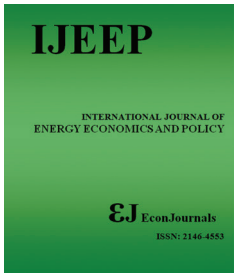

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# Connectedness to Nature and Environmental Concern as Antecedents of Commitment to Environmental Sustainability

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**ABSTRACT**

Environmental issues are challenging human existence on earth. There is growing consensus that individuals need to change their behaviour and consumption patterns to create a sustainable society. Despite the indispensability of building a sustainable society in Saudi Arabia, only limited empirical examinations have been attempted about the awareness, attitudes and the role of individual attitude towards environment and sustainability. Attempting to fill this gap in literature, the study examined the relationship of Connectedness to nature and Environmental concern with Environmental sustainability. The data collected from 261 respondents was analyzed using Structural Equation Modeling. The results showed that Connectedness to nature and Environmental concern were antecedents of Commitment to environmental sustainability. Demographics did not have any effect on the variables studied. It is expected that the understanding about the various factors related to pro-environmental behaviour would facilitate designing of appropriate agendas and programs for effective dissemination of information about environment issues.

**Keywords:** Environmental Concern, Connectedness to Nature, Commitment to Environmental Sustainability
**JEL Classifications:** K32, O13, O44, P18

## 1. INTRODUCTION

Environmental sustainability is a topic of social relevance. The growth in population, consumption, and the use of non-renewable resources are have accelerated the need for sustainability and sustainable development (SD). Shrinking natural resources, global warming, pollution, depletion of ozone layer, and climate change is challenging human existence on earth (Sulphey, 2016). There is growing consensus that individuals need to change their behavior and consumption patterns substantially to create a sustainable society. Since environmental sustainability is about human choices and actions, in-depth psychological studies are required to understand the general attitudes of people.

In the past two decades environmental problems like global warming and climate change have attracted wide attention the world over. No nation in the world has been spared of these problems, nor any citizens left untouched. Public awareness and concern about climate change are now widespread. That environmental concern is now a global phenomenon has been highlighted by a number of cross-national empirical studies (Iizuka, 2000; Sulphey, 2019). However, while most people accept that climate change is caused by human, there are a significant number of persons who still remain skeptical about the issue. For them the detailed understanding of the process and its contribution to different problems still remain limited. A number of issues like global warming, ozone depletion, and pollution have been found to be conflated with climate change. For instance, a number of studies since 1990 reveal that the general public confuse between ozone depletion, greenhouse effects, and climate variability (Boon, 2009; Bostrom et al., 1994; Bell 1994; Dunlap, 1998; Ungar, 2003).

There is also a tendency to perceive climate change as a remote issue, with certain immediate and more pressing personal, social

and local environmental issues receiving priority. Evidences show that the public risk perceptions of climate change correspond more with variables like demography, ideology, identity, and institutional trust (O'Connor et al., 2002). The general public tends to assign responsibility of tackling climate change to their governments. It is also observed that while public support for mitigation actions is high, willingness to change personal behaviour is limited. As such there is a definite need to focus attention on individual environmental behaviour (Kaiser et al., 1999, Sulphey, 2019). Further, despite the mounting scientific and general awareness and consensus about global warming, climate change and the multitude of risks posed by them; there is always a tendency in the media to portray them as merely an aspect of scientific controversy and intellectual debate. These aspects are yet to trickle down to the level of individual duty and responsibility. Only few empirical examinations have been done regarding the awareness, informedness, attitude and the role of personal efficacy and individual attitude towards environment and related sustainability issues. The present study intends to fill this gap in literature by examining whether individual level environmental concerns and connectedness to nature are antecedents of commitment to environmental sustainability.

The study is conducted in Kingdom of Saudi Arabia (KSA). Conducting a study of this dimension in KSA is significant as the nation is geographically diverse, with harsh and extreme patterns of weather events, and rain fall. The manifestations of climate change in KSA are also different and at times severe at certain parts of the country. There a definite need to inculcate in the citizens a positive attitude towards nature, environment and sustainability. To the best of the knowledge, a scientific assessment of the awareness level of climate change and ecology, sustainability, and connectedness with nature are yet to be carried out. Similarly, adequate focus has also not been found assigned to heat□related impacts from climate change. Awareness about these aspects have been observed to be at abysmally low levels among various sections of the Saudi society.

## 2. REVIEW OF LITERATURE

The environmental problems faced by Earth is mostly anthropogenic in nature. There is now a broad understanding across the globe that the cost of ignoring the environment and having a lax attitude towards environment protection would be massive (Sulphey, 2017). Pro-environmental behaviour is one aspect that is essential to overcome the multitude of environmental issues now faced by the world. Researchers have attempted to identify factors that motivate such behaviours. A few pro-environmental behaviours include environmental concern, social norm connectedness to nature, commitment to environmental sustainability, etc. (Oreg and Katz-Gerro, 2006; Schultz, 2001; Steg and Vlek, 2009). The following section reviews the available literature regarding connectedness to nature, environmental concern and commitment to environmental sustainability, all of which are essential to solve the repercussion of the present anthropogenic issues.

### 2.1. Theoretical Underpinnings

The Theory of Planned Behaviour (TPB) (Ajzen, 1985), which is an extension of Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980; Ajzen and Madden, 1986), proposes that the behavioural intention to perform a particular behaviour occurs due to its immediate antecedent. Intention is the function of one's attitude towards the performance of a particular act, as well as the subjective norms. Subjective norm is considered as the strength of one's normative belief, which in turn, is the motive to conform with the belief and values. Further, social expectations and morality are can be categorized as the approximation of an individual's subjective norms. Since attitude is based on the valuation of outcomes, and the estimation of the probability of this outcome, factual knowledge is required for the formulation of the attitude (Stutzman and Green, 1982). TPB also theorises about the influences on various behaviours that are beyond one's control (Ajzen and Madden, 1986), which can be applied to the realm of ecology.

Thus, in tune with TPB, ecological behaviours and intentions are normally based on a wide range of outside and societal influences, which are often beyond the control of any individual (Hines et al., 1986). For instance, the weather conditions include temperature influences aspects like consumption of water, electricity, recycling behaviour; type of residential property, space utilization, etc. (Gamba and Oskamp, 1994; Lansana, 1992; Moore et al., 1994; Olsen, 1981; Oskamp et al., 1991; Verhallen and Van-Raaij, 1981; Williams, 1991). Further, the attitude towards and use of public transportation system is based on the facilities provided by the community (Sulphey and Safeer, 2017). This is also true with respect to the aspect of garbage disposal behaviour. In general, multiple community and socio-cultural constraints play a significant role in determining the ecological behaviour of any individual (Kaiser, et al., 1999). Thus, to a certain extent, individual ecological behaviour is extraneous to the individual.

Kaiser et al., (1999) further elaborates that the framework of TPB is one that is capable of brining various paradigms pertaining to attitude towards environment as well as ecological behaviours. For this to occur three components are helpful. They include factual knowledge, social and moral values concerning the environment, and social and moral values about the intentions regarding environmental and ecological behaviours. The TRA and TPB has been applied in environmental attitude and behaviour by many social scientists (Macovei, 2015). Hirose (1994) and Seligman and Ferigan (1990) applied TRA with respect to pro-environmental behaviorus. The specific areas in which the framework was applied include consumption behaviour, water and energy conservation. Many social scientists like Kim et al. (2013), Macovei (2015), Si, et al., (2019), Zhang et al., (2019), etc., have applied TPB with respect to environmental behaviours.

Another theoretical model that has been applied in the analysis of environmental behaviour is Schwartz's Norm Activation Model (Schwartz, 1977). This theory is also called Theory of activation of altruistic norms (Widegren, 1998). This model stipulates that behaviours are outcomes of beliefs about the consequences that could arise out of individual actions. It also explains about the drive towards helping behaviours that are motivated by altruism. Schwartz's theory further proposes that helping is likely to occur, when there is an awareness the consequences of helping would be

positive, and when a form of responsibility is ascribed to helping behaviour. Many studies have applied Schwartz's Model to elucidate pro-environmental behaviours (Blamey, 1998; Macovei, 2015; Stern et al., 1993). Specific areas wherein it has been applied extensively include energy conservation, recycling behaviour, etc. (Blamey, 1998; Black et al., 1985, Hopper and Nielsen, 1991; Widegren, 1998). Both these theories are in unison in stating that for environmental actions, in addition to the attitude of individuals, the attitudes and responses of many "others" also have a significant influence. These "others" could include environmental/climate activists, opinion builders, governments, etc.

Each of the three variables of the study – connectedness to nature, environmental concern and commitment to environmental sustainability, are now discussed in the following sections.

## 2.2. Connectedness to Nature

Connectedness to nature is defined by Schultz (2001) as "the extent to which an individual includes nature within his/her cognitive representation of self". Mayer and Frantz (2004) describes it as "a sense of belonging to or a sense of oneness with nature". To the broader natural community, it is a prerequisite for fostering ecological behaviour. According to Roszak (1995) connectedness is "self expanded to include the natural world," wherein the "behaviour leading to destruction of this world will be experienced as self-destruction." Schultz (2002 p. 67) defined connectedness to nature as the "extent to which an individual includes nature within his/her cognitive representation of self." Connectedness to nature as a values-based attitude (Brugger et al., 2011), which could yield multiple benefits to humans and the natural environment (Chew, 2018). Mayer et al., (2009) considered connectedness to nature as "a state," which can either increase or decrease through contact with nature.

Connectedness to nature has multiple benefits to humans and the environment. Some of the benefits to humans include happiness (Capaldi et al., 2014), mindfulness (Huynh and Torquati, 2019), positive moods (Mayer et al., 2009), emotional and psychological well-being (Huynh and Torquati, 2019; Nisbet et al., 2011; Windhorst and Williams, 2015), better health (Frumkin, 2001; Kaplan, 2001), etc. Individuals having a strong connectedness to nature exhibit various environment friendly behaviours, like saving electricity, engagement with nature, etc. (Nisbet et al., 2009; Tam, 2013; Tang and Chang, 2011). It could also lead to sustainable lifestyles (Fox et al., 2006).

Multiple theoretical models have suggested that having a sense of belonging to the broader natural community is a prerequisite for fostering ecological behaviour. A number of studies have been undertaken in other parts of the world in this area (Tang and Chang, 2011; Dutcher et al., 2007). Tang and Chang (2011) found that an individual's connectedness with nature has a significant and positive association with perceptions related the restorative qualities of nature, and willingness to engage with nature. Multiple studies have established that sense of connectedness with nature is an important to factor for the development of concerns about environment, and environmentally responsible behaviors (Schultz, 2002; Mayer and Frantz, 2004; Dutcher et al., 2007). This was confirmed by Whitburn et al. (2019) when they found a deep relationship between connectedness to nature and pro-environmental behaviour. Those who are connected to nature are found to have more pro-environmental behaviour and involve in conservation activities (Whitburn et al., 2019). Thus, there are ample evidences to suggest that connectedness to nature will be concerned with the nature (Mayer and Frantz, 2004; Whitburn et al., 2019). This could ultimately result in positive relationship with environment and sustainability.

## 2.3. Environmental Concern

Environmental concern is now getting increase prominence across the globe. It is identified as an affective environmental attitude (Schultz et al., 2004, 2005). Environmental concern is the evaluation of one's own or others' behaviour with the consequences for the environment (Kim et al., 2019; Takala, 1991; SjÎberg, 1989; Weigel, 1983). Fransson and Garling (1999) considered it as "specific attitude toward environmentally relevant behaviour to a more encompassing value orientation". Xiao and Dunlap (2007, p. 475) defined environmental concern as:

> "a dual-universe conceptual structure consisting of two general components—the 'environmental' and 'concern' domains—both of which are multifaceted."

Studies to identify factors of individual level environmental concern are now getting due focus, and adequate literature has accumulated in this regard (Bohr and Dunlap, 2018; Dunlap, 2017; Dunlap and Jones, 2002; Hao and Song, 2020; Hong and Park 2018; Liu and Mu 2016; Sulphey, 2019a; Zhou, 2013). Since attitudes predispose actions, many studies have attempted to examine the causal processes that is initiated from attitudes and result in pro-environmental behaviors (Donald et al., 2014). Empirical evidences exist to prove that individuals having higher levels of concern for environment are likely to behave in responsible manner (Bak and Huh, 2010; Dunlap and Jones, 2002; Oreg and Katz-Gerro, 2006). Individuals who have concern for the environment are often willing to offer sacrifices for the sake of environment. This could lead to pro-environmental behaviors from their part (Oreg and Katz-Gerro, 2006). Xiao and Dunlap (2007) and Xiao and McCright (2007) found that individual perception about environment could vary based on topographical differences. As such, the topological dimension of environmental concern is one of top priority, since it has high level of ramifications in the development of pro-environmental behaviours (Bak, 2018; Cruz and Manata, 2020). Further, Iizuka (2000) opines that pro-environmental behaviour among citizens facilitates successful implementation of environmental policies and regulations.

The construct of environmental concern is considered to be too broad and multidimensional in nature (Cruz and Manata, 2020; Dunlap and Jones, 2002), and need to be operationalized accordingly (Guber, 1996). Many studies have found the economic affluence of a country and environmental degradation were positively related to the concern for the environment (Franzen and Vogl, 2013; Hong and Park, 2018; Marquart-Pyatt, 2012). Environmental concern is found to be affected by collective and individual-level factors (Franzen and Meyer, 2010; Givens and

Jorgenson, 2011). However, the individual-level factors have started to receive the due attention only in the near future (Hao and Song, 2020). Bak (2018) opined that regular pro-environmental behaviour could be fostered through the concern about the environment.

### 2.4. Commitment to Environmental Sustainability

Acute consumerism, unnecessary wastages, degradation of natural resources, pollution of earth and water, inequitable distribution of natural resources, egoistic attitude of the rich and the affluent, etc., have made sustainability, and sustainable behaviour an essential aspect. Sustainable behavior is a set of "deliberate and effective actions" that facilitates environmental conservation for the current and future generations (Bonnes and Bonaiuto, 2002). It is the aggregate of pro-ecological action, frugality, altruism and equitability. According to Corral-Verdugo et al. (2011) an individual who is sustainably-oriented is simultaneously pro-social and ecological.

Individuals with commitment towards sustainability care for fellow humans (Corral-Verdugo, et al., 2011). They strive to create circumstances that permit equitable use of available natural resources (Ehrlich and Ehrlich, 2004, Sulphey, 2019a), exercise moderation in consumption (de Young, 1996; Iwata, 2002), and have a sense of altruism and assist the needy (Pol, 2002; Schultz, 2001). They involve in activities that conserve natural resources (Faridi and Sulphey, 2019; Kaiser, 1998).

There is no dearth of literature about environmental sustainability, its antecedents, initiatives and the multitude of benefits that could be derived from it (Adomako et al., 2019; Bragagnolo et al., 2014; Danso et al., 2019; Sulphey and Safeer, 2017, Sulphey, 2019). Studies have identified an array of behaviours like pro-ecology, frugality, altruism, and equitability to lead to sustainable behaviours (Bragagnolo et al., 2014; de Young, 1991; Iwata, 2002; Kaiser, 1998; Schultz, 2001; Winter, 2002). Some of the examples of pro-ecological behaviors encompass of activities that are capable of conservation of various natural resources. Certain other similar behaviours include reduced consumption, pro-environmental lobbying, pro-ecological activities, etc. (Kellert et al., 2008; Hsu, 2004). These behaviours could manifest as three R's (reduce, reuse and recycle), frugal behaviour and commitment to sustainability in individuals (de Young, 1991; Kaiser, 1998; Thogersen, 2005).

Bamberg and Moser (2007) and Corral-Verdugo et al. (2009) found aspects like environmental knowledge, pro-ecological attitudes, beliefs and values to be antecedents of environmental sustainability behaviours. These behaviours could also help in predicting sustainable behaviors.

Based on the review of literature the following hypothesis are formulated for the study:

$H_1$: There is a positive relationship between connectedness to nature and Environmental concern.

$H_2$: There is a positive relationship between Environmental concern and commitment of environmental sustainability.

### 2.5. Demographic Variables

Social scientists have identified a number of demographic factors that exercise influence over environmental attitudes and behaviours. Some of them include age (Arcury and Christianson, 1990; Fransson and Garling, 1999; Gamba and Oskamp, 1994); gender (Davidson and Freudenburg, 1996; Graça et al., 2018; Milfont et al., 2014; Ruolin and Nicolette, 2020; Schultz et al., 1995); education (Howell and Laska, 1992; Liere and Dunlap, 1980); place of residence (Arcury and Christianson, 1990; Howell and Laska, 1992); etc. A few demographics are now discussed in detail.

### 2.6. Age

The relationship of age with environmental attitude has been a matter of empirical interest (Dietz et al., 1998; Inglehart, 2018; Mohai and Twight, 1987; Nord et al., 1998; Liere and Dunlap, 1980). The results of these studies are however inconclusive. A study by Nord et al. (1998) observed a strong correlation between age and environmental attitude. Fransson and Garling (1999) found only weak link between environmental attitude and age. Liere and Dunlap (1980) observed young persons to be better aware and concerned about environmental degradation. This view was also supported by many other like Arcury and Christianson (1990), Eagly and Kulesa (1997) and Fransson and Garling (1999). A number of other, for instance Clark and Finley (2007), Hsu and Feng (2019) and Lee et al., (2013) found older people to have higher levels of environmental behaviour.

### 2.7. Gender

The influence of gender on environmental behaviour seems to have received only scant empirical attention (Davidson and Freudenburg, 1996; Stern et al., 1993). Though it is claimed that females are capable of understanding relationships with nature better (Diamond and Orenstein, 1990; Eckersley, 1992), available empirical evidences present ambiguous results (Liere and Dunlap, 1980). Hines et al. (1987) and Schultz et al. (1995) found that there is no correlation between gender and environmental behavior. While Elwell and Williams (2016), Hunter et al. (2004), Stern et al. (1993), Stern et al. (1995) and Liere and Dunlap (1980) found females to have better pro-environmental attitudes and behaviours; Arcury and Christianson (1990) found males to be more environmentally concerned. Recent studies by Hsu and Feng (2019) and Milfont and Schultz (2018) found women to display higher level of environmental behaviour. McStay and Dunlap (1983) and Mohai (1992), however found men be active in public regarding environmental issues.

Based on the reviewed literature, it is hypothesised that (H03) Age and gender of the respondents moderate the relationship between connectedness to nature and environmental concern.

A fair review of literature failed to find any evidence about the relationship of employment status and environmental concern or environmental sustainability. There is thus a need to fill this gap in literature. Thus, it is thus hypothesised that (H04) Employment status of the respondents moderates the relationship between environmental concern and commitment to environmental sustainability.

## 3. METHODOLOGY

Three standardized questionnaires have been used to collect data for the study. The details of the questionnaires are presented below:

1. Connectedness with nature: The connectedness to nature scale (CNS) developed by Mayer and Frantz, (2004) was used to collect data to measure this variable. The CNS enjoys good psychometric properties with acceptable level of reliability. It reported Cronbach's alpha of .79.
2. Environmental concern: Environmental concern was measured using a scale developed by adapted from Diekmann and Preisendörfer (2003). The scale has nine items in three factors. The three factors are Affective, Cognitive and Conative. The scale reported an acceptable alpha of 0.72.
3. Commitment to Environmental Sustainability: Alcock's (2012) seven item, unidimensional scale was used to measure commitment to environmental sustainability. This scale also reported acceptable levels of alpha.

All the questionnaires were on a five-point scale, ranging from strongly agree to strongly disagree. The particulars of the respondents pertaining to various demographic details, including gender, age, course studying (undergraduate or graduate), etc., were also collected. Data were collected from 261 samples. The samples pertained to varying demographics, the details of which are presented in Table 1.

The minimum and maximum age of the respondents were 17 and 60 years respectively. The average age was 24.03 years. Those respondents who were employed had experience ranging from less than a year to 35 years. 217 respondents were Saudis and 43 were expatriates. From the diversity representativeness of the sample can be assumed. The descriptive statistics is presented in Table 2.

**Table 1: Demographics of the sample**

| Particulars | | Number | Per cent |
|---|---|---|---|
| Gender | Male | 170 | 65.13 |
| | Female | 91 | 34.87 |
| Occupation | Working | 41 | 15.71 |
| | Student | 220 | 84.29 |
| Marital status | Married | 49 | 18.77 |
| | Unmarried | 212 | 81.23 |
| Qualification | Non-Graduate | 188 | 72.03 |
| | Graduate | 28 | 10.73 |
| | Post Graduate | 24 | 9.20 |
| | Ph.D. | 21 | 8.04 |

**Table 2: Descriptive statistics of the variables**

| Variable | Mean | SD | % of variance in FA |
|---|---|---|---|
| Connectedness to nature (CN) | 49.17 | 7.53 | 81.34 |
| Environmental concern | 31.26 | 5.42 | 83.97 |
| Commitment to Environmental Sustainability | 24.19 | 3.63 | 79.89 |

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was found to be .958 (approximate Ch-score 5275.072) with Sig of 0.000. This signifies that the sample is adequate. The exploratory factor analysis (EFA) of the variables yielded the same factors as envisaged in the original scales. The factors exhibited fairly high loadings. The loadings ranged between 0.796 and .953 for Connected to nature, 0.952 and 0.850 for Environmental concern, and 0.920 and 0.854 for Commitment to Environmental Sustainability. The confirmatory factor analysis (CFA) was done for all the variables, and the details are presented in Table 3. It can be observed that most of the fit indices are met for all the three variables.

For the measurement of the model, the proof of discriminant validity as proposed by David (1998) was tested. As a rule of thumb, a 0.85 correlation or higher indicates poor discriminant validity in structural equation modelling. The inter-correlation between affective and cognitive was 0.13 ($p < 0.05$), affective and conative was 0.17 ($p < 0.05$) and cognitive and conative was 0.31 ($p < 0.05$). None of the correlations between variables were above 0.85, thus establishing the discriminant validity of the measurement model.

Correlation and regression analyses were done to examine the contribution of CN on ENV and CS. The results of Pearson correlation analysis between the different variables are presented in Table 4. Significant positive correlation at 0.01 level was found between the three variables of study. Other than for the variable Concern for Environmental Sustainability, the other two variables had significant correlation with the demographic variables of age and experience. Table 5 presents the results of regression between CN and ENV, and Table 6 provides the results between ENV and CES. The results show that the regression models are adequate with all the tested variables revealing significant contributions. The contribution of CN was found to be 17% and that that of ENC on CES was 25%. To test the significance, ANOVA was applied and the both the F values were found to be significant. Thus, it can be considered that both the regression models are adequate, and the independent variables exercised significant contributions.

### 3.1. Estimation of Proposed Model

For estimation of the proposed model SEM was conducted. The analysis was initially done in without considering moderating

**Table 3: CFA of the variables**

| Variable | CFI | GFI | TLI | NFI | RMSEA |
|---|---|---|---|---|---|
| Environmental concern | 0.957 | 0.932 | 0.919 | 0.944 | 0.05 |
| Connectedness to nature | 0.927 | 0.919 | 0.901 | 0.914 | 0.048 |
| Commitment to Environmental Sustainability | 0.904 | 0.900 | 0.901 | 0.898 | 0.051 |
| Standards | >0.9 | >0.9 | >0.9 | >0.9 | <0.05 |
| Authors | Bentler (1992), Hair et al. (2010) | Hair et al., (2010) | Tucker and Lewis (1973) | Hooper et al., (2008) | Byrne (1998), Diamantopoulos and Siguaw (2000), Hu and Bentler (1999) |

variables and thereafter with the moderating variables. The first section presents the analysis without moderating variables.

### *3.1.1. Result of SEM without moderating variable*

The hypothesized relation between the variables was tested using Amos. The nature of the various constructs of the study was reflective. The constructs CN and CEs were first-order constructs, and ENV was measured using the first-order constructs of Affective, Cognitive and Conative. The variables were found to enjoy fairly good fit. The CFI was 0.904, GFI 0.901, TLI 0.900 NFI 0.901 and RMSEA 0.05. They are well within the prescribed rule of the thumb (Byrne, 1998; Hair et al., 2010; Hu and Bentler, 1999; Tucker and Lewis, 1973). The SEM, without moderating variables is presented in Figure 1.

Based on SEM, the hypotheses formulated for the study were tested for their tenability, and the results are presented in Table 7. A significant positive relationship ($p < 0.05$) was found between CN and EC. The beta value was found to 0.30. Thus, the hypothesis H01 that "*There is a positive relationship between connectedness to nature and Environmental concern*" is accepted. This finding is in accordance with the findings reported by Dutcher et al., (2007), Mayer and Frantz (2004), Whitburn et al., (2019), and many others.

A significant positive relationship ($\beta$ value = 0.23, $p < 0.05$) was also observed between EC and CES. Thus, the second hypothesis that "There is a positive relationship between Environmental concern and commitment of environmental sustainability" is also accepted. A partially similar pattern of results was observed in the studies by Bamberg and Moser (2007) and Corral-Verdugo et al. (2009).

### *3.3.2. Demographics as moderating variables*

SEM was also done to examine the moderating effect of demographics like age, gender and employment status. The fit indices are presented in Table 8. It can be observed that all the indices present adequate fit. The results of the moderation analysis are presented in Figure 2 and Table 9.

It was hypothesised that "age and gender of the respondents moderate the relationship between connectedness to nature and environmental concern." The analysis provided a beta value of 0.21 ($p < 0.05$) signifying that the two variables did not moderate the relationship between CN and EC, and hence the hypothesis is rejected. It was also hypothesised that (H04) "Employment status of the respondents moderates the relationship between environmental concern and commitment to environmental sustainability." Results showed that there is no relationship between the two variables (beta value 0.02), thereby rejecting the hypothesis. No pervious study has examined this aspect. Thus, this finding can be considered to be a new addition to environmental literature.

**Table 4: Correlation matrix**

| | CN | ENV | CES | Age | Experience |
|---|---|---|---|---|---|
| CN | 1 | 0.412** | 0.215** | 0.179** | 0.182** |
| ENV | | 1 | 0.505** | 0.140* | 0.149* |
| CES | | | 1 | 0.058 | 0.011 |
| Age | | | | 1 | 0.844** |
| Experience | | | | | 1 |

N = 260. *Correlation is significant at the 0.05 level. **Correlation is significant at the 0.01 level

## 4. DISCUSSION

The world is now plagued my many issues. Pro-environmental behaviour is indispensable to face the multitude of environmental issues. Researchers have attempted to identify pro-environmental behaviours like environmental concern, social norm connectedness to nature, commitment to environmental sustainability, etc., that are useful in dealing with the environmental issues (Oreg and Katz-Gerro, 2006; Schultz, 2001; Steg and Vlek, 2009). The present study was undertaken to find out the relationship between CN, EC and CES, among Saudi Arabian citizens. These variables were choses as they are considered to be capable of solving the many repercussion arising out of the anthropogenic problems now faced by Earth. SEM was used to analyse the data. Results show that there is significant positive serial relationship between the variables. The results are in accordance with the findings reported by many other social scientists (Bak and Huh, 2010; Bak, 2018; Bragagnolo, et al., 2014; Corral-Verdugo et al., 2011; Cruz and Manata, 2020; Hong and Park, 2018; Marquart-Pyatt 2012). Since no studies have been found to be conducted in Saudi Arabia in this regard, these findings assume significance. It is sure the findings of this study will motivate further empirical examinations in this interesting area. Further, there a definite need to have a wider examination of pro-environmental behaviours among Saudi population, as the country is one that is reeling under various problems like, erratic and scant rain induced water stress,

**Table 5: Regression analysis between CN and ENV**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | Constant | 16.658 | 2.032 | | 8.198 | 0.000 |
| Independent | CN | 0.297 | 0.041 | 0.412 | 7.271 | 0.000 |

a. Dependent variable: ENV. $R^2 = .170$, F = 52.870, Sig = 0.000

**Table 6: Regression analysis between ENV and CES**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | Constant | 13.627 | 1.139 | | 11.961 | 0.000 |
| Independent | ENV | 0.338 | 0.036 | 0.505 | 9.409 | 0.000 |

a. Dependent Variable: CES. R2 = 0.255. F = 88.522. Sig = .000

**Figure 1:** Structural equation model – without moderating variables

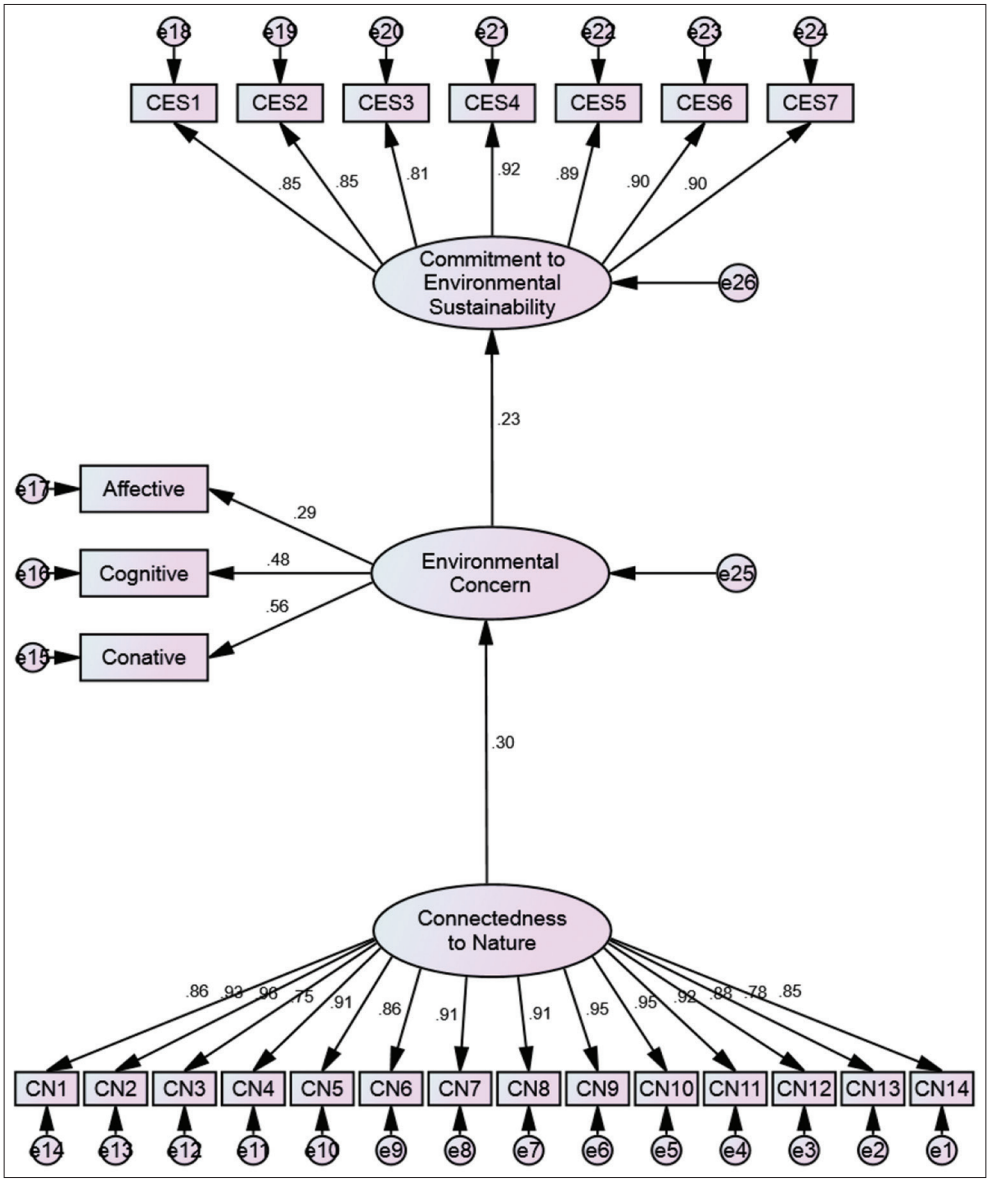



**Table 7: Testing of hypotheses**

| Hypotheses | β Value | Nature of relation | p value | Decision |
|---|---|---|---|---|
| $H_{01}$: There is a positive relationship between connectedness to nature and Environmental concern | 0.30 | Positive | <0.05 | Accepted |
| $H_{02}$: There is a positive relationship between Environmental concern and commitment of environmental sustainability | 0.23 | Positive | <0.05 | Accepted |

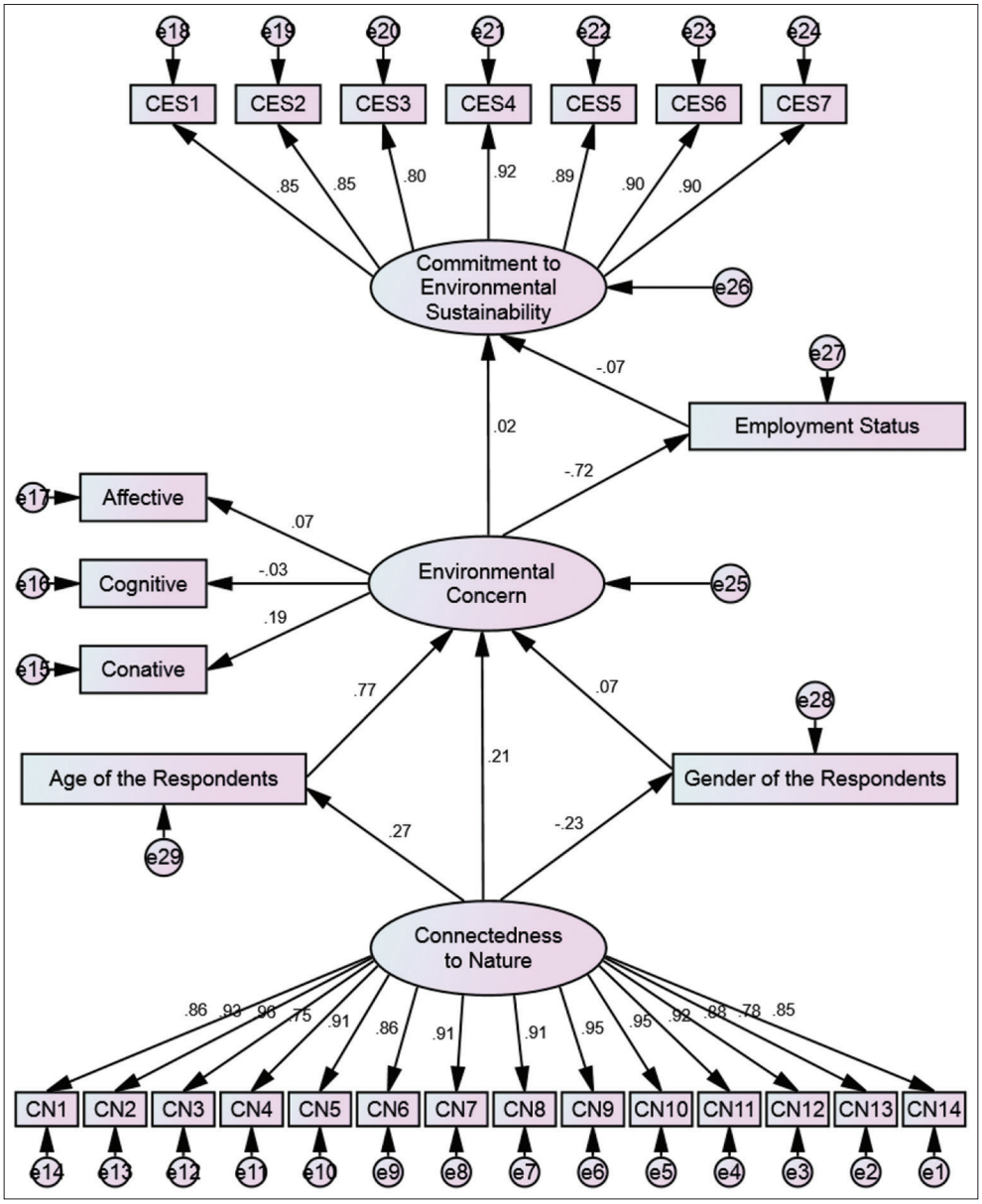
**Table 8: Model fit indices**

| Variable | CFI | GFI | TLI | NFI | RMSEA |
|---|---|---|---|---|---|
| Measurement model | 0.909 | 0.902 | 0.900 | 0.900 | 0.051 |
| Standard | >0.9 | >0.9 | >0.9 | >0.9 | <0.05 |
| Authors | Bentler (1992), Hair et al. (2010) | Hair et al., (2010) | Tucker and Lewis (1973) | Hooper et al., (2008) | Byrne (1998), Hu and Bentler (1999) |

**Table 9: Testing of hypotheses**

| Hypotheses | B value | Increase/Decrease | p value | Decision |
|---|---|---|---|---|
| Age and gender of the respondents moderates the relationship between connectedness to nature and environmental concern. | 0.21 | Decrease | <0.05 | Rejected |
| Employment status of the respondents moderates the relationship between environmental concern and commitment to environmental sustainability. | 0.02 | Decrease | <0.05 | Rejected |

**Figure 2:** Structural equation model- with moderating variables




extreme climatic conditions, etc. Fostering pro-environmental behavior among citizens would help to foster a fair amount of environmental quality and sustainability in the kingdom, and facilitate maintenance of a satisfied social scenario.

There are now heated deliberations about the impact of the current scale of environmental degradation on the various environmental attitudes, including pro-environmental behaviour in developing and developed countries. Researchers (for instance, refer to environmentalism in the developed world as "full stomach environmentalism" and that of the developing world as "empty belly environmentalism". While the former could reflect a broad-based value change like post-materialism, environmentalism, etc.; the latter could involve the first-hand practices with the environment that has been degraded and the resultant diminished resources availability (Dunlap and York, 2008). The present study has collected that data only from Saudi Arabia, which has its own unique culture. A study based on cross national data is sure to bring in interesting findings. Hope future researchers will take up this challenge.

## 5. CONCLUSION

There is widespread consensus that individuals in Saudi Arabia need to make drastic changes with respect to their attitude toward the environment and their consumption patterns profoundly. This is quintessential for the creation of a society that is sensitive to environmental sustainability, which is now the need of the day. Towards this, appropriate interventions that aimed creating pro-environmental behaviour and sustainability are required. This need to be done at different levels – individual, societal and national. This can in turn create broader interventions that can change the cultural worldview.

The findings of the study are consistent with the available literature, supporting the "socio-tropic" model that individuals are

pro-environmental in nature. The findings have both theoretical and practical applications. First of all, a study of similar nature has not been conducted in Saudi Arabia. Next, a fair understanding of the innumerable factors related to pro-environmental behavior would facilitate designing of appropriate agendas for effective communication about environment issues. It will also help in inculcating among the communities the need for sustainable behaviour. Though the sample for the study has been modest and limited to students and employed persons, it is capable of generalization. However, a study with a longitudinal sample across a large population would provide a more generalizable study. It is expected that the present study will motivate researchers and social scientists to conduct more studies in this challenging discipline. A study that spread across the GCC and other areas, is sure to provide interesting results. It is expected the present study will trigger more empirical examinations.

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