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Exploring experiences in wild versus manicured natural environments and their relationship to the trait 'connectedness to nature'

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Abstract

Research has overwhelmingly shown that spending time in nature can be beneficial. Yet the field is dominated by studies which compare built and manicured natural environments. Therefore relatively little is known about experiences in wild or untamed natural environments and what personal factors may affect these experiences. This study compares visitor experiences, measured as affective appraisals and transcendence, in two distinct natural environments (wild cliffs and manicured gardens), and how the trait 'connectedness to nature' may influence these experiences ($N=253$). Significant differences were found between visitor's experiences at the wild cliffs (disturbing, awe-inspiring and diminutive transcendence) and the manicured gardens (calming, boring, and deep flow transcendence). Regression analysis revealed three significant interactions and two significant non-linear results. High levels of 'connectedness to nature' at the cliffs positively predicted transcendence and a sense of awe; at the gardens, similarly high levels predicted a sense of calm. Nonlinear analyses revealed a convex (U) relationship between the trait of 'connectedness to nature', and experiencing an environment as calming, as well as a concave (inverted U) relationship with experiencing an environment as disturbing. The need to broaden experiential research content and ground research methods is discussed.

Key words: nature experience, connectedness, transcendence, natural environment

Exploring experiences in wild versus manicured natural environments and their relationship to the trait 'connectedness to nature'

Imagine you are walking along a pebbled pathway in a traditional manicured English Garden -- to your right and left are lawns of rows of neatly lined flowers. Now imagine standing on jagged, lush cliffs -- taking in the view of ocean waves crashing against rocky walls. How you might experience these two places might be attributable to their clear physical distinctions; but, of potentially equal strength is the power of personality traits and individual differences. This paper explores a spectrum of experiences and how the trait 'connectedness to nature' may influence their expression in manicured versus wild natural environments.

Research on experiences in nature has long established the wide-ranging physiological, cognitive and emotional benefits of spending time in the natural environment (Berto, 2005; Hartig, Evans, Jamner, Davis & Garling, 2003; Hartig Mang & Evans, 1991; Kaplan, 1995; Lohr, Pearson-Mims & Goodwin, 1996; Pretty, Peacock, Sellens, & Griffin, 2005; Ulrich, Simmons, Losito, Forito, Miles & Nelson, 1991). These findings are generally characterised within two predominant theories: Attention Restoration Theory (ART) (Kaplan & Kaplan, 1989; Kaplan, 1995; 2001) and Stress Reduction Theory (Ulrich, 1983). Both of these are reflective of the more general 'Biophilia hypothesis,' which proposes that humans naturally affiliate with nature due to an evolutionary need to approach that which is life-sustaining (Kellert, 1997; Kellert & Wilson, 1993; Wilson, 1984). While support for these theories is popularly noted (Kahn, 1999), demonstrative studies typically compare the impact of natural versus built

environments on emotion and cognition, providing little information on extraordinary experiences in nature, such as the experience of transcendence.

Specifically, research investigating emotional outcomes demonstrates that spending time in natural rather than built environments can decrease negative emotions (e.g. fear, aggression) (Hartig, Mang and Evans, 1991; Hartig, Evans, Jamner, Davis & Garling, 2003; Ulrich, 1991) and increase positive emotions (Hartig, Mang and Evans, 1991; Hartig, Evans, Jamner, Davis and Garling, 2003; Myers et al., 2009; Ryan et al., 2010; Staats & Hartig, 2004; Ulrich, 1991) such as being at peace (Herzog & Strevey, 2008) and a sense of vitality (Berto, 2005; Hartig et al., 1991; Ryan, 2010). Moreover in terms of cognition, both perceived restoration (Staats & Hartig, 2004; Staats, Kieviet, & Hartig, 2003) and actual restoration (e.g. increased attention span) are found to increase significantly in the natural environment (Berto, 2005; Hartig, Mang and Evans, 1991; Hartig, Evans, Jamner, Davis & Garling, 2003; Herzog, Rector & R.Kaplan, 2001; Herzog & Strevey, 2008; S. Kaplan, 1995; Kuo, 2001; Kuo & Sullivan, 2001; Myers et al, 2009; Ryan et al., 2010; Staats & Hartig, 2004; Taylor, Kuo & Sullivan, 2001, 2002; Tennesse & Cimprich, 1995; Wells, 2000). Although many studies use manicured natural environments to represent the nature condition (e.g. Berto, 2005; Hartig, Mang and Evans, 1991; Hartig, Evans, Mayers et al, 2009; Tennesse & Cimprich, 1995; Staats & Hartig, 2004; Ryan et al., 2009; Wells, 2000), some researchers have compared similar emotional and cognitive variables in *different* natural environments (Berto, Baroni, Zainaghi & Bettella, 2010; Herzog, Maguire & Nebel, 2003; Schultz & Tabanico, 2007; Ulrich et al., 1991; Van den Berg & Koole, 2006).

Manicured & Wild Natural Environments

Traditionally, natural environments are generally characterized as either wild/untamed or, manicured/cultivated natural environment (Hartig and Evans, 1993). Yet, little research has explicitly studied wild or unmanaged natural environments (Kaplan & Kaplan, 1989; Maguire & Nebel, 2003; Martens, Gutscher & Bauer, 2011; Van den Berg, Koole & Van der Wulp, 2003) and even less has compared these with manicured natural environments (Hartig and Evans, 1993; Van den Berg, Koole, 2006 & Van der Wulp, 2003). Those which have similarly focus on emotional and cognitive outcomes.

Manicured natural environments have been found to evoke positive emotions (Martens, Gutscher & Bauer, 2011) such as the experience of tranquility in coherent and open natural settings (Herzog and Bosley, 1992; Herzog & Chernick, 2000). Cognition is also found to be positively affected by non-threatening manicured environments. For instance, participants tend to favor manicured over complex natural environments for recovery from mental fatigue (Herzog & Rector, 2010; Korpella, Hartig, Kaiser, & Fuhrer, 2001; Van den Berg Koole & van der Wulp, 2003; Hartig & Staats, 2006; Herzog & Rector, 2010). Moreover, specific manicured environmental features such as compatibility, legibility and coherence are all found to positively and significantly predict cognitive restoration (Herzog, Maguire & Nebel, 2003).

In contrast, more complex natural environments have been found to subconsciously evoke negative affective experiences (Andrews & Gatersleben, 2011; Hietanen & Korpela, 2004; Parsons, 1991), such as fear and danger (Herzog, Maguire & Nebel, 2003; Herzog & Kroscott, 2004). Theorists also suggest that too much complexity

in an environment can pose a serious threat to cognitive restoration (Kaplan & Kaplan, 1984). However, dense and wild natural environments do not always evoke negative reactions. Some researchers have found that semi-dense and wild natural environments invoke a sense of ‘mystery’ -- a variable found to correlate with both positive (Herzog & Kropscot, 2004) and negative emotional experiences, such as danger (Herzog & Smith, 1988; Herzog and Miller, 1998). Similarly, Van den Berg & Heijne report that for some people threatening experiences in complex natural environments can evoke both positive (fascination) and negative (fear) emotional reactions (2005).

Unlike previous research, this study examines experiences in real settings rather than descriptions (Van den Berg & Heijne, 2005), photographs (e.g. Berto et al, 2005; Staats & Hartig, 2001) or memories of such settings (Williams & Harvey, 2001). This study examines a variety of experiences by measuring affective appraisals (Russel & Lanius, 1984), but in addition, explores other emotional experiences which are relatively understudied, but which can prove critical to fully understanding nature experiences.

Transcendence

Some experiences are defined by how they move us *beyond* immediate affective reactions. Though relatively understudied, the paradoxical experience transcendence can has been described as “the beautiful and terrifying, the awesome and awful,” (Burke, 1756/2001). Theorists have long investigated the impact of encountering wilderness, specifically noting a sense of inspiration and awe as well as spirituality and timelessness (Fredrickson & Anderson, 1999; Kaplan & Kaplan, 1989; Kaplan & Kaplan, 1989; Williams & Harvey, 2001). Research has affirmed that individuals do indeed report transcendent or mystical experiences in nature (Csikszentmihalyi, 1992; Mitchell, 1983;

Van den Berg and Heijne, 2005; Williams & Harvey, 2001), sometimes described as experiencing positive affect, a sense of unity, absorption in the moment and a sense of timelessness (Csikszentmihalyi, 1992).

Williams & Harvey (2001) conducted a preliminary exploration into different dimensions of transcendence by analysing experiences recalled by participants. Data reduction analysis determined that transcendence may be comprised of two types - deep flow and diminutive. While both deep flow and diminutive experiences in nature were perceived as 'highly transcendent,' principal component analysis found the two to be distinct from one another and the other three clusters found. Deep flow experiences clustered with effortless attention, relaxation, goal-achievement or a feeling of power over the environment, as well as a sense of ease, moderate novelty, compatibility and belonging in the environment. On the other hand, diminutive transcendence clustered with a sense of fascination, humility and insignificance (Fredrickson & Anderson, 1999; Van den Berg and Heijne, 2005; Williams & Harvey, 2001). Results also suggested that these experiences occurred in different natural environments: deep flow transcendence in moderately interesting, open, familiar environments, and diminutive transcendence in potent, novel, complex and hard to understand environments, such as dense forests, high waterfalls, or areas with vast views or tall trees (Williams & Harvey, 2001).

Traits & Experiences in Natural Environments

Similar to the relatively understudied phenomena of transcendence, few studies have explored the influence of personality traits on experiences in the natural environment (Koole & Van den Berg, 2005; Van den Berg & Heijne, 2005; Van den Berg & Winsum-Westra, 2010). Van den Berg & Winsum-Westra determined that individuals with a high

need for structure tend to prefer manicured rather than wild gardens (2010). In contrast, other researchers have found that individuals high in thrill/sensation seeking (particularly males) are more likely to respond positively and less reactionary to encounters with threatening, wild or challenging natural environments (Herzog & Rector, 2010; Hoff & Maple, 1982; Zuckerman et al., 1993; Zuckerman, 1994; Jang, Stein, Taylor, & Livesley, 1999). Similarly, individuals who are action-orientated (exploratory and high in emotional regulation) reportedly prefer wild rather than manicured landscapes, and more readily and effectively suppress associations between wilderness and death than those who are weak at emotional regulation (Koole & Van den Berg, 2005).

Connectedness to nature

A trait particularly relevant to experiences in nature is ‘connectedness to nature’. ‘Connectedness to nature’ refers to one’s intimate beliefs about the relationship between the self and nature (Mayer & Franz, 2004; Mayer, Franz, Bruehlman-Senecall, & Dolliver, 2009). Two psychological scales measure this construct – the original scale measures the ‘trait’ and a more recent version measures the ‘state’ of connectedness to nature (Mayer & Franz, 2004; Mayer et al 2009). Recent studies have found that the ‘state’ of connectedness to nature increases after exposure to natural rather than built environments and is positively related to commonly measured cognitive and emotional variables, including attentional capacity, positive affect and the ability to reflect (Mayers et al., 2009). Similarly, studies have found that the trait ‘connectedness to nature’ is positively related to spending time in nature as well as environmental concern, biospheric values and being less ego-focused (Mayers & Frantz, 2004; Frantz, Mayer, Norton, & Rock, 2005; Mayers et al, 2009; Kals, Schumacher & Montada, 1999; Dunlap & Van

Liere, 1978; 2000). These results may provide clues into potential relationships between the trait and various experiences. How might increasingly high levels of ‘connectedness to nature’ influence experiencing an environment as awe-inspiring, scary, boring, calming, or transcendence?

Present Study

The first goal of this study is to explore affective and transcendent experiences in two distinct natural environments (Russell & Lanius, 1984; Williams & Harvey, 2001). This study anticipates that visitors will report both pleasant and unpleasant arousing experiences at the wild natural environment, the cliffs, and pleasant and unpleasant non-arousing experiences at the manicured natural environment, the gardens. This study further anticipates that visitors will report more deep flow transcendence in the manicured natural environment of the gardens and more diminutive transcendence in the wild natural environment of the cliffs. The second goal of this study is to explore the relationship between the trait ‘connectedness to nature’ and affective and transcendent experiences in nature in distinct natural environments.

Method

Setting

The Sliabh Liag Cliffs in Donegal, Ireland, were chosen to represent wild or spectacular nature, and the National Botanical Gardens in Dublin, Ireland were chosen to represent manicured nature (Figure 1). In many other respects, the two environments were similar - both are located in the Republic of Ireland, and managed by government agencies as tourist destinations visited by local, national and international visitors. Weather conditions during data collection were similar in both locations, with average

temperatures at 14.5 degrees Celsius, though at times the winds at the cliffs were 12 mph faster than at the gardens.

Figure 1

Procedure

Data were collected at both sites for a period of one week. Participants in groups of three or less were approached by the lead researcher after they had spent at least twenty minutes in the environment. Potential participants were asked if they “would be willing to take a 10 minute questionnaire about their experience at the gardens/cliffs.” Upon receiving verbal agreement, the participant was thanked and handed a clipboard and pencil with a printed questionnaire attached and asked to find a quiet place to fill out the questionnaire. Data collection occurred from Monday June 2nd to Friday June 6th, 2008, from 9:00 am to 6:30 pm, ($N = 137$) at Sliabh Liag cliffs and from Monday June 16th to Friday, June 20th, 2008, from 9:30 am until 5:00 pm, ($N = 116$) at the National Botanical Gardens.

Participants

Participant age ranged from 18 to 87, ($M = 44.93$, $SD = 14.97$). A total of 110 males (43.58%) and 143 females (56.52%) participated: 72 males and 66 females at the wild cliffs, and 39 males and 77 females at the manicured gardens. Participants were mostly Irish (105) and British (57), but were also American (24), German (12),

Australian (11), Canadian (11), French (9), Polish (6), Dutch (4), Finland/Iceland (4), Danish (3), Indian (3), Belgian (2) and Italian (1).

Measures

Participants completed a six-part questionnaire. All scales were measured using a 5-point Likert scale (strongly disagree = 1 to strongly agree = 5).

The dichotomous indicator variable, *environment type* (0 = gardens and 1 = cliffs), was created to represent the two natural environments visited ($M = .54$, $SD = .56$).

'*connectedness to nature*' was measured using the original trait version of the CNS ($\alpha = .80$), ($M = 3.80$, $SD = .45$) (Franz and Mayer, 2005).

Affective appraisals were measured by 12 randomly presented appraisal items. Principal component analysis using varimax rotation identified four subscales: Disturbing (high arousal, low pleasure) ($\alpha = .69$) ($M = 1.53$, $SD = .61$); Boring (low arousal, low pleasure) ($\alpha = .70$) ($M = 1.46$, $SD = .45$); Awe-inspiring (high arousal, high pleasure) ($\alpha = .80$) ($M = 4.25$, $SD = .62$); and Calming (low arousal, high pleasure) ($\alpha = .75$) ($M = 4.74$, $SD = 1.54$). The Calming scale was recoded for normality such that 1 = 2.9; 2 = 2.9 to 3.6; 3 = 3.6 to 3.9; 4 = 3.9 to 4.2; 5 = 4.2 to 4.6; 6 = 4.6 to 4.9, and 7 = 4.8 to the highest score.

Transcendence was measured with 10 items (adapted from Williams & Harvey, 2001) ($\alpha = .81$) ($M = 3.67$, $SD = .57$). Items included feeling, "at one with the environment," "a sense of awe," "a sense of connection," "time meant nothing to me," "a newer or higher way of looking at the world," "greater awareness of the feelings in my mind and body," "a new understanding of life," "very excited or agitated," "overwhelmed by nature," and "hardly aware of the feelings in my body and mind."

Results

To explore any significant differences between the demographic characteristics of the visitors to the two natural environments a t-test was performed on age and a chi-square test on gender. While results of the t-test revealed no significant differences for age and environment type $t(251) = -1.03, p = .304$, results of the chi-square found that gender and environment type were not statistically independent from one another, $\chi^2(1, N = 253) = 8.51, p = .004$. As such, the variable gender is included in all further analysis. Finally, no significant differences were found between the two visitors to the gardens and cliffs on the independent variable ‘connectedness to nature,’ demonstrating its stability across samples $t(251) = 1.644, p = .101$.

Affective Appraisals

Independent samples t-tests and discriminant analysis tested differences between affective appraisals and transcendent experiences at the wild cliffs and manicured gardens. T-tests revealed significant mean differences in affective appraisals of the cliffs and the gardens, but not between transcendence. Respondents indicated that the wild cliffs were more awe-inspiring ($p = .000$) and disturbing ($p < .001$) than the manicured gardens, and the manicured gardens were more calming ($p < .001$) and boring ($p = .007$) than the wild cliffs (Table 1).

Table 1: Differences between the Cliffs and Gardens (N=251)

	Cliffs		Gardens		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Awe-Inspiring	4.43	0.05	3.90	0.62	8.00*
Disturbing	1.70	0.70	1.40	0.50	4.33*
Calming	4.30	1.53	5.28	1.36	-5.50*
Boring	1.30	0.40	1.50	0.50	-2.80*
Transcendence	3.65	0.55	3.53	0.67	-0.92
‘connectedness to nature’	3.76	0.45	3.85	0.55	1.64

*significant

Transcendence

Due to the inability to test deep flow and diminutive transcendence as independent constructs (principal component analysis revealed a one factor solution), a discriminant analysis of scale items representing deep flow or diminutive experiences was performed to explore whether experiences differed in the two natural environments.

Analysis revealed significant differences in the type of transcendence experienced at the cliffs versus the gardens (Wilks's Lambda = .82, $p = .001$) (see Table 2).

Unstandardized canonical discriminant functions at group means indicates the cliffs ($M = .427$) amongst the diminutive transcendent items, and the gardens, ($M = -.510$), amongst the deep flow transcendent items. As seen in Table 2, the majority of items associated with deep flow transcendence on the scale are below zero, and the majority of items associated with diminutive transcendence are above zero. All items aside from the three items closest to zero aligned with their theorized transcendence dimensions. Specifically, "time meant nothing to me," and "I was unaware of the feelings in my mind and body," are theoretically aligned with deep flow transcendence (below zero), and "very aware of the feelings in my mind and body," with diminutive transcendence, respectively (above zero).

Table 2: Discriminant Analysis by Transcendent Experience

<i>Deep flow Transcendence</i> <i>Items</i>	<i>Discriminant</i> <i>functions</i>
<i>M</i> gardens	-0.51
New understanding of life	-0.51
Sense of connection	-0.45
Higher way of looking at the world	-0.33
Very aware of the feelings in your mind and body	-0.31
<i>Diminutive Transcendence</i> <i>Items</i>	<i>Discriminant</i> <i>functions</i>
Hardly aware of the feelings in your mind and body	0.02
Time meant nothing to me	.013
At one with the universe	0.26
Overwhelmed	0.28
Excited or agitated	0.47
Sense of awe	0.76
<i>M</i> cliffs	0.43

Regression

Linear Regression

A series of OLS regressions tested whether the trait of ‘connectedness to nature’ influenced these affective and transcendent experiences. Linear analysis revealed interesting main and interaction effects between environment type and “‘connectedness to nature’.” Non-linear analysis with a quadratic version of the ‘connectedness to nature’ variable also revealed significant and interesting relationships.

Table 3: Regressions Weights of Connected to Nature x Environment Type on Nature Experiences

	Transcendence	Awe-inspiring	Calming	Disturbing	Boring
Environment Type	1.31*	2.05*	2.23	.46	-.79
CNS	.26*	.11	.25	-.24*	-.24*
CNS x Env Type	.31*	.38*	.80*	.04	-.16
Age	.00	.00	-.01	.00	.00
Gender	.13	.15*	.38*	.046	-.03
R^2	16.1	28.3	17.5	.10	.13
F	9.57	19.53	10.45	5.53	7.60
p	< .001	< .001	< .001	< .001	< .001

* indicates significance

Main Effects

Transcendence in nature was positively related to ‘connectedness to nature’, where, as ‘connectedness to nature’ increased, so did the experience of transcendence ($p = .012$). Two pleasant experiences were positively predicted by the dummy variable, environment type. Visiting the cliffs and not the gardens positively predicted transcendence ($p = .023$) and experiencing an environment as awe-inspiring ($p = .000$). Finally, the dummy variable for gender (1= female, 0 = male) positive predicted both experiencing an environment as awe-inspiring ($p = .035$) and calming ($p = .040$). Experiencing an environment as disturbing ($p = .036$), and boring ($p = .004$) was negatively predicted by “‘connectedness to nature’,’ where as participant’s ‘connectedness to nature’ scores decreased, they experienced the environments as more disturbing and boring (Table 3).

Interactions

Regression analysis revealed significant interactions between environment type and ‘connectedness to nature’ on three experiences in nature. The slope of ‘connectedness to nature’ was different for people who visited the wild cliffs versus the manicured gardens. Transcendence, experiencing an environment as awe-inspiring and

experiencing an environment as calming, were all positively predicted by the interaction between ‘connectedness to nature’ and environment type. High levels of ‘connectedness to nature’ at the wild cliffs rather than the gardens positively predicted the experience of transcendence ($p = .038$), experiencing an environment as awe-inspiring ($p = .011$) and experiencing an environment as calming ($p = .044$) (Figure 2, 3, and 4 respectively). High levels of ‘connectedness to nature’ at the wild cliffs rather than the manicured gardens predicted transcendence and experiencing an environment as awe-inspiring and calming.

Figure 2: Transcendence: Interaction of ‘connectedness to nature’*Environment Type

Figure 3: Awe-Inspiring: Interaction of ‘connectedness to nature’*Environment Type

Figure 4: Calming: Interaction of ‘connectedness to nature’*Environment Type

Non-linear Regression

Two non-linear regressions also significantly represented how ‘connectedness to nature’ influences experiences in different natural environment (See Figures 5 & 6). The R^2 values of both non-linear regressions are nearly identical to those of the linear regressions above (Disturbing $R^2 = .119$, and Calming, $R^2 = .181$).

Table 4: Regressions Weights of Connected to Nature (Quadratic) on Nature Experiences

	Disturbing(Log)	Calming
Envm Type	.23*	-.85*
CNS	1.22*	-4.50*
CNS (Quad)	-.21*	.28*
Age	0.002	-.00
Gender	0.03	.42*
R^2	13.30	18.05
F	7.56	10.88
p	< .001	< .001

*indicates significance

Experiencing an environment as disturbing was positively predicted by the quadratic ‘connectedness to nature’ variable, revealing a significant concave relationship ($p = .025$). As ‘connectedness to nature’ levels increased from very low to relatively low levels, experiencing the environments as disturbing also increased, until the inflection point when ‘connectedness to nature’ equaled 3.4. After this point, as ‘connectedness to

nature' continued to increase, experiencing an environment as disturbing began to decrease. Those with higher levels of 'connectedness to nature' appear to experience the environments as less disturbing than those with an average level of 'connectedness to nature' (Figure 5).

Experiencing an environment as calming was positively related by the quadratic 'connectedness to nature' variable, revealing a significant convex relationships ($p = .016$) (Table 4). As 'connectedness to nature' increased to moderate levels, experiencing an environment as calming decreased, until the inflection point where 'connectedness to nature' equaled 3.30 (Figure 6). After this point, as 'connectedness to nature' continued to increase, experiencing an environment as calming began to increase. Those with higher levels of 'connectedness to nature' appear to experience the environments as extraordinarily calming.

Figure 5: Effect of Quadratic 'connectedness to nature' on Disturbing

Figure 6: Effect of Quadratic ‘connectedness to nature’ on Calming

Discussion

Results provide preliminary evidence to support the two research questions introduced in the first paragraph of this paper. Analysis revealed that the physical environment does indeed have an impact on experience. Visitors reported significantly different experiences at the manicured garden and the rugged Irish coastline. Personal factors were also found to influence experience – the trait ‘connectedness to nature’ significantly influenced the type and strength of experiences in nature.

Results addressing the first research question appear to reflect Russell & Lanius’s bipolar dimensions of pleasantness and arousal (1984). Visitors to the manicured gardens found the environment to be calming and boring, representing the non-arousing pleasant and unpleasant affective appraisals, respectively. Alternatively, visitors to the wild cliffs found the environment to be more pleasantly (awe-inspiring) and unpleasantly (scary) arousing than the manicured gardens. While identifying multiple experiences in a natural environment is not necessary new (Van den Berg & ter Heijne, 2005), these results highlight the importance of extending research beyond the one dimensional association of positive experiences in manicured natural environments (Herzog and Bosley, 1992;

Herzog & Chernick, 2000) and negative experiences in wild natural environments (Herzog, Maguire & Nebel, 2003; Koole & Van den Berg, 2005). Additionally, this paper highlights the importance of providing a theoretical framework to differential nature experiences and challenges future research to consider a wider variety of experiences, particularly those that occur in relatively understudied wild natural environments, such as transcendence.

Expanding upon Williams & Harvey's (2001) preliminary analysis of reported past nature experiences and their associated environmental features, the direct experience of two distinct locations revealed interesting differences. Visitors to the wild cliffs reported more diminutive transcendence, and visitors to the manicured gardens reported more deep flow transcendence, highlighting the importance of investigating direct experiences in pre-identified natural environments. Future research should investigate possible alternate influences on experience (e.g. activity level as suggested by Mitchell 1983), particularly in wild natural environments, or, in what other natural or built environments such an intimate experience as diminutive transcendence might occur.

In terms of public policy, that such intimate diminutive transcendent experiences were found to occur at the wild cliffs is particularly interestingly and timely given recent debates over tourism development at the Sliabh Liag Cliffs in Donegal County, Ireland. While the county recently received development funds to pave access roads, increase parking and build a visitors centre to manage the amount of traffic at the cliffs, the results of this study suggest that the idea of 'manicuring' this environment could potentially increase the psychological distance between the visitor and the natural environment to such an extent as to change the stage upon which this valuable human experience of

diminutive transcendence appears to occur (“World class plan for world class attraction,” 2011). A pre and post analysis of a wild natural environment becoming increasingly manicured might be able to identify if, or at what point, the experience diminutive transcendence changes.

The second primary finding of this study is that the trait ‘connectedness to nature’ was found to significantly influence different experiences in different natural environments. In both natural environments, visitors low in ‘connectedness to nature’ reported negative experiences (bored and scared) and visitors high in ‘connectedness to nature’ reported positive experiences (transcendence). Linear analysis also revealed three interesting interactions, where levels of ‘connectedness to nature’ at either the gardens or cliffs significantly influenced experiences. Visitors high in ‘connectedness to nature’ at the wild cliffs rather than the gardens experienced the environment as more awe-inspiring and transcendent. These results reiterate how investigating the relationship between two understudied variables such as transcendence and wild natural environments can unearth compelling results.

Non-linear regression analysis provided similarly significant and compelling results. On one end of the spectrum, visitors low in ‘connectedness to nature’ experienced both environments as scary and not calming. But as average ‘connectedness to nature’ levels rose, visitors reported experiencing both environments as less and less scary, and more and more calming until those with the highest ‘connectedness to nature’ levels reported feeling completely calm. By imagining the spectrum of the trait ‘connectedness to nature’, the rather unintuitive positive relationship between ‘connectedness to nature’ and feeling fearful can be understood. It is possible that visitors low in the trait may be

less familiar with the natural environment in general. This lack of familiarity may be due to choice (no interest), or chance (no opportunity or little experience). If it is *choice* and the visitor is simply uninterested in natural environments, the experience of understimulated boredom is unsurprising. If alternatively their lack of familiarity with nature is due to *chance*, experiencing either wild or manicured natural environments may provoke fear simply because they are ‘new.’ As the trait increases to average and above average levels, it becomes more intuitive that one would report more positive and less negative experiences. This is consistent with reports from previous research that certain personalities, such as sensation-seekers, action-oriented individuals and effective emotional regulators are less afraid of complex natural environments (Hoff & Maple, 1982; Jang, Stein, Taylor, & Livesley, 1999; Koole & Van den Berg, 2005; Zuckerman et al., 1993; Zuckerman, 1994). Future research should investigate possible interactive relationships between these traits and the variety of experiences investigated in this study.

In summary, there appears to be preliminary evidence that some relationships between the trait ‘connectedness to nature’ and experiences in nature are best explained linearly and others non-linearly. First and most simply, the non-arousing negative experience of boredom is best explained by the main effects in linear analysis: low ‘connectedness to nature’ predicts boredom. Alternatively, the positive experiences of transcendence and feeling awe-inspired are best represented by the interactions in linear analysis: the arousing wild cliffs induced experiences more than the gardens. Finally, the non-arousing positive experience of feeling calm and the arousing negative experience of feeling scared were represented with equal strength and overall significance in both interactive linear and non-linear analyses. While overall the cliffs provoked more fear

than the gardens, this did not affect visitors highly connected to nature. Similarly, while the gardens provoked a greater sense of calm than the cliffs, visitors highly connected to nature reported feeling calm in *both* the manicured and wild natural environment. Both conclusions provide compelling foundations for future investigation.

Conclusion

The study demonstrates the importance of expanding our conceptions and measurements of ‘nature experiences’ and challenges existing assumptions about how people reportedly perceive the natural environment (e.g. wild nature is scary and manicured nature is pleasant). It also highlights the importance of grounding methods in a realistic context. While many acknowledge and some practice applied research (e.g. Mayer & Frantz, 2009), we should strive to reflect this ideal by choosing to study phenomena in the actual contexts in which they occur. By doing so, we demonstrate our commitment to bridging the gap between laboratory science and reality and move one step closer to unveiling more complex and rich relationships. Finally, this study proposes that we reimagine the stage upon which psychological traits, of any kind, should and can be investigated. Looking beyond traditional questions of trait-behavior consistency to the fundamental notion of how traits are experientially expressed, we will invariably discover a wealth of varied and compelling relationships.

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Appendix

Transcendence Scale

At one with the environment
 A sense of awe
 A sense of connection
 Time meant nothing to me
 A newer or higher way of looking at the world
 Greater awareness of the feelings in my body and mind
 A new understanding of life
 Very excited or agitated
 Overwhelmed by nature
 Hardly aware of the feelings in my body and mind

Affective Appraisal Subscales

Awe inspiring
 Sensational
 Spectacular

Serene
 Peaceful
 Calming

Disturbing
 Stressful
 Scary

Uninspiring
 Boring
 Unimpressive