The natural context of wellbeing: Ecological momentary assessment of the influence of nature and daylight on affect and stress for individuals with depression levels varying from none to clinical

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ABSTRACT

This paper explores how everyday encounters with two natural phenomena –natural elements and daylight-influence affect and stress levels for people differing in mental health. Nature and daylight exposure both have well-documented beneficial effects on mental health and affect but to what extent their exposure has beneficial effects in daily life is currently under investigated, as is the question whether lower mental health would make one more, or instead, less responsive. To this end, an ecological momentary assessment protocol was employed for a period of 6 days. Fifty-nine participants varying in level of depressive symptoms from none to clinical completed momentary assessments of affect, stress, and their physical environment. Results indicate beneficial effects of nature and daylight on affect and some effects on stress and stress-related outcomes. For nature exposure, but not for daylight exposure, effects were stronger for those in higher need of restoration, stressing the importance of our everyday environment for mental wellbeing.

1. Introduction

Our experiences and emotions are situated in the places we encounter throughout the day, thereby inseparably connecting wellbeing with our physical surroundings. It may not be surprising therefore that the World Health Organization (2016a) stresses the importance (amongst others) of environmental factors in the promotion and protection of mental health. Presently, mental health issues present an ever-growing problem. Depression, for example, is the leading cause in sick leave and finding ways to combat depression should have top priority (WHO, 2016a). Existing therapies are geared towards pharmaceutical interventions and cognitive behavioral therapy, but smaller everyday interventions -such as exposure to restorative environments- could complement the healing process or even help prevent mental illness. The present study therefore investigated how everyday exposure to restorative environmental elements –nature and daylight-influenced affective states and stress levels for both healthy individuals and people suffering from depression and / or anxiety.

Restorative environments represent those places that foster our mental and physical health, improve our affective states and replenish our resources (see, e.g., Hartig and Staats, 2003). They offer their visitors a place to get away from their daily struggles and provide fascinating scenery (see, e.g., Kaplan, 1983). The majority of studies in this domain of research have focused on the restorative effects of nature, but other environmental characteristics may also contribute (see, e.g., Beute and de Kort, 2014a). In the present study, natural light and natural elements were considered for their restorative potential as well as their omnipresence in everyday life. Exposure to nature and daylight often coincides when one is outdoors, but exposure can also occur indoors in the presence of a window (providing both a view to the outside and daylight entrance) and indoor plants. Besides often going hand in hand (WHO, 2016b), very similar beneficial effects of these nature and daylight exposure have been reported in separate research domains (Beute and de Kort, 2014a).

Benefits of nature have been proposed to run through both affective (Ulrich, 1983) and cognitive pathways (Kaplan, 1995; Kaplan and Berman, 2010). Natural environments are inherently fascinating and present us the opportunity to get away from our daily hassles and worries (see, e.g., Kaplan, 1983, 1995). These qualities help boost depleted mental resources (Kaplan and Berman, 2010). In addition, we may have an evolutionary-based predisposition to respond positively to unthreatening natural environments (Ulrich, 1983). These positive affective responses have been proposed to be pre-cognitive and contribute to the stress-reducing potential of nature (Ulrich et al., 1991). Reported beneficial effects of nature include a reduction in stress levels (Ulrich et al., 1991), improvement of mood (Beute and de

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studies have yielded evidence for protective bene-

(2012). They report that, just as healthy individuals, people with
duals experiencing mental health issues. Their results indicated that
urban environments could also contribute to adverse mental health
most for those high in need for restoration. A lack of natural elements in
from exposure to nature. Memory span improved

and research question. For instance, one can compare

models can deal well with the nested nature of the data (i.e., multiple
models to test for bene-
time (Beute et al., 2016). EMA studies typically employ Hierarchical
restorative environments researchers a tool to gain a wealth of new

insights and the ability to advance restoration theory, for instance

studies have indicated positive e-

fects of restorative environ-
ments on mental health (for an overview, see e.g.,Annerstedt et al.,
2014a). Indeed, people show a consistent preference for the presence of
windows (see, e.g., Collins, 1975) as well as sunny and bright as opposed to
overcast and dark scenes (Beute and de Kort, 2013).

Whereas restorative effects of nature have mainly been tested for
healthy individuals, evidence of beneficial effects of daylight exposure on
affective problems has since long been collected in clinical research. Perhaps
the most direct link between daylight exposure and mental health is illustrated by Seasonal Affective Disorder (Rosenthal et al.,
1984). A shorter photoperiod in winter is seen to play an important role in
the etiology of “winter depression”, but also causes (milder) symptoms in
the healthy population (Rosenthal et al., 1984). Bright Light Therapy is
often the remedy for Seasonal Affective Disorder (Terman and Terman,
2005). In fact, it has also proven successful in treating non-seasonal
depression (Terman and Terman, 2005) as well as other mental health
issues such as burnout (Meesters and Walsander, 2010). In tandem, field
studies have indicated positive effects of sunlight exposure in patient
rooms on recovery from depression (Beauchemin and Hays, 1996;
Canellas et al., 2016) and spending time outdoors in daylight could
improve depressive symptoms in elderly as well as improve their

cognitive functioning (Caldwell et al., 2014). A daily walk outdoors
proved beneficial for individuals with seasonal affective disorder, an
effect the authors attributed to daylight exposure (Wirz-Justice et al.,
1996). Notably, walking outdoors not only means exposure to daylight
but also potentially to nature, as well as an increase in physical activity
(Beute and de Kort, 2014). Not only individuals with mental health
problems appear to benefit from daylight exposure as, for instance, a 30-
min exposure to daylight has been found to improve mood (Kaida et al.,
2007) for healthy individuals as well.

As the previous sections illustrate, both nature and daylight can have
profound positive affective benefits. These phenomena are naturally
available and can vary widely between different environments.

1.1. Ecological momentary assessment of context and affect

While the amount of nature and daylight can vary substantially
throughout the day, affective states and stress levels also show dynamic
diurnal patterns (e.g., Murray et al., 2009; Takano and Tanno, 2011).
Ecological Momentary Assessment (EMA; Shiffman, and Stone, 1998),
or Experience Sampling Methodology (ESM; Csikszentmihalyi et al.,
1977), allows capturing these dynamics in environmental conditions and
affective states in concurrence by probing participants multiple
times per day to fill in short questionnaires. This methodology has high
ecological validity – capturing behavior and cognition in everyday life-
and is especially suitable to capture contextual effects (Beute et al.,
2016; Reis, 2012). This methodology has recently flourished due to
rapid advancements in mobile and sensor technology. EMA provides
restorative environments researchers a tool to gain a wealth of new
insights and the ability to advance restoration theory, for instance
because it allows capturing multiple environmental factors at the same
time (Beute et al., 2016). EMA studies typically employ Hierarchical
models to test for beneficial effects of nature exposure. Hierarchical
models can deal well with the nested nature of the data (i.e., multiple
measurements per person over multiple days) as well as with missing
data (i.e., participants not responding to beeps). Another advantage is
the ability to create your own model tailored to the particular dataset
and research question. For instance, one can compare fixed with
random effects of the independent variable, to see whether effects are
the same for all individuals or differ between individuals.

Some related research has already been conducted employing ESM/
EMA protocols. Being in a natural environment was found related to
happiness (Mackerron and Mourato, 2013) as well as vitality (Ryan et al., 2010). These studies used either geographical location
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