity	0.135	3.052	0.002
Frequency of visits	0.102	2.266	0.024
Step 2 $R^2=0.130$			
Satisfaction with recreation area	0.160	3.54	0.000
Shopping	-0.145	3.17	0.002
Transportation to recreation area	-0.167	3.73	0.000
Time spent for excursions outside region	0.122	2.70	0.007
Intensity of main recreation activity	0.109	2.39	0.017
Time spent on green around the house	0.105	2.32	0.021
Step 3 $R^2=0.151$			
State of physical health	-0.289	-5.14	0.000
Conflicts with colleagues / customers	-0.198	-3.508	0.001
Shopping	-0.114	-2.017	0.045
Intensity of main recreation activity	0.113	1.99	0.048
Step 4 $R^2=0.204$			
State of physical health	-0.351	-6.48	0.000
Conflicts with colleagues / customers	-0.209	-3.85	0.000
Age	0.136	2.43	0.016
Intensity of main recreation activity	0.122	2.22	0.019
Time spent on green around the house	0.098	1.88	0.062
Study area	-0.91	-1.70	0.091

(β =Beta of standardized coefficients, t = t -value and p =significance).

Table 7

Hierarchical regression model of psychological resilience, by including relevant nearby outdoor recreation variables (step 1), relevant leisure activities variables and outdoor recreation variables of additional spatial levels (step 2), relevant physical health and work load variables (step 3) and relevant socio-demographic variables (step 4).

	β	t	p
Step 1 $R^2=0.02$			
Time spent in nearby outdoor recreation area	-0.158	-3.48	0.001
Step 2 $R^2=0.07$			
Time spent in green space	0.207	4.43	0.000
Excursions outside of the region	0.113	2.42	0.016
Shopping	-0.099	-2.13	0.034
Step 3 $R^2=0.13$			
Conflicts with colleagues / customers	-0.228	-3.86	0.000
Contact with colleagues	0.213	3.46	0.001
Time spent in green space	0.122	2.14	0.034
Excursions outside of region	0.139	2.38	0.012
State of physical health	-0.165	-2.72	0.007
Fade craft, handicraft, gardening	0.13	2.12	0.035
Step 4 $R^2=0.13$			
Conflicts with colleagues/customers	-0.230	-3.87	0.000
Contact with colleagues	0.218	3.53	0.000
Time spent in green space	0.124	2.16	0.032
State of physical health	-0.165	-2.71	0.007
Excursions outside of the region	0.138	2.38	0.019
Fibre craft, handicraft, gardening	0.136	2.22	0.028

(β =Beta of standardised coefficients, t = t -value and p =significance).

significant relationship to only one of the dependent variables. Outdoor recreation and shopping was found to be significantly correlated with well-being only, while excursions outside the region, electronic media use and handicraft activities were mainly correlated with psychological resilience. Shopping and electronic media use showed a significant negative association to the dependent variables.

The different characteristics of the dependent variables were also reflected in their relationships to the control variables. In terms of the work load related variables, they only shared the (very strong) relationship with the variable "conflicts with colleagues and customers". In terms of physical health and age, the coefficient appeared to be clearly higher for well-being than for resilience. The socio-demographic variable "income" was found to correlate with well-being only.

The hierarchical regression analysis confirmed the moderate role of regular nearby outdoor recreation for respondents' well-being and psychological resilience. In the first step, when we only included the nearby outdoor parameters, only 7.6% and 2.3% of the variance of the dependent variables could be explained respectively (Tables 6 and 7). In accordance with the correlation analysis, the contributing variables of the two dependent variables appeared to be disjunct. Adding the variables on the wider range of leisure activities and the further spatial scales of outdoor recreation contributed to a considerably better explanation of the variance for both dependent variables. For well-being, the major additionally contributing variable was shopping (though with an inverse sign), while the major additionally contributing variable for psychological resilience was found to be the time spent in the green space. The inclusion of the control variables on work load and the state of physical health increased the explained variance, especially for psychological resilience, while it also considerably reduced the contribution of the outdoor recreation and leisure activity variables. In this third step, the dominant variables for well-being became the state of physical health and the conflicts with people (both negative), while the dominant variables for psychological resilience were found to be the conflicts (negative) and the contacts (positive) with people. In the regression model of well-being, only the intensity of outdoor recreation activities remained as a positive leisure activity predictor. In the regression model of psychological resilience, the two remaining leisure activity variables appeared to be of greater weight than the remaining outdoor recreation variable. The last step of the regression analysis, in which relevant socio-demographic variables and the study area variable were added, contributed substantially to the explanation of variance of well-being, in which shopping was superposed by age, while the regression model of psychological resilience virtually remained the same. The (remaining) differences between the study area subsamples (Delémont > Langenthal > Bellinzona) appeared to be relevant for emotional well-being but only on a very low significance level (see Table 6).

6. Discussion

We attempted to systematically explore the effects of urban residents' regular nearby outdoor recreation on their long-term well-being and psychological resilience. We based our analysis on data of representative cross-sectional surveys that were conducted in three Swiss cities with very different cultural backgrounds. Thereby the questions on outdoor recreation behaviour referred to the period of the last three months, and the questions on well-being to the period of the last month. To realistically assess the relevance of the measured effects, we included variables on respondents' participation in other leisure activities and on potentially confounding influence factors such as their physical health

state and their work load in the analysis.

We found that regular participation in nearby outdoor recreation had a rather marginal, but significant effect on respondents' long-term well-being and psychological resilience when the control variables were included in the regression analysis. In terms of long-term well-being, the intensity of the main nearby outdoor recreation activity remained in the final regression model and explained about 1.5% of the variance (overall explained variance: 20.4%). In terms of psychological resilience, no "pure" nearby outdoor recreation variable but only an index variable comprehending (leisure time spent for) outdoor recreation in all spatial scales (green around the house, recreation area outside the region) contributed to explanation of variance (1.5% out of an overall 12.9%). These long-term effects are considerably lower than the short-term effects of visits to natural environments on emotional well-being that have been measured in a number of experimental studies (Barton & Pretty, 2010; Bowler et al., 2010; Martens et al., 2011), in which the confounding variables are implicitly controlled. The only experimental study that measured long-term effects on mental well-being (Isaacs et al., 2007), however, also revealed only marginal effects of outdoor recreation on (mental) well-being. This difference in the effect sizes does not necessarily mean that the long-term effects are of lower relevance for people's life because long-term well-being, as measured in our study, refers to a wider notion of people's well-being than the short term well-being measured in experimental studies.

Without including the control variables, the nearby outdoor recreation behaviour variables explained 7.6% of the variance of long-term well-being. This effect size is very close to that found by Korpela et al. (2014) who had measured the effect of nature-based recreation (four categories of used leisure time) on Finnish populations' long-term emotional well-being (6.9% explained variance). Unlike the Finnish study, however, our study focused only on the spatial scale of nearby outdoor recreation. Nearby outdoor recreation therefore seems to contribute substantially to the well-being benefits of overall nature-based recreation.

With regard to psychological resilience, nearby outdoor recreation variables could only explain 2.3% of the variance, even without including the control variables. Unlike the regression model of well-being that selected use frequency, satisfaction and access modes as relevant outdoor recreation variables, the regression model for psychological resilience only selected the variable "time spent in the nearby outdoor recreation area". The measured effect of nearby outdoor recreation on psychological resilience was found to be significant and of a similar magnitude as that identified by Lee et al. (2013) in their study of relevant social influence factors of psychological resilience such as positive social interactions or affective social support. From this perspective, the relevance of outdoor recreation for increasing psychological resilience, which is considered to be determined to a wide extent by personality factors (Leppert et al., 2003), is not negligible.

The inclusion of variables on inhabitants' participation in further leisure activities revealed that some leisure activities (handicraft, gardening and excursions outside the region) as well as outdoor recreation in other spatial scales (green around the house, recreation area outside the region) were of similar relevance for inhabitants' well-being and their psychological resilience. The effect sizes of these leisure activities for well-being were, however, only measured in one dimension, in accordance to findings of recent studies (Doerksen et al., 2014; Hung & Lee, 2013; Trainor et al., 2010). Similar to Trainor et al. (2010) who focused on adolescents, we also found that unstructured and undirected leisure activities such as electronic media use or shopping had a negative effect on well-being for adults but, unlike these authors, we could not confirm a relevant role of social leisure activities on well-

being.

Well-being and psychological resilience as measured in our study were unexpectedly found to be influenced in a nearly disjoint manner by different variables. In the complete regression models, the only significant predictor they shared was the social work stressor: "conflicts with colleagues and customers". In terms of leisure activity variables, psychological resilience was mainly influenced by the duration of the activities and by time-consuming activities such as gardening and excursions outside the region. The frequency and intensity of the activity appeared to be of higher relevance for well-being. This lack of congruence is not implausible in light of the different connotations associated with the two terms, but is nevertheless surprising, because well-being aspects such as self-esteem, positive emotions, and self-efficacy have been conceptualized to be promoting factors for psychological resilience before (Fletcher & Sarkar, 2013). This unexpected finding might be influenced by the way we operationalized the two concepts. While well-being is a complex construct that embraces habitual, actual, individual and social components (Becker, 1994), our study focused on emotional states which are characteristic of acute stress and fatigue (De Bloom, Kinnunen, & Korpela, 2014). Psychological resilience is also considered as a multidimensional construct, which includes personal traits and capacities that change over time (Fletcher & Sarkar, 2013), whereas the resilience scale used in our study refers more to the constitutional aspects of resilience (Leppert et al., 2003). In spite of these measurement-related limitations, emotional well-being and psychological resilience can be concluded to be complementary resources that both contribute to fitness for work and everyday interactions.

Further limitations of this study might be associated with the scales used to measure the relevant concepts, which were shortened because of the comprehensive nature of the survey. The scales were however carefully validated including through critical translation of the scale items into French and Italian (see Section 4), and the focus on a specific (Swiss and urban) context. If a better explanation of the concept is desired, future studies might be well advised to apply more complete scales, in particular in terms of the two dependent variables, and to concentrate on the relevant leisure activity variables. Another useful change in a future study might be to extend the set of variables in terms of psychological traits (e.g. extraversion) and social aspects (e.g. quality of relationships). Furthermore, shortening the reference period to two weeks might provide a more relevant time scale and result in higher data quality.

7. Conclusions

This is the first study to measure the effects of regular nearby outdoor recreation on long-term well-being, and the first study to include psychological resilience as a benefit of leisure activities. The systematic analysis of the data could provide robust evidence that inhabitants' regular nearby outdoor recreation contributes significantly to both their long-term well-being and their long-term psychological resilience; but only to a marginal extent of about 2%. Similarly small effects on long-term well-being have been found in recent studies of leisure activities, which is not astonishing given the wide range of major influencing factors such as people's relationships, their job situation, their health, or the widely acknowledged dominant role of personality features for long-term well-being and psychological resilience. However, based on these findings one should not automatically infer that nearby outdoor recreation is irrelevant for increasing well-being and psychological resilience. Unlike most of the other essential influence factors, such as conflicts with colleagues or the state of physical health, nearby outdoor recreation can be purposefully

encouraged by fostering individual awareness or by public planning. So far research literature in this field has provided clear evidence that easy access to recreation areas increases the frequency of outdoor recreation and therefore primarily recommended to invest in the accessibility of the recreation areas. The findings of this study that highlight the important role of other recreation parameters such as the satisfaction with the recreation area and the time spent in the recreation area, suggest that cities', and other residential, administrations should as much invest in the quality of people's nearby outdoor recreation areas, if their goal is to increase their inhabitants' well being and their fitness for work.

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