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**Swami V., von Nordheim L. and Barron D.**

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Self-Esteem Mediates the Relationship between Connectedness to Nature  
and Body Appreciation in Women, But Not Men

Viren Swami<sup>1-2\*</sup>, Laura von Nordheim<sup>1</sup>, & David Barron<sup>1</sup>

<sup>1</sup> Department of Psychology, University of Westminster, London, UK

<sup>2</sup> Department of Psychology, HELP University College, Kuala Lumpur, Malaysia

\* Viren Swami is now at the Department of Psychology, Anglia Ruskin University,  
Cambridge, UK.

Address correspondence to: Prof. Viren Swami, Department of Psychology, Anglia Ruskin  
University, East Road, Cambridge, Cambridgeshire CB1 1PT, UK. Email:  
viren.swami@anglia.ac.uk.



### Abstract

Connectedness to nature (i.e., an affective and experiential connection to nature) is known to have a positive effect on psychological well-being, but its specific associations with body image have not been fully examined. To attend to this oversight, we conducted a preliminary investigation of associations between connectedness to nature and body appreciation. A total of 380 British adults completed measures of connectedness to nature, body appreciation, and self-esteem. Bivariate correlations revealed significant positive associations between all variables in women. In men, body appreciation was significantly correlated with self-esteem, but not connectedness to nature. Mediation analysis showed that, in women, self-esteem fully mediated the relationship between connectedness to nature and body appreciation. In men, body appreciation was significantly associated with self-esteem, but not connectedness to nature. These results point to a potential route for improving body image among women through connectedness to nature and self-esteem, but further research is necessary.

*Keywords:* Body appreciation, Connectedness to nature, Self-esteem, Nature

Direct physical-sensory exposure to nature is known to have a positive effect on aspects of psychological well-being, including positive affect (Mayer, Frantz, Bruehlman-Senecal, & Dlovier, 2009) and higher self-esteem (Pretty et al., 2007). Experimental research has further revealed that direct exposure to nature promotes recovery from stress and attention fatigue, facilitates social contact, and provides opportunities for personal development and a sense of purpose (Mayer et al., 2009). Direct exposure also increases a sense of connectedness to nature, or an “affective, experiential sense of oneness with the natural world” (Mayer & Frantz, 2004, p. 504). This feeling of connectedness to nature has also been found to be associated with more positive psychological well-being (e.g., Kamitsis & Francis, 2013; Mayer et al., 2009; Nisbet, Zelenski, & Murphy, 2011).

Connectedness to nature may also be associated with facets of well-being beyond positive affect, including positive body image (Hennigan, 2010). Because connectedness to nature involves a sense of involvement in something larger than oneself, it may focus attention on eudaimonic aspects of well-being (e.g., living a fulfilled life) rather than hedonic aspects (e.g., a focus on appearance; Howell, Dopko, Passmore, & Buro, 2011). Stronger connectedness to nature may also promote a shift away from patriarchal or hierarchical frameworks of experience to an equalitarian worldview (Holloway, Murray, Okada, & Emmons, 2014). Such a worldview emphasises a rejection of coercive power, connectedness over separateness, and self- and other interactions that are based on compassion and harmony, rather than competition or aggression. Thus, connectedness to nature may promote an empowered stance that is also characteristic of how body image researchers have conceptualised positive body image (Tylka & Wood-Barcalow, 2015b).

Furthermore, connectedness to nature may help foster embodying experiences, through which individuals gain a sense of ownership of their physical selves and experience their bodies as deserving of respect (Hennigan, 2010). In addition, connectedness to nature

may afford individuals the space and tools to better cope with threats to body image or to distance oneself from perceived threats to body image (e.g., objectifying cultural contexts). To date, however, studies that have examined associations between connectedness to nature and body image remain piecemeal. In qualitative work, Hennigan (2010) found support for the idea that direct exposure to nature improved connectedness to nature and increased embodying experiences, which in turn improved body image. An experimental study showed that greater self-objectification and internalisation of a feminine ideal resulted in lower connectedness to nature in women, although body image outcomes were not examined in this work (Scott, 2010). Other work has suggested that connectedness to nature is associated with a more favourable body image (Kamitsis & Francis, 2013), but a limitation of this work is that facets of body image and appearance satisfaction were not studied independently of other facets of well-being (i.e., a pure measure of body image was not used).

Our understanding of the relationship between connectedness to nature and body image could be enriched through further investigation, which is the goal of this study. Here, we examined associations between connectedness to nature and body appreciation (i.e., a measure of positive body image emphasising connection to, acceptance of, and respect toward the body; Avalos, Tylka, & Wood-Barcalow, 2005), hypothesising that there would be a positive association for both women and men. Because exposure to nature has been found to prompt self-esteem (Pretty et al., 2007), and there is evidence that improving self-esteem improves body image (e.g., O’Dea & Abraham, 2000), perhaps connectedness to nature is connected to body appreciation through enhancing self-esteem. For this reason, we examined whether self-esteem mediates the relationship between connectedness to nature and body appreciation.

## **Method**

### **Participants**

Participants of this study were 210 women and 170 men, who ranged in age from 18 to 80 years ( $M = 36.90$ ,  $SD = 15.03$ ). Of the sample, the majority were of British White ancestry (84.3%), 10.2% were of mixed ancestry, and the remainder identified as some other ancestry.

## Materials

**Body appreciation.** Participants completed the Body Appreciation Scale (BAS; Avalos et al., 2005), a 13-item measure of positive body image (sample item: “I respect my body”). Although a revised version of the BAS is now available (Tylka & Wood-Barcalow, 2015a), we were not aware of its existence when we prepared our questionnaire materials. Items on the BAS are rated on a 5-point scale, ranging from 1 (*Never*) to 5 (*Always*). Among Western samples of college students, the scale has a one-dimensional factor structure in both women and men, with estimates supporting the discriminant, construct, and incremental validity of its scores (Avalos et al., 2005; Tylka, 2013). Items were averaged, with higher scores reflecting greater body appreciation. In the present study, Cronbach’s  $\alpha$  for this scale was .94 for women and .92 for men.

**Connectedness to nature.** We used the 14-item Connectedness to Nature Scale (Mayer & Frantz, 2004) to measure participants’ affective and experiential connection to nature (sample item: “I often feel part of the web of life”). Items are rated on a 5-point scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Mayer and Frantz (2004) reported that the scale has a one-dimensional factor structure, and estimates support the psychometric properties of its scores among North American college and community samples. Items were averaged, and higher scores on this scale reflect greater connectedness to nature. In this study, Cronbach’s  $\alpha$  was .81 for women and .84 for men.

**Self-esteem.** To measure self-esteem, we used Rosenberg’s Self-Esteem Scale (Rosenberg, 1965), a measure of a person’s overall sense of self-worth (sample item: “I feel

that I have a number of good qualities”). The scale consists of 10 items that are rated on a 4-point scale, ranging from 1 (*Strongly disagree*) to 4 (*Strongly agree*). Among Western samples of mainly college students, the scale has a one-dimensional factor, and estimates support the internal consistency reliability and construct validity of its scores (Schmitt & Allik, 2005). Items were averaged, with higher scores reflecting greater self-esteem. Cronbach’s  $\alpha$  for this scale in this study was .82 for women and .84 for men.

**Demographics.** Participants indicated their age, sex, and ethnicity.

### **Procedures**

Ethics approval was obtained from the relevant university ethics committee. Data collection for this study was conducted online via opportunistic sampling. The researchers shared a link to the anonymous questionnaire on social networking sites and solicited participation from their contacts between November 2014 and May 2015. First, participants provided informed consent and confirmed that they met inclusion criteria (i.e., of adult age and resident in the United Kingdom). The questionnaires were presented in randomised order for each participant. The final page presented participants with debrief information. All participants took part on voluntary basis and were not remunerated for participation. The likelihood of duplications was minimised by limiting to one the completion of the questionnaire per IP address and by manually checking IP addresses for duplications.

## **Results**

### **Preliminary Analyses**

Missing data accounted for less than 2.0% of the total dataset and were replaced using mean substitution. Descriptive statistics for all variables are reported in Table 1. We tested for sex differences in age, body appreciation, connectedness to nature, and self-esteem. Because of the large number of comparisons, we used the Bonferroni adjustment to reduce the chance of Type I error, such that  $p = .05/4 = .0125$ . There were no significant differences



between women and men in mean age,  $t(378) = 1.04$ ,  $p = .299$ ,  $d = 0.11$ , or self-esteem,  $t(378) = 0.79$ ,  $p = .431$ ,  $d = 0.08$ . However, men had significantly higher body appreciation than women,  $t(378) = 2.76$ ,  $p = .006$ ,  $d = 0.28$ , and women had significantly higher connectedness to nature than men,  $t(378) = 3.44$ ,  $p = .001$ ,  $d = 0.35$ . Due to these significant differences, we computed all subsequent analyses separately for women and men.

### **Bivariate Associations**

Correlation coefficients between all variables are reported in Table 1. Among women, higher body appreciation was significantly associated with greater connectedness to nature and higher self-esteem. In addition, greater connectedness to nature was associated with higher self-esteem. In men, on the other hand, body appreciation was significantly and positively associated with self-esteem, but not connectedness to nature. Connectedness to nature was also not significantly associated with self-esteem in men. Finally, in both women and men, higher connectedness to nature was significantly associated with greater age, but age was not significantly correlated with either body appreciation or self-esteem.

### **Mediation Analysis**

Given the observed statistically significant relationships between body appreciation, connectedness to nature, and self-esteem, we used the SPSS PROCESS macro developed by Preacher and Hayes (2008) to test the hypothesised mediation model. The bootstrap procedure embedded in the macro was used, drawing on 1,000 bootstrap samples from the dataset. Both direct and indirect effects were estimated, with the latter considered statistically significant at the .05 level of the 95% CI when the CI does not include zero. In women, when self-esteem was examined as a mediator in the link between connectedness to nature and body appreciation, the indirect effect was estimated at .28 (95% CI: .15, .42). The indirect effect without applying bootstrapping (normal theory test) was also estimated at .28,  $z(209) = 4.94$ ,  $p < .001$ . The direct effect of connectedness to nature in this mediation model was estimated

at .10,  $t(209) = 1.55$ ,  $p = .123$ , CI: -.03, .22, and the direct effect of self-esteem was estimated at .88,  $t(209) = 13.07$ ,  $p < .001$ , CI: .74, 1.10. Standardized path coefficients are included in Figure 1. These findings collectively indicate that self-esteem fully mediated the relationship between connectedness to nature and body appreciation in women. Because this mediation approach makes the assumption that significant relationships between connectedness to nature and body appreciation, connectedness to nature and self-esteem, and self-esteem and body appreciation must be established before determining a mediation effect (Preacher & Hayes, 2008), we were not able to perform the same analysis for men.

### Discussion

In the present study, we examined associations between connectedness to nature and positive body image, which we operationalised in the form of body appreciation. Our results revealed a significant positive association between connectedness to nature and body appreciation in women. Broadly speaking, this is consistent with previous qualitative (Hennigan, 2010) suggesting a relationship between connectedness to nature and women's body image. In addition, we found support for our hypothesised mediation model in women: self-esteem fully mediated the effects of connectedness to nature on body appreciation. Just as important, however, is our finding that connectedness to nature was not significantly associated with body appreciation in men.

Previous studies have shown that engagement with nature, including through a sense of connectedness to nature, is associated with improved psychological well-being (Kamitsis & Francis, 2013; Mayer et al., 2009; Nisbet et al., 2011). Building on this work, our results suggest that connectedness to nature is associated with women's positive body image, although this relationship is mediated by self-esteem. One explanation of our findings is that higher self-esteem provides women with the tools to more effectively recover from emotional, attentional, and physiological aspects of stress and to maintain better cognitive

and affective functioning, which in turn promote healthier body image. Higher self-esteem may also facilitate changes in self-concept that help women to focus on the functionality of their bodies or to filter appearance-related information in a body-protective manner (Wood-Barcalow, Tylka, & Augustus-Horvath, 2010). Finally, higher self-esteem may also generate greater feelings of social acceptance, which may be particularly important in buffering against unhealthy body image-related messages (Wood-Barcalow et al., 2010).

Explaining why connectedness to nature is associated with body appreciation in women but not men is more difficult to explain. One possibility is that connectedness to nature may provide unique, gendered opportunities for women's self-esteem, which could in turn enhance their body appreciation. For example, ecofeminists emphasise that there is a strong parallel between the subordination of women and the destruction of nature (McGuire & McGuire, 2004). To the extent that the everyday lived experiences of women confirm this parallel, it may mean that the healing power of connectedness to nature is more salient for women than men. In a similar vein, given that women are more often depicted with nature than men (Reynolds & Haslam, 2011), it is possible that putative associations between connectedness to nature and body image are more important or meaningful for women. Alternatively, it is possible that there are complex interactions between neglected variables that affect the relationship between connectedness to nature and body image or well-being more broadly. Emerging evidence highlights how gendered life course transitions may differentially affect the mental health outcomes of engagement with nature (Astell-Burt, Mitchell, & Hartig, 2014).

Certain limitations of this work need to be recognised. First, the preliminary nature of this work and the relative novelty of this area of research generally highlight the fact that there are a host of potentially neglected variables that may have altered our findings. For example, while the focus of our work was on connectedness to nature, future work could

examine the independent or mediating effects of direct physical-sensory exposure to nature on body image. It will also be important to include other neglected variables, such as internalisation of media ideals and body mass index. Likewise, while we have focused on body appreciation, it is also possible that connectedness to nature increases the speed at which individuals recover from mental ill-health. As such, it may be worthwhile examining whether the present results can be replicated when the focus is on aspects of negative body image, such as body weight discrepancy.

The cross-sectional nature of the present work is a further limitation. This aspect of our work could be improved upon through well-controlled studies that carefully unpack the relationship between engagement with nature and body image (e.g., by examining body image before and after a move closer to nature; cf. Mayer et al., 2009). Similarly, it may be useful to experimentally examine whether spending time in nature, which is known to result in a stronger sense of being connected to nature (e.g., Bruni, Fraser, & Schultz, 2008), improves an individual's state body appreciation. Last, although we randomised the order of presentation of the scales in this study, it is possible that completing the Connectedness to Nature Scale first may have altered body appreciation. Yet, this may be unlikely as they both measure trait rather than state variables.

If the present results can be replicated and extended, it may point to a useful avenue for promoting body appreciation, at least among women. For example, there is evidence that environmental education programmes are able to effectively increase connectedness to nature (Ernst & Theimer, 2011). It would, therefore, be worthwhile to investigate whether such programmes are also able to promote healthier body image among women, either directly through connectedness to nature or indirectly via mediating factors such as self-esteem. While such work would be of interest to practitioners and policy-makers, there is also an

urgent need for further research on the effects of engagement with nature on body image. We hope this preliminary investigation helps to stimulate such research.

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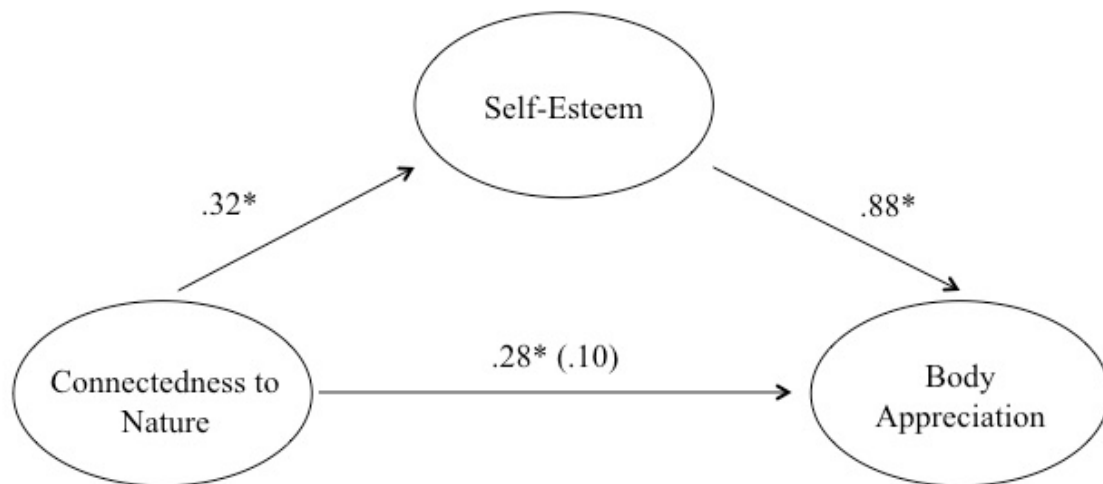
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Table 1

*Descriptive Statistics (Means and Standard Deviations) and Bivariate Correlations Between Body Appreciation, Connectedness to Nature, Self-Esteem, and Age (Women in Top Diagonal).*

	(1)	(2)	(3)	(4)	
(1) Body appreciation		0.32**	0.71**	.02	
(2) Connectedness to nature	.10		0.35**	0.25**	
(3) Self-esteem	.49**	.12		.08	
(4) Age	.05	.26*	.09		
Women ( $n = 210$ )	<i>M</i>	2.70	4.00	2.95	37.62
	<i>SD</i>	0.65	0.55	0.50	14.83
Men ( $n = 170$ )	<i>M</i>	2.87	3.79	2.99	36.01
	<i>SD</i>	0.51	0.63	0.42	15.26

Note: \*  $p < .05$ . \*\*  $p < .001$ .



*Figure 1.* Mediation model of connectedness to nature, self-Esteem, and body appreciation in women. The path coefficients are included for the direct effect (i.e., the coefficient inside the parenthesis) and indirect effects (i.e., coefficient outside the parenthesis). \*  $p < .001$ .