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Brief research report

The impact of exposure to films of natural and built environments on state body appreciation

Viren Swami[a,b,*], Mark Pickering[c], David Barron[b], Shreepali Patel[c]

[a] Department of Psychology, Anglia Ruskin University, Cambridge, UK
[b] Centre for Psychological Medicine, Perdana University, Serdang, Malaysia
[c] StoryLab, Anglia Ruskin University, Cambridge, UK

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ABSTRACT

Previous work has shown that exposure to images of nature results in elevated state body appreciation, but static images may lack ecological validity. Here, we examined the impact of exposure to short films of simulated, first-person walks in natural or built environments. Thirty-six university students completed a measure of state body appreciation before and after watching films of either a walk in a natural or a built environment created specifically for the present study. Two weeks later, they completed the same task but watched the other film type. Results indicated that exposure to the film of a natural environment resulted in significantly elevated state body appreciation ($d = 0.66$). There was no significant change in state body appreciation following exposure to the film of the built environment ($d = 0.14$). These findings suggest that exposure to films depicting the natural environment may promote immediate, moderate-sized improvements in state body image.

1. Introduction

Exposure to natural environments (e.g., wild nature, green spaces, parks) has wide-ranging benefits in terms of physical health and psychological well-being (see van den Bosch & Bird, 2018). Emerging research suggests that these benefits may extend to one's body image. For example, cross-sectional studies with North American adults have shown that self-reported exposure to natural environments is significantly associated with more positive trait body image (Mitten & D'Amore, 2018; Swami, Barron, Weis, & Furnham, 2016). In addition, experimental studies with British adults have shown that exposure to "isomorphic" (i.e., images of) natural environments results in significantly improved state body image (Swami, Barron, & Furnham, 2018, Studies 1–3). Likewise, exposure to real natural environments was found to result in significantly improved state body image (Swami et al., 2018, Studies 4–5).

Across studies, Swami et al. (2018) reported that the effect sizes of exposure to real nature tended to be larger ($d = 0.60$) than that of exposure to images of nature ($ds = 0.26$–0.40). One reason for this may be because static images provide limited representations of in-situ real environments and thus have limited ecological validity (Pearson & Craig, 2014). More specifically, static images do not provide multi-sensory input (e.g., sound, motion), dynamic characteristics (e.g., perceived atmosphere), and continuous multi-views that promote immersion and presence in an environment (Heft & Nasar, 2000; Huang, Parsons, & Tassinary, 2004; Kroh & Gimblett, 1992). Both *immersion* (the extent to which a display system blocks out sensory input from the outside world) and *presence* (the extent to which individuals feel they are "there" in the mediated environment) can be promoted through the use of film (de Kort, Meijnders, Sponselee, & IJsselsteijn, 2006).

Films of natural environments are known to produce more natural viewing behaviour compared to static images (Dorr, Martinetz, Gegenfurtner, & Barth, 2010). Moreover, the available evidence suggests that exposure to films of natural environments elicits positive effects in terms of physiological and psychological well-being (e.g., de Kort et al., 2006; Kjellgren & Buhrkall, 2010; Nadkarni, Hasbach, Thys, Crockett, & Schnacker, 2017; Tsutsumi, Nogaki, Shimizu, Stone, & Kobayashi, 2017), but that these effects do not extend to films of built environments (e.g., Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009; McAllister, Bhullar, & Schutte, 2017; van den Berg, Koole, & van der Wulpe, 2003). To date, however, the potential benefits of exposure to films depicting natural, as opposed to built, environments on body image have not been examined.

To fill this gap in the literature, we examined the impact of exposure to films of natural and built environments on state body image. To do so, we first developed novel films depicting simulated, first-person walks in a natural and built environment. Next, we

* Corresponding author at: Department of Psychology, Anglia Ruskin University, East Road, Cambridge, Cambridgeshire CB1 1 PT, UK.
E-mail address: viren.swami@anglia.ac.uk (V. Swami).

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followed Swami and colleagues (2018, Study 3) in using a prospective design in which participants completed a measure of state body appreciation (a measure of positive body image) immediately before and after viewing either the film of the natural or built environment. Two weeks later, participants completed the same procedure, but viewed the other film type. Based on Swami et al. (2018), we expected that exposure to the natural environment, but not the built environment, film would result in elevated state body appreciation.

2. Method

2.1. Development of stimulus materials

We followed a previous study (Amati, Sita, Parmehr, & McCarthy, 2018) in developing two films depicting simulated walks in a natural and built environment, respectively. We first discussed and agreed upon potential shooting locations for the films of the natural and built environments. A number of test shoots were conducted before we settled on Grantchester Meadows (wild meadowland intersected by the River Cam) for the natural environment film and Cambridge city centre (low-rise commercial buildings) for the built environment film. Next, the second author – a cinematographer and sound specialist – produced digital films of first-person walks in each environment in February 2018, early in the morning and under fair weather conditions. A high-quality digital camera (Cannon DSLR Mark III with a 35 mm lens) was attached to a DJI Ronin Handheld 3 axis stabilisation rig to create films with fluid movements in HD 1080p resolution at 25 fps. Films were shot in a single take, so that each simulated walk was 3 min long. Gaze direction, walk trajectories, and camera movement were standardised as far as possible across both films. It was not possible to entirely eliminate the intrusion of other people and vehicles in the built environment film, but we elected not to exclude the relevant frames so as to produce a smooth and cogent transition. Following filming, ambient sounds were added to both films to reflect sounds typically found in each environment. This was done to ensure that sound volumes and frequencies were consistent across both films (see Supplementary Materials). The final films were produced with identical colour grading and are available at the following URLs: https://vimeo.com/257870213 (natural environment) and https://vimeo.com/257870376 (built environment).

To determine that the nature film was indeed more restorative than the built environment film, we conducted a pilot study with 33 university students (51.5% women; age $M = 20.24$, $SD = 2.87$; 75.8% White). Participants were invited to a laboratory setting where they were individually shown each film in a randomised order on a 20″ screen and asked to rate each film using the short form of the Perceived Restorativeness Scale (PRS; Korpela & Hartig, 1996; short form: Berto, 2005), which includes five items that assesses restorative qualities rated on an 11-point scale (0 = *not at all*, 10 = *completely*). Overall PRS scores for each film were computed as the mean of all five items and demonstrated adequate internal consistency coefficients (ordinal α natural environment = .80, built environment = .78). A paired-samples t-test revealed that the film of the natural environment ($M = 6.55$, $SD = 0.74$) was rated as being significantly more restorative than the film of the urban environment ($M = 4.60$, $SD = 0.55$), $t(32) = 13.77$, $p < .001$, dependence-corrected $d = 2.14$.

2.2. Participants

An *a priori* power analysis based on Swami and colleagues (2018, Study 3) indicated that a minimum sample of 32 participants was sufficient to detect a medium-sized effect (f^2) at $\alpha = .05$, power ($1 - \beta$) at .80, and expected correlations of .60 between repeated measurements. Because Swami et al. (2018) reported that participant sex did not influence their findings, we did not include sex as a variable in the present study but recruited a mix of women and men. In practice, 39 undergraduates were recruited from a university in Cambridge, United Kingdom, but three did not complete both testing sessions, leaving a final sample of 36 (19 women and 17 men). Participants ranged in age from 18 to 29 years ($M = 20.47$, $SD = 2.22$) and in self-reported body mass index (BMI) from 17.47 to 31.63 kg/m^2 ($M = 22.81$, $SD = 3.45$). The majority of participants self-reported as being of White ethnicity (77.8%).

2.3. Measures

2.3.1. State body appreciation

We used the 10-item State Body Appreciation Scale-2 (SBAS-2; Homan, 2016), a measure of transient mood states reflective of body appreciation. All items were rated on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores reflecting more positive state body appreciation. Homan reported that SBAS-2 scores have a one-dimensional factor structure, satisfactory validity, and adequate internal consistency. In the present study, ordinal α for this scale was $\geq .94$ across testing conditions.

2.3.2. Demographics

Participants provided their demographic details, consisting of sex, age, ethnicity, height, and weight (the latter two items were used to compute self-reported BMI).

2.4. Procedure

Ethics approval for the pilot and mainstage studies were obtained from the departmental research ethics committee at Anglia Ruskin University (application number: EHS17-009). Participation for the mainstage study was solicited through flyers placed in areas of congregate activities on campus and through a call for participation during undergraduate lectures. An attempt was made to mask the study hypotheses by advertising the project as a study on the effects of personality on aesthetic preferences. Participants who agreed to take part in the study were invited to a laboratory, where they provided written informed consent and completed a paper-and-pencil questionnaire consisting of the SBAS-2 along with filler scales consistent with the study's advertised objectives. Following completion of the pre-test questionnaire, participants were seated at a distance of about 60 cm in front of a flat-screen, high-definition 20″ screen in a testing cubicle. Lights in the cubicle were turned off to ensure that participants were focused on the screen and participants wore headphones (JVC HA-RX300) to ensure a consistent audible sound. The first author explained to participants that they would be shown a film and were asked to imagine being the cameraperson, thereby experiencing what the cameraperson had seen and heard. The order of presentation of films (natural versus built environment) was counterbalanced for each participant (natural environment first, $n = 18$) and, following the film, participants were asked to rate how much they liked the environment depicted in the film (1 = *dislike very much*, 3 = *like very much*). Following this, the cubicle lights were turned on and participants were asked to complete the same scales as during pre-test. Two weeks after the first testing sessions, participants were invited to return to the laboratory to complete the same procedure but viewed the other film type. All participants took part on a voluntary basis, were not remunerated, and received written debriefing information at the end of the study. Following completion of the second testing session, all participants were verbally asked to guess the study hypothesis, but none were able to do so.