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The Relationship between Nature Relatedness, Trait Emotional Intelligence and Well-Being

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Abstract

Prior research has shown that nature relatedness (NR) and trait emotional intelligence (trait EI) are both associated with various well-being measures (Bhullar, Schutte, & Malouff, 2013; Furnham & Petrides, 2003; Nisbet, Zelenski, & Murphy, 2011; Zelenski & Nisbet, 2014); however, no prior research has examined the relationship between NR and trait EI. The current study was undertaken to determine which well-being measures are associated with NR and trait EI, and to determine if there is any association between NR and trait EI. Participants were 315 adults from 54 countries, who completed online questionnaires. Questionnaires included the Trait Emotional Intelligence Questionnaire (TEIQue-SF), the Nature Relatedness Scale (NR Scale) and five well-being questionnaires. Based on the biophilia hypothesis (Wilson, 1983), which states that humans have an innate need to connect with other life forms, it was hypothesized that well-being would be associated with NR and trait EI. Also based on the biophilia hypothesis, it was hypothesized that NR would positively associated with each other due to an underlying general connectedness factor. Correlational analyses showed that all well-being measures were significantly associated with NR and trait EI, and that NR was significantly associated with trait EI. Factor analysis showed an underlying factor shared by the three NR subscales, and the four subscales and four auxiliary questions of the TEIQue-SF. This underlying common factor was labelled *general connectedness.* Results support the view, based on the biophilia hypothesis, that nature relatedness and trait emotional intelligence may be associated with well-being and with each other, because both traits fulfill our innate need to connect with other life forms.

Acknowledgement and Dedication

I would like to thank Professor Vernon for his encouragement, wise counsel, patience, and being available any time of day for consultation. It has been a pleasure working with such a dedicated professor, who provided invaluable advice during every aspect of the study. I would also like to thank Erica Giammarco for her recommendations and especially for her assistance setting up the online questionnaires. Finally, I must thank my husband, Marc, and my two children, Sam and Moriah, who have encouraged my academic pursuits.

I would like to dedicate this paper to my later father, Sam Katz, who enjoyed nature, loved people, and exemplified a purposeful and fulfilling life.

The Relationship between Nature Relatedness, Trait Emotional Intelligence and Well-Being

The focus on positive psychology, which is essentially the study of why people experience happiness, has increased in the last decade as a way to improve the quality of people's lives. There have been a number of factors that have been well studied and have been shown to impact happiness, including relationships with people (Caunt, Franklin, Brodaty, & Brodaty, 2013). Our relationship with nature, however, has received less attention, yet is another potentially important factor affecting happiness. Recently, studies have shown that connection with nature is associated with happiness (Nisbet, Zelenski & Murphy, 2011). Another factor that has been found to be associated with happiness is emotional intelligence (Andrei, Mancini, Baldaro, Trombini, & Agnoli, 2014; Martins, Ramalho & Morin, 2010). The present study was undertaken to determine which well-being measures are associated with connection to nature and with emotional intelligence, and to also investigate if there is any association between an individual's connection with nature and their emotional intelligence.

Happiness Defined

To study happiness it must first be defined and operationalized. Happiness, being a broad topic, is generally broken down into two types of well-being: hedonic and eudaimonic well-being. Hedonic well-being, also referred to as subjective well-being, is concerned with pleasurable feelings (Nisbet et al., 2011). It is typically assessed through self-reports of positive and negative affect, and satisfaction with life (Nisbet et al., 2011). Eudaimonic well-being, also referred to as psychological well-being, rather than focusing on pleasurable feelings, is concerned with living an optimal life, such as realizing one's potential and self-actualization (Nisbet et al., 2011). Ryff (1989) considers eudaimonic well-being to consist of six components: autonomy, personal growth, purpose in life, environmental mastery, self-acceptance, and positive

relations with others. Ryff developed the Psychological Well-Being Inventory to assess these six components, and it has become a common measure of eudaimonic well-being. To make a broad assessment of someone's happiness, it is important to measure both hedonic and eudaimonic well-being.

Connection with Nature and Well-Being

Now that happiness has been defined and operationalized, one potentially important factor affecting happiness can be discussed: connection with nature.

Biophilia hypothesis. The idea that humans benefit from being connected with nature was developed by Wilson (1984) in his biophilia hypothesis. It states that due to our evolutionary past, humans have an innate need to connect with other life forms. It has been expanded to include non-living components of nature, such as water, mountains, and wind (Frumkin, 2001). The biophilia hypothesis suggests that spending time in nature fulfills this innate need to connect with nature and that nature deprivation may negatively affect us (Gullone, 2000). In support of the biophilia hypothesis, studies show that there are benefits of interacting with nature, including stress reduction (Gullone, 2000; Hartig, Mang, & Evans, 1991; Parsons, Tassinary, Ulrich, Hebl, & Grossman-Alexander, 1998) and physical health benefits (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003; Frumkin, 2001; Heinsch, 2012; Ulrich, 1984). However, systematic research has mainly focused on nature's recuperative power, rather than nature as a contributor to well-being (Nisbet et al., 2011). According to Nisbet et al. (2011), connecting with nature was "a significant and understudied potential contributor to well-being" (p. 306).

Connection with nature defined and measured. With increased interest in studying connection with nature, a number of different ways to conceptualize connection with nature have been developed since 1999. Most of these concepts focused on one aspect, such as emotionally

or cognitively connecting with nature (Tam, 2013). One such concept, developed by Mayer and Frantz (2004), is called connectedness to nature (CN). CN focuses on one's emotional connection with nature. In the first study correlating connection with nature and well-being using the CN scale, Mayer and Frantz (2004) found that CN had a small but significant association with life satisfaction.

This initial evidence that connection with nature is associated with hedonic/subjective well-being was important; however, Nisbet, Zelenski and Murphy (2009) felt that a multi-dimensional conceptualization was necessary to fully measure individual differences in connection with nature. Therefore, they developed the construct of nature relatedness (NR). NR is defined as individual differences in connecting with nature through one's feelings, thoughts and experiences. It is considered to be trait-like; thus, it is considered to be relatively stable, although it is expected that environmental experiences may change NR (Nisbet et al., 2009). To measure NR, the NR scale was developed, where people rate their extent of agreement or disagreement with 21 statements about nature (Nisbet et al., 2009). The validity of the NR scale was shown as it correlated with a number of environmental measures and in expected ways with the Big Five personality traits (Nisbet et al., 2009). They found that NR had the strongest positive correlation with openness, followed by agreeableness, and small positive correlations with extraversion and conscientiousness. These associations between NR and the Big Five personality traits were confirmed by Tam (2013). In addition, Tam found a small negative association between NR and neuroticism.

Nature relatedness and well-being. Having developed a valid, reliable, and multidimensional measure of nature relatedness, Nisbet et al. (2011) wanted to confirm that NR is associated with well-being. They had two independent groups of participants complete the NR

scale and various measures of both hedonic and eudaimonic well-being. One group consisted of Canadian undergraduates and it was found that all well-being measures had small to moderate associations with NR. The second group consisted of Canadian business executives. Here, some inconsistencies were found. Only some of the well-being measures were significantly associated with NR. The authors speculated that the different results may reflect different views between students and business executives about the nature of well-being. Despite some of the inconsistencies, the general findings from these two studies involving different populations support the biophilia hypothesis and suggest that there is an association between NR and happiness.

Further evidence that NR is a good predictor of well-being and a valid measure of connection with nature was supported by Tam (2013). Because previous studies had not directly compared the different concepts of connecting with nature, Tam compared seven concepts and measures of connecting with nature to determine how they correlated with each other, with the Big Five personality traits, with environmental behaviour, and with subjective well-being measures. Tam found that the seven measures of connecting with nature were intercorrelated, suggesting an overlap in these constructs. However, only two were multidimensional conceptualizations, including NR. Furthermore, results showed that NR had the strongest correlations with the Big Five personality traits, environmental behaviour and subjective well-being measures. This paper highlights that NR is a valid personality trait measure of connection with nature that seems to be the most useful for predicting hedonic/subjective well-being.

Subsequent research by the developers of the NR scale, Zelenski and Nisbet (2014), sought to determine if NR's association with hedonic and eudaimonic well-being was simply based upon general connectedness (e.g., with friends, culture, music). The first study in this 2014

paper involved two different groups of participants: Canadian university students and community members from various countries who were recruited online. Participants completed the NR scale, a measure of general connectedness, and various well-being measures. As expected, general connectedness and NR were associated with happiness. Furthermore, in line with the biophilia hypothesis, NR continued to have significant associations with happiness, even after controlling for general connectedness.

To confirm that NR is a distinct predictor of well-being beyond general connectedness, the second study in Nisbet and Zelenski's 2014 paper involved the NR scale and the same well-being measures, but used a combination of five common and validated measures to assess general connectedness. Participants were once again community members recruited online, but this time participants were restricted to those in the United States. Results confirmed that NR is uniquely associated with well-being beyond general connectedness. However, some of the well-being measures used in the first study were not significantly associated with NR in this study. Given that such inconsistencies had arisen in their previous paper (Nisbet et al., 2011), the authors suggested that future research was required to address these discrepancies. The researchers provided possible reasons for lack of correlations: some correlations were small and some variation could be caused by random error; also, there could be some potential moderators affecting the data including limited availability of natural surroundings, climate, season, and demographic characteristics.

First purpose of the current study. Thus, the first purpose of the current study was to attempt to resolve the discrepancies and determine which hedonic and eudaimonic well-being measures used by Nisbet and her colleagues are correlated with NR.

Emotional Intelligence and Well-Being

Looking at the happiness literature, another factor that has been associated with well-being is emotional intelligence.

Emotional intelligence defined and measured. What is meant by emotional intelligence? There are two different ways that emotional intelligence can be viewed, either as an ability or as a personality trait (Petrides, 2011). There is debate as to how best conceptualize and measure EI. There has been considerable difficulty objectively measuring EI as an ability through maximum performance tests for a number of reasons including "conformity to social norms" (Petrides, 2011, p. 659). Further criticism against measuring EI as an ability is that emotional experiences are very subjective (Petrides, 2011). As a result of these criticisms, it is widely accepted by personality researchers that EI is best conceptualized as a trait (Andrei et al., 2014; Martins et al., 2010).

Trait EI can be defined as our disposition to perceive, understand and regulate our emotions and others' emotions (Furham & Petrides, 2003). Trait EI reflects our perceptions of our emotional abilities. Because it involves one's own perceptions, self-report measures can be used to assess trait EI. There have been a number of self-report measures developed to operationalize EI, with the most prominent one being the Trait Emotional Intelligence Questionnaire (TEIQue) by Petrides and Furnham (2003). It has been found to have good validity. For example, one study found that there was good convergence of the self-reported TEIQue and others' ratings of trait EI (Petrides, Niven, Mouskounti, 2006). It has also been shown to be associated in expected ways with the higher order Big Five personality traits, being positively associated with extraversion, openness, conscientiousness and agreeableness, and negatively associated with neuroticism (Chamorro-Premuzic, Bennet, & Furnham, 2007; Petrides

et al., 2010). This also provides evidence that trait EI, as measured by the TEIQue, is validly conceptualized as a personality trait (Petrides et al., 2010). The TEIQue is also the most prominent measure of trait EI because, according to Andrei et al. (2014), it is the only broad measure of trait EI.

Trait EI and well-being. After developing the TEIQue and its short form version (TEIQue-SF), Furnham and Petrides noticed that the increase in happiness research in the early 2000s had not yet looked at whether EI is associated with happiness. Because those with high trait EI feel they can perceive, understand and manage emotions, they felt this should contribute to well-being (Furhnam & Petrides, 2003). For example, those high in trait EI may be able to decrease negative emotions and sustain positive emotions (Mikolajczak, Nelis, Hansenne, & Quoidbach, 2008). To see if trait EI is associated with happiness, Furnham and Petrides (2003) measured undergraduate participants' trait EI, Big Five personality traits and happiness, using the Oxford Happiness Inventory. Results showed that trait EI had the strongest association with happiness (with a correlation of .70), and this association remained significant even after controlling for the Big Five traits.

Subsequent studies have consistently shown that trait EI has a stronger association with hedonic well-being than do the Big Five personality traits. For example, Chamorro-Premuzic et al. (2007) found that among British university and community participants, trait EI had a strong correlation with happiness (as measured by the Oxford Happiness Inventory), while four of the Big Five traits had significant, but smaller correlations with happiness.

These findings have also been replicated in other cultures and using a variety of well-being measures. One study showed that using a Serbian version of the TEIQue, trait EI was strongly associated with psychological well-being (as measured by Ryff's Psychological Well-

Being Inventory) even after controlling for the Big Five traits (Marjanovic & Dimitrijevic, 2014). Another study by Bhullar, Schutte, and Malouff (2013) had Australian and Indian university students complete both hedonic and eudaimonic well-being measures including: positive and negative affect, satisfaction with life, and Ryff's psychological well-being dimensions. Results showed that all were moderately to strongly associated with trait EI.

Important confirmation of the association between trait EI, as measured by the TEIQue, and well-being comes from a comprehensive meta-analysis by Martins et al. (2010). They analysed 105 effect sizes of studies that examined trait or ability measures of EI and three types of health indicators: mental health, psychosomatic health and physical health. Results showed that trait EI measures have stronger associations with health indicators, compared to ability EI measures. This confirms the utility of conceptualizing EI as a trait instead of as an ability. Furthermore, within the trait EI measures, results showed that the TEIQue has the strongest associations with all three health indicators, the strongest relationship being with mental health.

Because of these strong associations between the TEIQue and health, a subsequent review paper solely focused on research papers examining the TEIQue and various health indicators (Andrei et al., 2014). Among studies relevant to the happiness literature, consistent findings showed that trait EI is associated with positive affect, happiness, satisfaction with life and psychological well-being.

Biophilia hypothesis. Despite the large body of research demonstrating the association between trait EI and well-being, no explicit theory has been established to explain this association. The association with well-being is often explained by the idea that those with higher trait EI may be able to better regulate emotions. But perhaps part of the association between trait EI and well-being also comes from being able to connect better with other people; thus, perhaps

Wilson's biophilia hypothesis may be used to explain the association with well-being. Recall that this theory states that due to our evolutionary past, we have an innate need to connect with other life forms. Even though the biophilia hypothesis has only been used by Wilson to explain the benefits of connecting with nature, it is possible that it might also be used to explain the benefits of connecting with people. Having greater trait EI could facilitate our connections with others and should, therefore, be associated with greater well-being. In fact, studies show that those with higher trait EI tend to have better interpersonal relations "because accurate emotion perception facilitates effective communication and social functioning" (Mavroveli, Petrides, Sangareau, & Furnham, 2009, p. 267). For example, Petrides, Sangareau, Furnham and Ferderickson (2006) found that elementary age students with higher trait EI tend to be viewed by their peers and teachers as being more pro-social (e.g., co-operative, leadership qualities) and less anti-social (e.g., aggressive, disruptive). Agreement for extending the biophilia hypothesis to our innate need to connect with others comes from Gunderson (2014) who very recently presented this same view. Gunderson's paper is based upon Eric Fromm's early writings about biophilia where biophilia includes "a love for nature as well as a love for humanity" (Gunderson, 2014, p.188).

Second purpose of current study. If the biophilia hypothesis can be used to explain the association with trait EI and well-being, as well as the association between NR and well-being, perhaps there is an association between trait EI and NR because of an underlying general connectedness factor. In addition to having a common theoretical basis, the empirical findings that both NR and trait EI are associated with well-being, also suggests that NR and trait EI may be associated with each other. Thus, the second purpose of the current study was exploratory because, to the best of my knowledge, no other study has looked at whether NR and EI are associated.

The Current Study

In support of the biophilia hypothesis, previous studies have demonstrated that NR is associated with a number of well-being measures (Nisbet et al., 2011; Tam, 2013; Zelenski & Nisbet, 2014). However, there have been some inconsistences concerning which well-being measures are associated with NR (Nisbet et al., 2011; Zelenski & Nisbet, 2014). Therefore, one purpose of this study was to determine which well-being measures, used by Nisbet and her colleagues in their 2011 and 2014 papers, are associated with NR. To attempt to resolve these discrepancies, two weaknesses in the previous studies were addressed in the current study. First, unlike most of the previous studies, participants were recruited online from different countries. Including participants from a broad background should help to control for any differences, such as demographic, cultural, or geographic. Second, because Nisbet's previous studies did not always specify the season when questionnaires were completed, this study was completed during July (summer for most of the world's population). It was expected that this might strengthen the weaker associations between some of the well-being measures and NR. This is expected because happiness tends to decline during the winter in regions where days are shorter and temperatures are cooler (Nisbet et al., 2011). In addition, NR has also been shown to decrease as winter approaches, probably because of less time spent outdoors (Nisbet et al., 2011).

In a separate body of research, it has been shown that trait EI is consistently associated with both hedonic and eudaimonic well-being (Andrei et al., 2014; Martins et al., 2010). These findings are consistent with the view that being able to effectively manage one's emotions should contribute to well-being (Furnham & Petrides, 2003). These findings may also partially be explained by the biophilia hypothesis because trait EI helps individuals to connect with other people (Mavroveli et al, 2009). Because trait EI and NR are both associated with well-being and

because their relationship with well-being may be explained by the biophilia hypothesis, it was suggested that these traits may be associated with each other. Therefore, the second purpose of this study was to determine if there is an association between NR and trait EI.

Participants were recruited online through the website Crowdflower. This correlational study included all the hedonic and eudaimonic well-being measures used by Nisbet et al. (2011) and Zelenski and Nisbet (2014): positive and negative affect, satisfaction with life, subjective happiness, Ryff's six psychological well-being factors (autonomy, growth, environmental mastery, purpose, self-acceptance and positive relations with others), and vitality. The NR scale was used to measure NR and the TEIQue-SF to measure trait EI.

First, it was hypothesized that NR would be significantly associated with all well-being measures. Second, it was hypothesized that trait EI would be significantly associated with all well-being measures. Finally, it was hypothesized that NR and Trait EI would be positively associated with each other.

Method

Participants

Participants were recruited through Crowdflower, a website similar to Amazon Mechanical Turk. Crowdflower has contributors from over 150 countries, where contributors select online jobs and are paid a small fee. Although both Crowdflower and Amazon Mechanical Turk are used frequently by researchers, few studies have examined the quality of the data. One study that examined Amazon Mechanical Turk found that participants are not only more diverse than typical internet samples but that the reliability of the data collected is comparable to that obtained through traditional approaches (Bhurmester, Kwang, & Gosling, 2011). In contrast, another study completed by Rouse (2015), found that reliability estimates were lower than those

obtained by conventional methods. However, they still considered the use of Amazon Mechanical Turk to be beneficial for research because of the many benefits including the ease, speed and low cost of data collection, the diversity of participants from many regions, and the cross-validation of data from other types of population samples. Therefore, even if the data collected from Crowdflower may be slightly less reliable that typical samples, it was felt that this was an easy and inexpensive way to collect data from diverse participants in different regions.

For this study, participants had to be 18 years of age or older and fluent in English. There were a total of 769 participants recruited from July 9th to July 12th, 2015. Additional participants were recruited after the first day because several participants were excluded because they either did not complete the questions, incorrectly responded to the two careless responding items, or completed the questionnaires in 10 minutes or under. As a result, more contributors were requested until over 300 participants with complete and reliable data were included.

After removal of the excluded participants, 315 participants were included in the final analyses (88 female, 226 male, 1 unspecified). The age range was 18 to 62 (M = 32.10, SD = 9.00). Participants were from 54 countries, with the top six countries being India, Serbia, Venezuela, United States, Bosnia-Herzegovina, and Indonesia.

Materials

Hedonic well-being measures. Three frequently-used questionnaires were administered to measure hedonic well-being: the Positive and Negative Affect Schedule, the Satisfaction with Life Scale, and the Subjective Happiness Scale.

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This questionnaire has participants rate to what extent twenty words describe how they generally feel on a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5

(*extremely*). Ten words are positive or pleasant, such as "interested," which provide a measure of positive affect. Ten words are negative or unpleasant, such as "distressed," which provide a measure of negative affect. It is important to note that negative affect is the only well-being measure used in this study where a lower score indicates greater well-being. Watson et al. (1988) reported strong internal reliabilities (alphas ranging from .86 to .90 for positive affect and .84 to .87 for negative affect). Positive and negative affect measures also showed good convergent validity with other mood scales and correlated in expected ways with distress and psychopathy measures (Watson et al., 1988). The PANAS has also been used successfully in different cultures, showing internal reliabilities ranging from .84 to .87 for positive affect and .76 to .90 for negative affect and good psychometric properties when factor analysis was conducted (Brannon, Biswas-Diener, Mohr, Mortazavi, & Stein, 2013; Pires, Filgueiras, Ribas, & Santana, 2013).

The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). This scale has participants rate their extent of agreement with five statements about their life satisfaction, using a 6-point Likert scale ranging from 1 (*strong disagreement*) to 6 (*strong agreement).* Statements include "The conditions in my life are excellent" and "I am satisfied with my life." Diener et al. (1985) reported this scale to have good internal reliability ($\alpha = .87$), test-retest reliability ($r = .82$), and construct validity. The SWLS has been used successfully in different cultures, showing internal reliabilities ranging from .79 to .88 and good convergent validity with other measures such as the Oxford Happiness Inventory, General Self-Efficacy Scale, and Locus of Control (Bayani, Koocheky, & Goodarzi, 2007; Brannan et al., 2013; Sachs, 2004).

The Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999). This scale measures individual differences in happiness. Participants rate the extent four items describe themselves using a 7-point Likert scale ranging from 1 (*not a very happy person/less happy/not at all*) to 7 (*a very happy person/more happy/a great deal*). One item is reverse-coded before scores are averaged. An example item is "Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?" Lyubomirsky and Lepper (1999) reported this scale to have good internal reliability across ages, occupations and cultures (alphas ranging from .79 to .94), good test-retest reliability when participants were retested from three weeks to one year later (.55 to .90), good convergent validity with other well-being measures, and good discriminant validity with measures of cognitive ability. Since the initial validation of the scale it has been successfully used in well-being studies in other cultures (Damásio, Zanon, & Koller, 2014; Iani, Lauriola, Layous, & Sirigatti, 2014; Jovanović, 2014; Tam, 2013).

Eudaimonic well-being measures. Two questionnaires were used to measure eudaimonic well-being: the Vitality Scale and Ryff's Psychological Well-Being Inventory.

Vitality Scale (VS; Ryan & Frederick, 1997). The individual difference level version of the Vitality Scale has participants rate their level of feeling alive and alert with seven statements using a 7-point Likert scale from 1 (*not at all true*) to 7 (*very true*). Statements include "I feel alive and vital" and "I look forward to a new day." Ryan and Frederick (1997) reported that the original seven-item version had good internal reliability ($\alpha = .84$) and good validity, as it was positively correlated with various well-being measures and self-esteem, and negatively correlated with ill-being measures, such as depression, psychopathy and anxiety. The Vitality Scale has been used and validated in other cultures and languages and demonstrated good

internal reliabilities ranging from .76 to .83 (Fayad & Kazarian, 2013; Salama-Younes, 2011). Only six of the seven items were used for the analyses in this study because the six-item version was used in Nisbet's previous studies (Nisbet et al., 2011; Zelenski & Nisbet, 2014). The six-item version, which omitted the only negatively worded item, was shown to yield better results based on confirmatory factor analysis completed by Bostic, Rubio, and Hood (2000).

Psychological Well-Being Inventory (PWBI; Ryff, 1989). The 54-item version of the PWBI was used to measure six dimensions of eudaimonic well-being. Participants rate their agreement with the 54 items on a 6-point Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*). Twenty-eight items are reverse-coded before scores for each dimension are averaged. Nine items measure each of the six dimensions of autonomy (e.g., "My decisions are not usually influenced by what everyone else is doing"), environmental mastery (e.g., "In general, I feel I am in charge of the situation in which I live"), personal growth (e.g., "I have the sense that I have developed a lot as a person over time"), positive relations with others (e.g., "Most people see me as loving and affectionate"), purpose in life (e.g., "I am an active person in carrying out the plans I set for myself"), and self-acceptance (e.g., "In general, I feel confident and positive about myself"). The original 120-item version developed by Ryff (1989) demonstrated good internal reliability, test-retest reliability, and good preliminary validity for each of the scales. Since that time a number of different item versions have been used, but the 54-item version was used in accordance with Nisbet's previous NR studies (Nisbet et al., 2011; Zelenski & Nisbet, 2014), which demonstrated good internal reliabilities (alphas ranging from .76 to .93). According to Sirigatti et al. (2013), Ryff's PWBI is the "most popular instrument employed to assess positive human functioning" and "has been used in diverse socio-cultural and linguistic contexts and with several different scale versions" (p. 75).

The Trait Emotional Intelligence Questionnaire –Short Form (TEIQue-SF; Petrides, 2009). The TEIQue-SF was used to measure trait EI. This short-form version has participants rate their agreement with 30 items using a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Fifteen items are reverse-coded before scores are averaged. Twenty-six of the items measure the four subscales: six items measure well-being (e.g., "On the whole, I'm pleased with my life"), six items measure sociability (e.g., "I can deal effectively with people"), eight items measure emotionality (e.g., "Expressing my emotions with words is not a problem for me"), and six items measure self-control (e.g., "Others admire me for being relaxed"). Combining these 26 items with the remaining four items (auxiliary questions), which directly contribute to the trait EI score, provide an overall measure of trait EI. Cooper and Petrides (2010) demonstrated that the short form version has good reliability (alphas ranging from .87 to .89). Internal reliabilities are generally lower for the subscales with alphas ranging from .67 to .86 (Siegling, Vesely, Petrides, & Saklofske, 2015). As previously mentioned, it has been found to have good validity, demonstrating good convergence of the self-reported TEIQue and others' ratings of trait EI (Petrides et al., 2006). It also correlates in expected ways with the Big Five personality traits, optimism, emotional stability, social desirability, anxiety and depression (Chamorro-Premuzic et al., 2007; Mikolajczak, Luminet, Lero, & Roy, 2007; Petrides et al., 2010). Different versions of the TEIQue have been successfully and widely used in many cultures (Andrei et al., 2014). For example, confirmatory factor analysis conducted in Serbia, demonstrated good internal reliability (α = .95; alphas ranging from .78 to .82 for the subscales) and good convergent validity with measures of empathy and ability EI, and correlated in expected ways with the Big Five personality traits (Marjanovic & Dimitrijevic, 2014).

The Nature Relatedness Scale (NR Scale, Nisbet et al., 2009). The NR Scale was used to measure NR. Participants rate their agreement with 21 items about their connection with nature on a 5-point Likert scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). Eight items are reversed coded before scores are averaged. The 21 items measure the three subscales of NR, which are combined to obtain an overall NR measure: nine items measure NR-Self (e.g. "I am very aware of my environmental issues"), six items measure NR-Perspective (e.g., "The state of non-human species is an indicator of the future of humans"), and six items measure NR-Experience (e.g., "My ideal vacation spot would be a remote, wilderness area"). Nisbet et al. (2009) reported good internal validity for the full NR scale ($\alpha = .87$), with somewhat lower internal validity for the subscales (NR-Self, $\alpha = .84$; NR-Perspective, $\alpha = .66$; NR-Experience, $\alpha = .80$). The validity of the NR scale was shown as it correlated with a number of environmental measures and in expected ways with the Big Five personality traits (Nisbet et al., 2009). Unlike the other measures in this study, this scale has had limited use in other cultures. However, one study completed by Tam (2013) involved undergraduates at a Hong Kong University where participants were from China, Indonesia, Korea and India. Results were consistent with findings from North American participants and good internal reliability was demonstrated ($\alpha = .83$). Furthermore, NR showed convergent validity with other measures of connecting with nature and correlated in expected ways with the Big Five personality traits. Therefore, this study provides some preliminary evidence that this scale is relevant for use in other cultures.

Procedure

Participants were recruited online through Crowdflower during July, 2015. Potential participants read the job description on Crowdflower (see Appendix A). If they were interested they clicked on the link, which directed them to Fluidsurveys.

At this website, participants read the letter of information and signified their consent to participate by accessing the questionnaires (see Appendix B). Participants first completed basic demographic information (age and gender). Next, participants were presented with the questionnaires in the following order: NR Scale, Satisfaction with Life Scale, Subjective Happiness Scale, Positive & Negative Affect Schedule, Vitality Scale, Ryff's Psychological Well-Being Inventory, and TEIQue-SF. Interspersed among the 143 questions were two careless responding items where participants were asked to "Please select strongly agree." For all items participants had the option of not answering if they so chose.

Following the questionnaires, a debriefing form was presented and a compensation code was provided (see Appendix C). Participants then returned to Crowdflower to input the code to receive payment of one U.S. dollar. The questionnaires typically took less than 30 minutes to complete.

Results

Correlational Analysis

All analyses were completed using SPSS version 23. Pearson bivariate correlation analysis was used to determine which well-being measures are associated with NR and trait EI and also to determine if there is an association between NR and trait EI. The data from 454 participants out of 769 participants was removed due to incomplete or invalid data (see previously outlined exclusion criteria), leaving 315 participants' data for analysis. Descriptive statistics (ranges, means, standard deviations, and Cronbach's alphas) for all scales and subscales are reported in Table 1. Consistent with the first two hypotheses, the correlational analyses showed that NR and trait EI had significant correlations with all well-being measures (see Table 2 for correlations). More specifically, NR had small to moderate positive correlations with all

Table 1

Descriptive Statistics for Scales and Subscales

Scale or Subscale	Range	Mean	Standard Deviation	Cronbach's α
NR Scale	2.24 - 5.33	3.98	0.46	.80
NR Subscale: NR-Self	2.22 - 5.22	3.96	0.54	.78
NR Subscale: NR-Perspective	2.00 - 5.67	4.26	0.66	.57
NR Subscale: NR-Experience	1.83 - 5.33	3.72	0.62	.61
TEIQue-SF	2.07 - 6.80	4.78	0.80	.92
TEIQue Subscale: Well-being	1.33 - 7.00	5.08	1.03	.81
TEIQue Subscale: Self Control	1.50 - 6.67	4.62	0.88	.66
TEIQue Subscale: Emotionality	2.50 - 7.00	4.74	0.90	.71
TEIQue Subscale: Sociability	2.17 - 7.00	4.67	0.95	.72
Satisfaction with Life Scale	1.00 - 7.00	4.39	1.22	.88
Subjective Happiness Scale	1.25 - 7.00	4.69	1.15	.83
PANAS: Positive Affect	1.30 - 5.00	3.54	0.64	.85
PANAS: Negative Affect	1.00 - 3.89	2.12	0.71	.88
Vitality Scale	1.00 - 7.00	4.85	1.13	.88
PWBI: Positive Relations	1.56 - 6.00	4.15	0.90	.84
PWBI: Environmental Mastery	1.67 - 6.00	4.08	0.77	.80
PWBI: Personal Growth	2.00 - 6.00	4.24	0.70	.72
PWBI: Self Acceptance	1.00 - 6.00	4.05	0.89	.86
PWBI: Purpose	1.44 - 6.00	4.17	0.75	.75
PWBI: Autonomy	2.43 - 6.00	4.29	0.67	.70

Table 2

Correlations between NR, Trait EI and Well-Being Measures

Well-Being Measure	Nature Relatedness	Trait Emotional Intelligence
Satisfaction with Life	.25	.48
Subjective Happiness	.36	.62
Positive Affect	.39	.54
Negative Affect	-.24	-.55
Vitality	.42	.58
Positive Relations with Others	.40	.73
Environmental Mastery	.38	.79
Personal Growth	.44	.67
Self Acceptance	.38	.71
Purpose	.40	.70
Autonomy	.31	.57

Note: All correlations significant, $p < .01$

well-being measures, except for a small negative correlation with negative affect. Similarly, trait EI had moderate to strong correlations with all well-being measures, except for a moderate negative correlation with negative affect. Therefore, those who reported higher NR and trait EI tended to report greater subjective happiness, satisfaction with life, positive affect, vitality, positive relations with others, environmental mastery, personal growth, self acceptance, purpose in life and autonomy, and less negative affect. Also consistent with the third hypothesis, NR and trait EI were significantly positively correlated with each other, r (313) = .41, $p < .01$. Therefore, those who reported higher NR tended to also report higher trait EI.

Factor Analysis

Because a significant positive correlation was found between NR and trait EI, factor analysis was conducted using the three subscales of the NR Scale, and the four subscales plus the auxiliary questions of the TEIQue-SF. The purpose was to determine if there was a factor that was common to all of these variables. Different criteria supported the use of factor analysis using these subscales. First, correlations between the variables revealed significant positive correlations between all the variables (refer to Tables 3a and 3b for the correlation matrix). Second, the Kaiser-Meyer-Olkin measure of sampling adequacy was .85, indicating a good degree of common variance and suitability for factor analysis.

Principal axis analysis was used because principal components analysis can yield an artifactual general factor even when one does not exist but principal axis analysis will only reveal a general factor when one actually exists. Two factors were yielded: eigenvalues showed that the first factor explained 44% of the variance and the second factor explained 10% of the variance. Prior to rotation, all variables positively loaded onto the first factor, with loadings ranging from .33 to 83 (see Table 4). Oblimin rotation was used to allow for the two factors to

Table 3a

Correlation Matrix of the Subscales of the TEIQue-SF and the NR Scale

	TEIQue Well-Being	TEIQue Self-Control	TEIQue Emotionality	TEIQue Sociability	TEIQue Auxillary
TEIQue Well-Being					
TEIQue Self-Control	.58				
TEIQue Emotionality	.57	.59			
TEIQUE Sociability	.62	.53	.64		
TEIQue Auxillary	.74	.55	.66	.66	
NR-Self	.38	.26	.29	.24	.32
NR-Perspective	.19	.24	.27	.20	.19
NR- Experience	.31	.21	.25	.23	.30

Note: All correlations significant, $p < .001$

Table 3b

Correlation Matrix (continued) of the Subscales of the TEIQue-SF and the NR Scale

	NR-Self	NR-Perspective	NR-Experience
TEIQue-Well-Being	.38	.19	.31
TEIQue-Self-Acceptance	.26	.24	.21
TEIQue-Emotionality	.29	.27	.25
TEIQue-Sociability	.24	.20	.23
TEIQue-Auxillary	.32	.19	.30
NR-Self		.30	.51
NR-Perspective			.28
NR-Experience			

Note: All correlations significant, $p < .001$

Table 4

Factor Matrix Using Principal Axis Factoring Prior to Rotation

Subscale	Factor 1	Factor 2
TEIQue-Well-Being	.81	-.09
TEIQue-Self-Control	.68	-.14
TEIQue-Emotionality	.77	-.16
TEIQue-Sociability	.76	-.22
TEIQue-Auxiliary Questions	.83	-.16
NR-Self	.50	.56
NR-Perspective	.33	.24
NR-Experience	.44	.52

be correlated. After rotation, the three subscales of the NR scale loaded onto one rotated factor, while the four subscales and auxiliary questions of the TEIQue-SF loaded onto a second factor (see Table 5). These two factors were quite highly correlated (r = .52).

Factor analysis not only confirmed that NR and trait EI are separate constructs because each of their respective subscales loaded onto separate rotated factors, but it also showed that NR and trait EI have something in common because all subscales loaded onto the first unrotated factor. This underlying factor could be called *general connectedness* as suggested by extending the biophilia hypothesis.

Discussion

The importance of happiness has led to an increase in the search for factors that affect it. Two factors that have been found to be associated with happiness/well-being are NR and trait EI. It was suggested that these associations may be explained by the biophilia hypothesis, and that NR and trait EI may be associated because both traits involve our innate need to connect with other life forms. Therefore, the purpose of the current paper was to determine which well-being measures are associated with NR and trait EI and to determine if there is an association between NR and trait EI. It was hypothesized that NR and trait EI would be associated with all well-being measures, and that NR and trait EI would be positively associated with each other. All hypotheses were supported.

NR and Well-Being

Results from the correlational analyses support the first hypothesis because participants who reported greater NR tended to report greater positive affect, satisfaction with life, subjective happiness, vitality, positive relations with others, environmental mastery, personal growth, self-acceptance, purpose in life and autonomy, and less negative affect. This helps to resolve discrepancies in five previous studies published in two papers examining these well-being

Table 5
Pattern Matrix using Principal Axis Factoring After Rotation

	Factor 1	Factor 2
TEIQue-Well-Being	.76	.10
TEIQue-Self-Control	.69	.01
TEIQue-Emotionality	.79	-.00
TEIQue-Sociability	.82	-.07
TEIQue-Auxiliary Questions	.84	.01
NR-Self	-.03	.77
NR-Perspective	.08	.36
NR-Experience	.04	.70

Note: Oblimin rotation method used.

measures and NR (Nisbet et al., 2011; Zelenski & Nisbet, 2014). In these studies positive affect, vitality and personal growth were the only well-being measures that were consistently associated with NR.

One explanation for the significant correlations is because the current study, unlike most of the previous studies, involved a broad spectrum of participants. It is felt that using online international participants helped to control for any differences, such as demographic, cultural, or geographic. Among the five studies by Nisbet and her colleagues, three of the studies involved Canadian university students and one study involved Canadian business executives, all unrepresentative samples of the general population, which could have some peculiarities. The study which resulted in the fewest significant correlations was an online study limited to U.S. participants, which showed that NR was only associated with positive affect, vitality, and personal growth (Zelenski & Nisbet, 2014). The authors speculated that perhaps "this U.S. sample construed at least one of the well-being measures differently than other samples" and that other factors could be moderating the relationship between NR and well-being such as "local nature or climate, season, demographic or other personality characteristics" (Zelenski & Nisbet, 2014, p. 17). It is important to note that only one of the five studies included participants from a variety of countries (New Zealand, United States, Canada, United Kingdom, and Australia), and this study yielded significant correlations with NR and all well-being measures used (Zelenski & Nisbet, 2014). Consistent with these findings are results from another study involving undergraduates outside of North America, at a Hong Kong university (Tam, 2013). This study found that NR was positively associated with subjective happiness and satisfaction with life, two well-being measures not always associated with NR using Canadian and U.S. participants.

Therefore, it appears that one reason for the significant correlations found in the present study may be because of the broad spectrum of participants.

Another factor contributing to the significant correlations found in the current study may be due to the completion of the study during the summer. Unlike the present study, some of the previous studies were conducted in the late fall and early winter, and the study involving the U.S. sample did not indicate when the study was completed (Nisbet et al. 2011; Zelenski & Nisbet, 2014). Completing some of the previous studies during the fall and winter could have contributed to fewer significant correlations with well-being measures since happiness tends to decline as days become shorter and temperatures become cooler (Nisbet et al., 2011). In addition, NR may also decline, probably because of less time spent outdoors (Nisbet et al., 2011). Seasonal variations may help explain inconsistencies between studies, especially given that some of the significant correlations tend to be small.

In summary, the significant associations found between NR and all the well-being measures can be explained because the current study involved a broad spectrum of international participants and was conducted during the summer. Given that some of the significant correlations were small, especially negative affect and satisfaction with life, it is understandable that these well-being measures have not always been significantly associated with NR. Therefore, the present study helps to understand and resolve the previous discrepancies between some well-being measures and NR. The current findings also lend support to the biophilia hypothesis, which suggests that those who are more connected with nature should experience greater well-being.

Trait EI and Well-Being

Results from the correlational analyses also support the second hypothesis because participants who reported greater trait EI tended to report greater well-being. Consistent with previous studies, including those conducted in other cultures, all correlations were moderate to strong (Andrei et al., 2014; Bhullar et al., 2013; Chamorro-Premuzic et al., 2007; Furnham & Petrides, 2003; Marjanovic & Dimitrijevic, 2014; Martins et al., 2010).

This strong and consistent association between well-being and trait EI is often explained because those with higher trait EI may be better able to regulate emotions. But perhaps part of the association can be explained by the biophilia hypothesis, if it is extended to include our innate need to connect with people. It seems logical that trait EI should help us connect with people and this is supported by studies which show that those with higher trait EI tend to have better interpersonal relations (Mavroveli et al., 2009; Petrides et al., 2006).

NR and Trait EI

Using the biophilia hypothesis to explain the benefits of both trait EI and NR, led to the third hypothesis that trait EI and NR would be positively associated with each other. Results from both the correlational and factor analyses support this hypothesis. The correlational analysis showed that those who reported higher trait EI tended to report greater NR. Because of this moderate correlation, factor analysis was undertaken using the subscales of the NR scale and the TEIQue-SF to determine if there was a common underlying factor to these subscales. Factor analysis not only confirmed that NR and trait EI are separate constructs, but it also showed that NR and trait EI share a common underlying factor. This underlying factor could be called *general connectedness* as suggested by extending the biophilia hypothesis to include our innate need to connect with other people. Therefore, both correlational and factor analyses support the

hypothesis that NR and trait EI are positively associated with each other, possibly because both traits involve connecting with other living things.

There are no previous studies that have examined the relationship between NR and trait EI to support the results found in the present study. However, given that the strength and direction of the associations found between NR, trait EI and all well-being measures were in agreement with previous findings, it reasonable to assume that the results concerning the relationship between these two traits are fairly reliable. Agreement for extending the biophilia hypothesis to include connecting with people, comes from Gunderson (2014). His suggestion was inspired by writings by from Eric Fromm who felt that biophilia included "a love for nature as well as a love for humanity" (Gunderson, 2014, p. 188).

Despite this theoretical basis for extending the biophilia hypothesis to explain the benefits of trait EI and the relationship between NR and trait EI, there could be another factor that connects these two traits. Some evidence against extending the biophilia hypothesis comes from the previously mentioned U.S. study by Zelenski and Nisbet (2014). This study was undertaken to determine if NR was a distinct predictor of well-being beyond general connectedness. To assess general connectedness, five measures of connectedness were combined: attachment, interdependence, loneliness, belongingness, and collective identity. As previously stated, results showed that NR contributed to well-being beyond general connectedness; however, Zelenski and Nisbet were surprised to find that NR was not associated with general connectedness. Indeed, these results are surprising since the current study found that NR and trait EI are associated, and it is logical to expect that some of these connectedness measures are associated with trait EI. Unfortunately, a review of the literature was unable to find a study correlating trait EI (measured by the TEIQue) and any of these specific connectedness measures. The lack of association

between NR and general connectedness appears to conflict with the idea that NR and trait EI are associated because of an underlying general connectedness factor. However, recall that this U.S. sample yielded the fewest significant correlations between NR and well-being measures; therefore, the results from this U.S. study may not be strongly reliable.

In contrast to the lack of significant correlations, another study published in the same paper by Zelenski and Nisbet (2014) did find that a general connectedness composite was associated with NR. This study involved the previously mentioned online participants from New Zealand, United States, Canada, United Kingdom, and Australia. Participants indicated their subjective connections with "country, culture, family, music, home, and friends" to assess general connectedness (Zelenski & Nisbet, 2014, p. 7). Given that this sample showed significant correlations between NR and all well-being measures, the results from this study may be more reliable. However, because the two studies by Zelenski and Nisbet used different measures to assess general connectedness, the results are not perfectly comparable. Nevertheless, because one of their studies demonstrated that NR is associated with general connectedness, this lends some support to the idea that NR and trait EI could be associated because of an underlying general connectedness factor.

In summary, correlational analysis showed that NR and trait EI are positively associated, and factor analysis showed that these traits share a common underlying factor. Therefore, based on the biophilia hypothesis, it is suggested that this common underlying factor can be labelled *general connectedness.* However, the conflicting evidence from two studies by Zelenski and Nisbet (2014) makes this proposition debatable.

Limitations, Implications and Future Research

To determine if NR and trait EI share a common underlying general connectedness factor requires future research. First, because this is the first study to examine the relationship between NR and trait EI, future studies are required to confirm these traits are correlated and share a common underlying factor. If this is confirmed, then research is also required to clarify what that common factor is. One suggested study could involve correlating NR, trait EI, and various connectedness measures to resolve the discrepancies found by Zelenski and Nisbet (2014).

Moving beyond correlational findings requires future experimental studies. Although results from the present study lend support to the biophilia hypothesis, because this is a correlational study it does not show causation. Based on the biophilia hypothesis it is suggested that NR and trait EI are associated with well-being measures because they lead to well-being. However, future experimental studies are required to determine if NR and trait EI are causally related to well-being and also to determine if NR and trait EI can be changed as a way to enhance well-being. In order to improve people's lives it is not only important to understand what factors affect well-being, but how to enhance well-being.

One longitudinal, quasi-experimental study by Nisbet et al. (2011) looked at the impact of taking environmental courses on NR and well-being measures. Two groups of Canadian university students, one group who enrolled in environment-related courses vs. one group who did not enrol in environment-related courses, completed the NR scale and six well-being measures before and near the end of the fall semester. Because the study ended up taking place in the fall when well-being, and possibly NR, decline as winter approaches, they hypothesized that taking environmental courses would produce relative benefits compared to the control group (i.e., taking environmental courses would temper the seasonal decreases in well-being). Results

showed that NR and one well-being measure, vitality, were maintained among those taking environmental courses, while NR and all well-being measures decreased in the control group. Although the other well-being measures decreased for both groups, the researchers were impressed that such a subtle factor as course content could be associated with any difference in well-being. They suggested that the results of this study should encourage other researchers to look at ways of increasing NR through educational courses (Nisbet et al., 2011). In agreement with their suggestion, it is felt that future experimental studies should be undertaken to look at ways to improve NR and see if this leads to changes in well-being. It will also be important to look at size effects to determine if improvements are sufficiently large to consider recommendation of specific methods to enhance NR.

Like NR, there have mainly been correlation studies involving trait EI. However, three recent experimental studies have attempted to change trait EI. A study by Nelis, Quoidbach, Mikolajczak, and Hansenne (2009) was the first well-controlled experimental study to determine if trait EI could be enhanced through training. In an attempt to reconcile the debate about conceptualizing EI as an ability or as a trait, a tripartite model of EI was recently developed (Nelis et al., 2009). This model includes three hierarchical levels of EI consisting of knowledge, abilities and traits. As explained by Nelis et al. (2009), these levels make a distinction between knowing about a strategy to manage emotions (e.g., distraction to reduce anger), the ability to use the strategy if prompted to do so (ability EI), and the tendency/disposition to use the strategy (trait EI). Based on this model, Nelis et al. (2009) attempted to educate and train participants to see if EI could be improved. The experimental group was taught theoretical knowledge about emotions and participated in emotional skills training for two and a half hours each week for four weeks, while the control group did not participate in any weekly sessions. The TEIQue was

completed before, just after, and six months after the training sessions. Results showed a significant increase in TEIQue scores among the experimental group, and this improvement was maintained six months later. This finding was important because it suggests that trait EI can be enhanced.

A subsequent study by Nelis et al. (2011) was undertaken to determine if changes in EI lead to changes in personality. The experimental design was similar to their previous study with the inclusion of a control group. Results confirmed that TEIQue scores showed significant improvements in the experimental group, which were maintained after six months. Additionally, results showed that immediately after training there was a significant increase in extraversion, and six months later they also found a significant increase in agreeableness and significant decrease in neuroticism. These results suggest that personality traits can be changed through intensive training interventions, and that improvements can even continue after the training has been completed (probably due to continued implementation of what was taught).

Another study by Nelis et al. (2011) published in the same paper was undertaken to determine if changes in EI could also lead to changes in well-being. Of importance, they added a second control group that experienced drama improvisation training to ensure that the changes in EI were due to the EI training and not because of participation in a social group, experimenter demands, or improvement expectations. Consistent with the two previous studies, trait EI increased in the EI training group, while both control groups showed no changes. Furthermore, those in the EI training group showed significant improvement in a number of well-being indicators including satisfaction with life and subjective happiness. These results are encouraging and it is hoped that future researchers will confirm and extend the research by Nelis and her colleagues.

Conclusion

The present study examined the relationship between NR, trait EI and well-being. Results confirm previous findings that NR and trait EI are associated with well-being. Furthermore, results showed that NR and trait EI are associated with each other and share a common underlying factor, which was labelled *general connectedness.* Therefore, the findings support the biophilia hypothesis and suggest that NR and trait EI may be associated with well-being and with each other because both traits fulfill our innate need to connect with other life forms. Because this was the first study to examine the relationship between NR and trait EI, future research is required to confirm the relationship between NR and trait EI and to clarify why this relationship exists. Future experimental studies are also required to determine if NR and trait EI are causally related to well-being and if these traits can be changed in order to improve well-being and enhance the quality of people's lives.

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Appendix A

Job Description on Crowdflower

Title: Nature Relatedness and Well-Being

This study is investigating the relationship between nature relatedness, well-being and trait emotional intelligence. For this study you will be asked to indicate your age and gender, as well as complete seven questionnaires: one measuring nature relatedness, five measuring well-being and one measuring trait emotional intelligence. For each questionnaire you will select the most appropriate response on a scale of one to five (or six or seven). The study should take approximately 30 minutes. You will be compensated $1.00 upon completion of the study.

You must be 18 years years of age or older and fluent in English to be participate in this study.

To access this survey please click on this link:

http://fluidsurveys.com/s/nature-relatedness-well-being/

Appendix B

Letter of Information

Title of Research: An Investigation of the Relationship Between Nature Relatedness, Well-being and Trait Emotional Intelligence

Research Investigators:
Priscilla Gerofsky (Undergraduate Student, Western University)
E-mail: mpgerofsky@rogers.com

Dr. Tony Vernon (Professor, Western University)
E-mail: vernon@uwo.ca

Erica Giammarco (PhD Student, Western University)
E-mail: egiammar@uwo.ca

1. Invitation to Participate
You are being invited to participate in this research study, which is investigating the relationship between nature relatedness, well-being and trait emotional intelligence. You will read a number of statements and then rate each statement on a given scale. You are requested to participate in this study because you are an adult member of the general population.

2. Purpose of the Letter
The purpose of the letter is to provide you with information required for you to make an informed decision regarding participation in this research.

3. Purpose of the Study
The purpose of the study is to investigate the relationship between nature relatedness, well-being and trait emotional intelligence. Previous studies have examined the relationship between nature relatedness and various well-being measures, and one purpose of this study is to help confirm which measures of well-being are associated with nature relatedness. Another purpose of this study is to determine if there is an association between nature relatedness and trait emotional intelligence.

4. Inclusion Criteria
Individuals who are 18 years of age and older and fluent in English are eligible to participate in this study.

5. Exclusion Criteria
There are no exclusion criteria for this study.

6. Study Procedures
If you agree to participate, you will be asked to indicate your age and gender, as well as complete seven questionnaires: one measuring nature relatedness, five measuring well-being and one measuring trait emotional intelligence. For each questionnaire you will select the most appropriate response on a scale of one to five (or six or seven). The study should take

approximately 30 minutes and will only require one session. The study will be conducted online via FluidSurveys. There will be a total of 500 participants.

7. Possible Risks or Harms
There are no known or anticipated risks or discomforts associated with participating in this study.

8. Possible Benefits
You many not directly benefit from participating in this study but information gathered may provide benefits to society because it may contribute to a better understanding of how relating/connecting with nature may enhance quality of life.

9. Compensation
You will be compensated $1.00 for you participation in this study. If you do not complete the study you will still be compensated the full amount.

10. Voluntary Participation
Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no penalty.

11. Confidentiality
All data collected will remain confidential and accessible only to the investigators of this study. If the results are published, your name will not be used. If you choose to withdraw from this study, your data will be removed and destroyed from our database.

12. Contacts for Further Information
If you require any further information regarding this research project or your participation in the study you many contact Priscilla Gerofsky (mpgerofsky@rogers.com or 519-675-0459), Dr. Tony Vernon (Vernon@uwo.ca or 519-661-3692), or Erica Giarmmarco (egiammar@uwo.ca).

13. Publication
If the results of this study are published, your name will not be used. If you would like to receive a copy of any potential study results, please contact Priscilla Gerofsky (mpgerofsky@rogers.com).

14. Consent
Accessing and completing the survey is indication of your consent to participate.

You may print this letter for your future reference.

Appendix C

Debriefing Form

Title of Research: An Investigation of the Relationship Between Nature Relatedness, Well-being and Trait Emotional Intelligence

Research Investigators:

Priscilla Gerofsky (Undergraduate Student, Western University)
E-mail: mpgerofsky@rogers.com

Dr. Tony Vernon (Professor, Western University)
E-mail: vernon@uwo.ca

Erica Giammarco (PhD Student, Western University)
E-mail: egiammar@uwo.ca

The current study was undertaken to investigate the relationship between nature relatedness, well-being and trait emotional intelligence. Under the realm of positive psychology, previous research has found that connecting/relating with nature is associated with certain measures of well-being. However, there have been some inconsistencies. Thus, one purpose of this study is to help determine which measures of well-being are associated with nature relatedness.

Another purpose of this study is to determine if there is an association between nature relatedness and trait emotional intelligence. Trait emotional intelligence involves being able to perceive and regulate emotions. Previous studies have shown that trait emotional intelligence is associated with well-being. Therefore, it is expected that trait emotional intelligence may also be associated with nature relatedness. If associations are found, this suggests that nature relatedness may positively impact well-being and emotional intelligence, supporting the view that connecting with nature may be one way to enhance quality of life.

In this study participants were asked to complete seven questionnaires. The purpose of this was to measure your nature relatedness, different aspects of your well-being and your emotional intelligence to determine any associations.

Your responses and participation are much appreciated. Without your involvement, it would not be possible to conduct this research. Thank you.

To ensure confidentiality, your responses will be assigned a coding number and will not be associated with your name.

If you have any further questions about this research please contact Priscilla Gerofsky (mpgerofsky@rogers.com or 519-675-0459), Dr. Tony Vernon (vernon@uwo.ca or 519-661-3692), or Erica Giammarco (egiammar@uwo.ca). Thank you for helping us with this thesis-your time is much appreciated.

If you have any questions about your rights as a research participant, you should contact the

Director of the Office of Research Ethics at ethics@uwo.ca or 519-661-3036.

HIT CODE: 35.27.98

IMPORTANT: You must return to CrowdFlower and enter this code before submitting your HIT to receive your compensation.

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You may print this letter for your future reference.