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INVESTIGATING ENVIRONMENTAL EDUCATION AND STRUCTURING THE ROLE OF INTEREST

Prior studies have explored a complex system where many factors correlate to environmental attitude and concern. The present study investigates how religious and environmental education background correlates to environmental interest and attitude. A total of 65 students from a midwestern religious college responded to a survey. The study focuses on structuring the role of interest, and a new theory is proposed partially based on the Theory of Planned Behavior. The Theory of Reverse Interest suggests the system of how voluntary or involuntary behaviors influence the interest towards a particular topic which then predicts the attitude and concern. In the study, the church attendance and the number of environmentally-themed courses was defined to be the voluntary or involuntary behaviors. The analysis indicates that there is a significant negative correlation between students' church attendance and interest in environmental topics, whereas the opposite trend is found for the number of environmental education taken. Students' interest in environmental topics was shown to be an excellent predictor for the environmental attitude. The full reverse interest model was briefly introduced at the end as a tool to explore what roles of interest (comparable to intention in the Theory of Planned Behavior) in explaining and predicting human attitude, subjective norm, and perceived behavior control.
Keywords: *environmental education, environmental attitude, interest, theory of reverse interest, religiousness.*

Introduction

There has been an increasing demand for environmental education in the past century as people started to realize diminishing marginal returns and unsustainable economic growth (Daly and Farley 2011). Recently, Ripple et al (2017) responded to the 1992 "World Scientists' Warning to Humanity" by exploring available time-series data along with 15,364 scientist signatories from 184 countries, and they suggested that humanity did not manage to make satisfactory progress in solving environmental issues. Because of the exacerbating environmental issues, the general attitude towards environmental education was supportive as it was showed in a survey published in 2001, which suggested 95% adult Americans supported for environmental learning, which includes 95% parents who felt that environmental education should be taught in K-12 schools (RSW, 2001).

A supportive attitude towards environmental education and pro-environmental policies is very important especially in the 21st century. However, environmental education faces numerous challenges. The nature of environmental education is more than simply informing and teaching. Study by Chi-Chung Ko and Chi-Kin Lee (2003) indicates that teachers, who they interviewed in Hong Kong, agreed "the essence of environmental education was attitude development among students, and that Integrated Science would be a very suitable subject for infusing environmental education" (197). There are several themes in environmental education. Cummings (1973) defined five major themes in environmental education (EE): (1) EE is interdisciplinary, (2) EE is a phenomenon with cultural implications spanning all ages and affecting individuals, (3) EE might need to penetrate human psyche in order to be effective, (4) environmental materials have man-centered quality, and (5) the recognition that environmental learnings must be founded on actual experience rather than upon exposure in the abstract. The cultural implication sometimes becomes a stubborn obstacle. Baines (1985) suggested "preventive" education where teachers help build awareness, appreciations, respect, fulfillment, wonder, concern, and participation in environmental topics and processes. After years practicing, how to make environmental education more effective

remains to be a great challenge for educators in different levels including primary, secondary, and higher education.

Judeo-Christian religion and political side might be another obstacle environmental educators have to face. Religion plays a big role in environmental education. As mentioned before, Cummings (1973) suggested effective environmental education requires to penetrate human psyche and need to fit under cultural implication. It is hard to change religious students' environmental view if their religion exerts a great influence in students' environmental worldview. Prior researches took different positions on whether Christian religiousness has a negative correlation on environmental awareness or not. This study is based on data collected via questionnaires in a religious college to explore for relationship between environmental education in higher education and religiousness, and how they interact and impact students' general environmental attitude and concern. This study also measured interest and perceived behavior control. An "Interest" centered model was built by reversing the sequence the Theory of Planned Behavior to explore the role of interest in education and social psychology.

Literature Review

Factors affecting Environmental Attitude

Most prior researches supported that environmentally themed courses lead to a higher environmental literacy. Study conducted by King and Franzen (2017) affirms the relevance and necessity for environmental education to cultivate environmental literacy in learners, but environmental education's ultimate objective, inspiring environmentally responsible behavior, was not explicitly practice in environmentally-themed higher education courses. Moogy's (2006) study suggests most students had increasingly knowledge and concern for environmental issues, whereas only a little over quarter students indicated that they changed their environmental behavior. Anderson et al. (2007) reports general education program may be affecting the environmental values of undergraduate students, but the report also indicates general education courses aimed at environmental literacy do not produce more environmentally preferred behaviors among students. Studies conducted abroad also revealed that students in Nigeria (Erhabor & Don 2016) and in Malaysia (Mrema 2008) taking environmental courses in higher education have a high level of knowledge about the environment.

Besides environmental education, some other factors attribute to environmental attitude and behavior. Study by Korfiatis, Hovardas & Pantis (2004) supports that people's attitudes towards environmental issues was a reliable predictor to environmental behavior whereas political attitudes did not have the significance. Recent study finds experiencing to environmental harm leads to more pro-environmental behavior and pro-environmental attitudes (Chen et al 2013). It was unclear if gender plays a role in environmental attitude and behavior. Previous study by Zelezny, Chua, and Aldrich (2000) indicates that women were more concerned than men on environmental issues. Xiao and Hong's study (2010) shows that women had more pro-environmental behavior at home, but expressed lower levels of environmental concern than men in China. Gender is an interesting topic here. Hayes' paper (2001) indicates women had relatively lower scientific knowledge and literacy than men. Matson's review (2013) shows that women are more likely to withdraw from science comparing to men; however, McCright's research (2010) suggests that women exhibited more scientifically accurate climate change knowledge than did men while they nevertheless underestimated their climate change knowledge than do men. This phenomenon is perplexing.

Besides gender, religiousness also plays a role. It has been argued whether religiousness influences people's environmental altitude and behavior since Lynn White (1967) proclaimed that religion Judeo-Christian religion has a negative effect on environmental concern. Kanagya and Nelsen's study (1995) explores and discusses a complex relationship between religiousness and environmental concern by breaking religiousness into three sections including church attendance, born again, and person religion. Despite complexity, Kanagy and Nelsen's study (1995) supports that religiousness was negatively related to environmental concern, and this correlation is also supported by (Guth Green, Kellstedt, & Smith 1995 and Lowry 1998). On the other hand, this negative correlation between religiosity and environmental was not supported in studies including

Tarakeshwar, Swank, Pargament, & Mahoney's study (2001) after controlling demography variables, theological conservatism and more, Greeley (1993) where they took religious imagery and political and moral rigidity into account, and Boyd (1999) who found no significant relationship except fundamentalist tradition after demographic variable controls.

Prior researches support that environmentally-themed courses improve environmental literacy, but do not necessarily lead to pro-environmental behavior. It is suggested demographics variables such as gender should be put in consideration as gender plays a role in environmental concerns and behavior although studies came to different conclusions based on geographic location. Correlations between religiousness and environmental concern were studied; it was unclear because some studies suggest negative correlation while other studies suggest no correlations based on different designs and models.

Theory of Planned Behavior

Ajzen expanded the theory of reasoned action (Ajzen & Fishbein, 1980 & Fishbein & Ajzen, 1975), and late developed the theory of planned behavior (Ajzen 1991, 2002) which captures the system explaining the behavior (Figure 1) with factors including attitude toward the behavior,

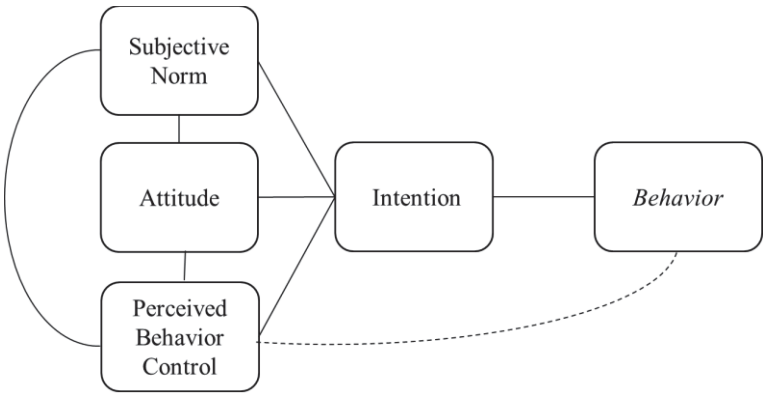

Fig. 1. *Theory of Planned Behavior (Ajzen 1991, 2002)*

subjective norm, perceived behavior control, and intention. The perceived behavior control is measured and obtained by multiplying belief strength and power with 7-point Likert scale (Ajzen 2002). Ajzen's model (1991) also emphasized antecedents including behavioral beliefs, normative beliefs, and control beliefs. The theory of planned behavior was applied to study different human behaviors such as unethical behavior (Chang 1998; Carpenter & Reimers 2005).

Methodology

I collected the data by sending out a questionnaire designed particularly for this study. 65 undergraduate students in Concordia University Wisconsin which is a Lutheran school participated in the study. Our research instrument consists of four sections. First section contains demographic information including age, major, number of environmentally-themed courses taken in high schools or post-secondary institutions, and church attendance rate (measured in 7 Likert scale). The second

section consists of two independent questions inquiring participants' environmental behaviors, four questions inquiring and measuring students' general environmental attitude and concern, one question measuring students' perceived behavior control, and nine questions inquiring what environmental topics student are most interested about. Most questions are measured in 7 Likert scale (see Table 1) for regression model. There are two main constructions including general environmental attitude and interest. The general environmental attitude construct measures the average score of students' attitude of the importance of environmental responsibility, the importance of environmental education, the importance of the governmental renewable energy policy, and the level of concern about climate change. Under the construction of measuring respondents' interest in various environmental topics, there is energy conservation, water conservation, renewable energy policy, eco-product, bio-diversity, climate change, green building, environmental research and analytics, and green economy.

Question	Measurement or Coding	Mean	SD
Gender	Binary: 0 (Male) and 1 (Female)	.646	.4819
Courses	Number of Courses taken in high school and college	1.262	1.4500
Religion	Likert Scale from 1 (Never) to 7 (Always)	4.708	1.9262
Recycling	Likert Scale from 1 (Never) to 7 (Always)	5.123	1.3406
Turning off light	Likert Scale from 1 (Never) to 7 (Always)	5.815	1.3681
Reusing paper	Likert Scale from 1 (Never) to 7 (Always)	4.169	1.4638
Environmental responsibility is	Likert Scale from 1 (Not important) to 7 (Very important)	5.985	1.1523
Perceived behavior Control	Likert Scale from 1 (No Control) to 7 (Full control)	5.323	1.1740
Environmental Education is	Likert Scale from 1 (Not important) to 7 (Very important)	4.846	1.5434
Concerned about Climate Change	Likert Scale from 1 (Not Concerned) to 7 (Very Concerned)	4.323	1.9293
Renewable Energy Policy	Likert Scale from 1 (Not important) to 7 (Very important)	5.292	1.4112
Energy Conservation	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.769	1.4445
Water Conservation	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.985	1.5257
Renewable Energy Policy	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	5.400	1.3555
Eco-product	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.431	1.6295
Bio-Diversity	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.369	1.7100
Climate Change	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.415	1.9517
Green Building	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.769	1.7657
Environmental Research and Analytics	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.262	1.7614
Green Economy	Likert Scale from 1 (Least Interested) to 7 (Most Interested)	4.554	1.7592

Tab. 1. *Survey and its Descriptive Statistics*

To assess the reliability and validity, the Cronbach's alpha was calculated as a coefficient for assessing internal consistency which indicates that all items are measuring the same thing (Bland & Altman, 1997). The Cronbach's alpha for general environmental attitude is 0.804 and for interest is 0.89. Both values are satisfactorily above 0.7.

Analysis

The main tools to explore associations and correlations among different variable include the Pearson's correlation, the independent T-Test, multiple linear regression, and multiple linear regression with a moderator.

The Pearson's correlation was used in the bivariate table to explore correlations among all variables. Independent T-test was calculated to examine if gender plays a role. A parametric test was selected in place of the nonparametric test because of the decent sample size. The Levenne's test is implemented to decide whether equal variances should be assumed.

Multiple linear regression was used as the main tool to not only confirm correlations found in the bivariate table, but also to measure the coefficient. The general equation for multiple linear regression is

$$Y = b_1X_1 + b_2X_2 + b_3X_3 + \cdots + b_nX_n + \mathrm{C} \quad (1)$$

Y is the dependent variable or D.V., and X_i is the independent variables. C is the intercept and b_i is the coefficient. The main purpose of the regression models built in this study is to explore the relationship among variables on contrary to serve as a prediction model. Nevertheless, in some degree, the regression model can be properly extrapolated to estimate and predict if it its R^2 or coefficient of determination is relatively high and its Durbin-Watson result indicates limited noises

in residuals. Coefficient of determination or R^2 is used as an index to measure the goodness of fit of the regression model (Barrett 1974) and it ranges from 0 indicating no data fits on the regression line to 1 indicating that all data fit the regression line. In addition to coefficient of determination, the Durbin-Watson test (d) (Durbin & Watson, 1950 and 1951) is used to detect autocorrelation and noises in the regression residuals, and the Durbin-Watson test was considered to be robust and powerful by many scholars in their reviews (Bartels & Goodhew 1981, Harrison 1975, and Schmidt & Guilkey 1975). The Durbin-Watson test's d being closer to 2 indicates there is less possibility that there is autocorrelation in residuals, and thus indicates betterment of the performance of the regression.

The other model is linear regression with interaction. It tests for interaction between predictor variables. The equation is

$$Y = b_1X_1 + b_2X_2 + b_3X_1X_2 + C \quad (2)$$

The interaction between two variables in the equation is the multiplication of these two variables. The linear regression model with interaction is similar to factorial ANOVA, and it is used in this study to explore whether there is interaction between number of environmental courses taken and church attendance.

Modeling and Finding

Interest turns out to be a crucial component in the survey as it is significantly correlated to number of environmental courses taken, church attendance, the frequency of turning off lights when leaving the room (EB 2), and general environmental attitude (See Table 2). Surprisingly, the frequency of recycling (EB 1) is correlated to gender whereas the frequency of turning off lights when leaving the room is correlated to perceived behavior control, interest, and attitude.

	Gender	Environmental Courses	Church Attendence	EB 1	EB2	Perceived Behavior Control	Interest
Environmental Courses	-.067						
Church Attendence	.224	.011					
EB1	.359**	.184	.111				
EB2	.160	.214	-.187	.243			
Perceived Behavior Control	.150	.096	-.137	.183	.320**		
Interest	.160	.399**	-.382**	.231	.329**	.223	
Attitude	.042	.372**	-.399**	.231	.409**	.291*	.766**

* p<.05 **p<.01

Tab. 2. *Bivariate Correlation*

The result from the independent T test shows that gender only affects the behavior of recycling. The Levenne's test ($p<0.01$) suggests that equal variance should not be assumed, and thus a non-pooled independent t-test was used. A significant result was founded ($p=.008$ and mean difference is .3533) and female students recycle slightly more frequently than male students.

Model 1 Direct Multiple Linear

The first model aims to look for the direct relationship between the environmental education, church attendance, and general environmental attitude. The regression output indicates that environmentally-themed courses increase the general environmental attitude which is supported by many prior studies. For each environmentally-themed courses taken by the student in high school or

college, the general environmental attitude increases by 0.317 which is substantial since it is measured in 7 Likert scale. On the other hand, the church attendance has a significant correlation meaning students with high church attendance got a lower score in general environmental attitude. For each unit increase in the frequency of church attendance, the general environmental attitude decreases by 0.255 (See Table 3). The coefficient of determination or R^2 suggests that 27.8 percent of data fits on the linear line, and the Durbin Watson value is 2.058 which is very close to 2. Therefore, the regression model is valuable.

Table 3 Summary of Regression Models

Model 1 Multiple Linear Regression Predicting Gen. Attitude				
D.V.	I.V.	Coefficient	Adjusted R Squar	Durbin Watson
Gen. Attitude	Course	0.317***	0.278	2.058
	Church Attend	-0.255 ***		
Model 2 Reverse Interest Model				
D.V.	I.V.	Coefficient	Adjusted R Squar	Durbin Watson
Interest	Course	0.338***	0.286	1.949
	Church Attend	-0.244**		
Gen. Attitude	Interest	0.768***	0.581	1.597
Model 3 Reverse Interest With Moderator				
D.V.	I.V.	Coefficient	Adjusted R Squar	Durbin Watson
Interest	Course	0.67*	0.292	1.994
	Church Attend	-0.16		
	Moderator	-0.069		
*p<.05 **p<.01 ***p<.001				
Moderator = Church Attendence × Course				

Tab. 3. *Summary of Regression Models*

Model 2 Theory of Reverse Interest and the Role of Interest

The second model tests the fundamental structure of Theory of Reverse Interest which starts with education and religious background. It shows that students become more interested in various environmental issues after taking environmentally-themed courses (b=.338, p<0.001 see Table 3). Students who are interested in environmental issues are more concerned about the environment, and thus develop more supportive attitudes toward renewable energy policies and environmental education (b=.768, p<0.001 see Table 3). On the other hand, the significant negative correlation (b= -.0244, p<0.001 see Table 3) between students' church attendance and interest in environmental topics is found.

In the first part where the model predicts interest with the number of environmentally-themed courses taken and the church attendance of the Reverse Interest Model (Figure 2, 3), the adjusted R

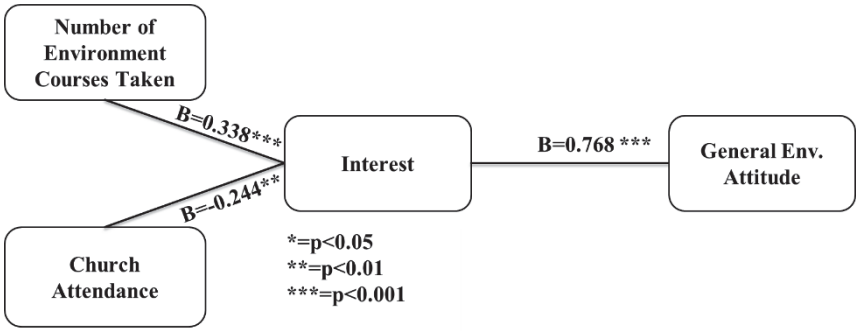

Fig. 2. *Reverse Interest Model in this study*

square in Table 3 indicates 28.6% data fit in the linear model with a great Durbin Watson of 1.949 suggesting limited noise in the residual. In the second part where the model predicts the general environmental attitude with interest, the adjusted R square in Table 3 shows 58.1% data fit in the linear line with a decent Durbin Watson of 1.597 suggesting some noises in the residual. The higher R square in the second part of the model to some degree supports my hypothesis and indicates that interest construct is a useful predictor for the general environmental attitude.

Model 3 Testing for Interaction

The final model in this study is similar to the second model. The only difference is the interaction. The hypothesis is that there is some interaction between the church attendance and the number of environmentally-themed courses taken. The negative correlation between church attendance and students' interest in environmental topics is significant, and therefore it is reasonable to test the existence of interaction; however, the result shows that the interaction is not significant ($p>0.05$, See Table 3). Therefore, there is no sufficient evidence supporting there is an interaction and thus it can't be concluded that there is association between church attendance and the number of environmentally themed courses taken by students.

Discussion

Reversing the causation and structuring the role of interest

The role of interest is sometimes ignored in the literature, and it has not been fully explored by other scholars. The idea of the Theory of Reverse Interest was inspired by and derived from the Theory of Planned Behavior. In a free society, people mostly make decision based on their intention which is the result from their attitude, subjective norm, perceived behavior control, and the interactions among these factors. It is one of the most popular and eminent theory in social psychology. However, people sometimes are not as free as it seems to be. For instance, kids born in religious families might have to go to church with their parents and kids in school sometimes are required to take courses even if in both cases they have no intention doing so. Another example is the prison. Prisoners have limited freedom to choose what they want to do. In either case, the Theory of Planned Behavior has limited implication since people are deprived of the ability to choose or they are forced to do something for various reasons. The Theory of Planned Behavior has limited implication when the perceived behavior control is limited.

Fig. 3. *Reverse Interest Model*

Therefore, the sequence has to be reversed when actions or behaviors are the outcomes of certain situations. In the other word, in some scenarios, people do not have the freedom to make choices for themselves because someone with greater authority make choices for them. For instance, a younger kid usually does not the freedom to choose whether they go to school. To explain the situation, the Reverse Interest Model starts with the behavior or receiving education in this study and the action or behavior predicts interest and then the interest predicts attitude. For this study, students definitively have the freedom to choose whether they take an environmentally-themed course. It is not the case where students are forced or required to take the course. It is debatable what the correct sequence is or what comes first. Are students interested in the environmental topics first, or do they become interested in the environmental topics after they take the course. The reverse interest model assumes the latter sequence and logic.

Interest is the essential element in the model. Interest has not been widely explored and researched by scholars. Students' interest can influence students' decision about whether to invest in or withdraw from learning (Singh, Granville, & Dika, 2002). In the present study, interest has significant correlations with many other variables including church attendance, number of

environmentally-themed courses taken, and general environment attitude (see Table 2). Therefore, the role of interest might be more important than simply being a state. The rationale behind the reverse interest role is that the behavior itself, in this case education, stimulates or diminish students' interest in a particular topic, and once students are becoming interested in the topic, they develop positive attitudes in terms of showing more willingness to further study and explore the area.

Fundamental Attribution Error

In this study, the behaviors were defined either voluntary or involuntary. Although in the survey, it was not measured. The nature of being voluntary or involuntary might be a moderator for the result. In Jones and Harris's research (1967) in attribution error, participants' attitudes towards the Castro's Cuba was influenced on whether they freely chose to read the pro-Castro essay or were assigned. The similar situation applies to students' decision on attending an environmentally-theme course or attending religious service. If the university requires students to take a related course to graduate, the attitude might be vastly different than if students freely choose to take the course. However, overall, the outcome of receiving environmental education successfully changes students' attitude.

Environmental Education

The Reverse Interest model captures the system of how education, interest, and attitude correlate. Education is successful in term of stimulating students' interest in various environmental topics and increasing students' general environmental attitude; however, this study reveals two concerns for environmental educators. First, this study found a significant negative correlation between church attendance and the general environmental attitude as well as interest in environmental topics which is supported by many literatures.

There might be several potential factors mediating behind the negative correlation between church attendance and environmental attitude. Political factors may play a role since students tend to be more conservative in the school; however, no conclusive statement can be made without further research. Nonetheless, the correlation is concerning, and environmental educators are supposed to be aware of it especially when facing a large proportion of students from religious background.

Second, there is little correlation between environmental education and behavior (See Table 1). It is also supported by literatures. It is hard to say that our current environmental education is successful if it is not changing students' behavior. It is crucial to start to make changes in the environmental education as the anthropogenic climate change is also affecting people's lives now (Jayawardhan 2017 & Sorensen, Knudsen, et al 2018) and posing an unprecedented threat to humanity (Causevic 2017 & Palomo 2017). There is hardly anything for mankind to slowly work something out.

Changing the Sequence

The idea of changing the sequence might be even more meaningful than research findings in this study. As mentioned in the prior section, sometimes, people do not make their own decision in various situations, and the Theory of Planned Behavior and Reasoned Action might not be applicable. In the famous social psychology Milgram's experiment (1963), the theory of planned behavior might not be applicable since the situation influenced the participants' behaviors, and obedience was considered to be the main factor and later analyzed and study by other scholar (Helm & Morelli 1979). In Milgram's study (1963), he created the situation and found out that subjects displayed a substantial amount of obedience. The famous experiment known as the Stanford Prisoner Experiment conducted by Zimbardo, Haney et al (1971) also indicates the power of situations and external factors might determine how people behave. Education and classroom might also be considered as one type of various situations. By switching the order of the theory of planned behavior and replacing the behavior with situations, the new model might help us to better understand human behaviors.

Future Research

This study is limited since the population represented is a regional religious college. Further extrapolation from the result findings is not plausible. A different population might generate dramatically different findings with the same survey. A comparative study can be conducted to

further explore how church attendance, environmental education, environmental interest, and general environmental attitude correlate. The same survey can be distributed to two different populations. One population can be students from a secular college whereas the other population represent students from a religious institute. Questions regarding to respondents' political background, and a more comprehensive construct on measuring general environmental attitude is suggested to refine the research.

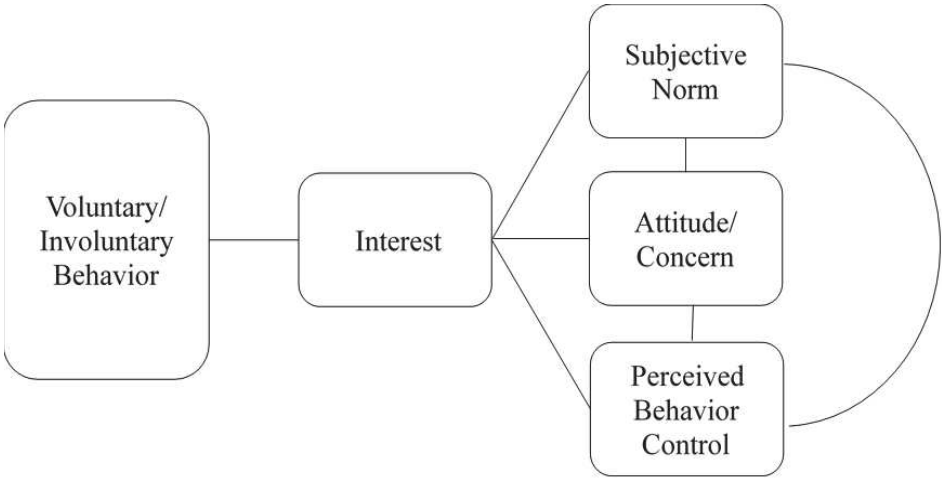

Fig. 4. *Expanded the Theory of Reverse Interest*

In addition, the Theory of Reverse Interest can be expanded by adding subjective norm and perceived behavior control (Figure 4). The complete reverse interest model can be presented in figure 4 which looks similar to the Theory of Planned Behavior, however in a different order. The Theory of Reverse Interest can be tested in study of education, as well as consumer behavior. For instance, it might be a useful when exploring the power of advertising in the following context. Consumers might voluntarily or involuntarily watch some advertising. It is interesting to see compare and explore how watching advertising affects consumers' interest in the product and whether it can predict consumers' attitude.

References:

1. Ajzen, I. (1991). The Theory of Planned Behavior. Organizational Behavior and Human Decision processes 50, 179-211.
2. Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.
3. Ajzen, I. (2002). Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. Journal ofApplied Social Psychology, 2002, 32, 4, pp. 665-683
4. Anderson, M., Teisl, M., Criner, G., Tisher, S., Smith, S., Hunter, M., . . . Bicknell, E. (2007). ATTITUDE CHANGES OF UNDERGRADUATE UNIVERSITY STUDENTS IN GENERAL EDUCATION COURSES. *The Journal of General Education,56*(2), 149-168.
5. Baines, J. (1985). The World Conservation Strategy: The Teacher's Task. Geography, 70(1), 63-65.
6. Barrett, J. (1974). The Coefficient of Determination-Some Limitations. The American Statistician, 28(1), 19-20. doi:10.2307/2683523
7. Bartels, R., & Goodhew, J. (1981). The Robustness of the Durbin-Watson Test. The Review of Economics and Statistics, 63(1), 136-139. doi:10.2307/1924228
8. Bland, J., & Altman, D. (1997). Statistics Notes: Cronbach's Alpha. BMJ: British Medical Journal, 314(7080), 572-572.
9. Boyd, H. (1999). Christianity and the Environment in the American Public. Journal for the Scientific Study of Religion, 38(1), 36-44. doi:10.2307/1387582
10. Causevic, A. (2017). Facing an Unpredictable Threat: Is NATO Ideally Placed to Manage Climate Change as a Non-Traditional Threat Multiplier? Connections, 16(2), 59-80.
11. Chang, M. (1998). Predicting Unethical Behavior: A Comparison of the Theory of Reasoned Action and the Theory of Planned Behavior. *Journal of Business Ethics, 17*(16), 1825-1834.

12. Carpenter, T., & Reimers, J. (2005). Unethical and Fraudulent Financial Reporting: Applying the Theory of Planned Behavior. *Journal of Business Ethics, 60*(2), 115-129.
13. Chen, X., Peterson, M., Hull, V., Lu, C., Hong, D., & Liu, J. (2013). How Perceived Exposure to Environmental Harm Influences Environmental Behavior in Urban China. Ambio, 42(1), 52-60.
14. Chi-Chung Ko, A., & Chi-Kin Lee, J. (2003). Teachers' Perceptions of Teaching Environmental Issues within the Science Curriculum: A Hong Kong Perspective. *Journal of Science Education and Technology, 12*(3), 187-204.
15. Cummings, S. L. (1973). Environmental Education: The Central Need. *The American Biology Teacher, 35*(8), 448-450. doi:10.2307/4444513
16. Daly, H. E., & Farley, J. (2011). *Ecological economics: principles and applications*. Washington, D.C: Island Press.
17. Durbin, J., and Watson, G. S. (1950), "Testing for Serial Correlation in Least Squares Regression I," Biometrika, 37, 409-428.
18. Durbin, J., and Watson, G. S. (1951), "Testing for Serial Correlation in Least SquaresRegression II," Biometrika, 38, 159-178.
19. Erhabor, N. & Don, J. (2016). Impact of Environmental Education On the Knowledge and Attitude of Students Towards the Environment. *International Journal of Environmental & Science Education,* Vol. 11 No. 12, 5367-5375.
20. Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.
21. Gilovich, Thomas, et al (2016). Social Psychology. W.W. Norton & Company.
22. Greeley, A. (1993). Religion and Attitudes toward the Environment. Journal for the Scientific Study of Religion, 32(1), 19-28. doi:10.2307/1386911
23. Guth, J., Green, J., Kellstedt, L., & Smidt, C. (1995). Faith and the Environment: Religious Beliefs and Attitudes on Environmental Policy. American Journal of Political Science, 39(2), 364-382. doi:10.2307/2111617
24. Harrison, M. (1975). The Power of the Durbin-Watson and Geary Tests: Comment and Further Evidence. The Review of Economics and Statistics, 57(3), 377-379. doi:10.2307/1923930
25. Hayes, B. C. (2001). Gender, scientific knowledge, and attitudes toward the environment. Political Research Quarterly, 54, 657-67
26. Helm, C., & Morelli, M. (1979). Stanley Milgram and the Obedience Experiment: Authority, Legitimacy, and Human Action. Political Theory, 7(3), 321-345.
27. Jayawardhan, S. (2017). Vulnerability and Climate Change Induced Human Displacement. Consilience, (17), 103-142.
28. Jones, E. E. & Harris V. A. (1967). The attribution of attitudes. Journal of Experimental Social Psychology, 3, 1-24
29. Kanagy, C., & Nelsen, H. (1995). Religion and Environmental Concern: Challenging the Dominant Assumptions. Review of Religious Research, 37(1), 33-45. doi:10.2307/3512069
30. King, J. A. & Franzen, R. L. (2017). Environmental Literacy in Environmentally Theme Higher Education Courses. *The Journal of Sustainability Education, Vol. (13)*.
31. Korfiatis, K., Hovardas, T., & Pantis, J. (2004). Determinants of Environmental Behavior in Societies in Transition: Evidence from Five European Countries. Population and Environment, 25(6), 563-584.
32. Lowry, R. (1998). Religion and the Demand for Membership in Environmental Citizen Groups. Public Choice, 94(3/4), 223-240.
33. Matson, J. (2013). Gender Gaps. Scientific American, 308(5), 88-88.
34. McCright, A. (2010). The effects of gender on climate change knowledge and concern in the \American public. Population and Environment, 32(1), 66-87.
35. Milgram, S. (1963). Behavior Study of Obedience. Journal of Abnormal and Social Psychology, Vol. 67, 3, 371-378.
36. Moody, G.L. (2006). *Evaluating the University of Georgia's environmental literacy requirement,* University of Georgia, Athens, Georgia.
37. Mrema, K. (2008). An Assessment of Student's Environmental Attitude and Behaviours and theEffectiveness Their School Recycling Programs Master Dissertation, Dalhousie University, School of Resource and Environmental Studies.
38. Palomo I. (2017). Climate Change Impacts on Ecosystem Services in High Mountain Areas: A Literature Review. Mountain Research and Development, 37(2), 179-187.
39. Ripple, W. J., Wolf, C., Newsome, T. M., Galetti, M., Alamgir, M., Crist, E., . . . Laurance, W. F. (2017). World Scientists' Warning to Humanity: A Second Notice. *BioScience*. doi:10.1093/biosci/bix125
40. Roper Starch Worldwide [RSW]. (2001). Lessons from the Environment Why 95% of Adult Americans Endorse Environmental Education. National Environmental Education and Training Foundation.
41. Schmidt, P., & Guilkey, D. (1975). Some Further Evidence on the Power of the Durbin-Watson and Geary Tests. The Review of Economics and Statistics, 57(3), 379-382. doi:10.2307/1923931
42. Singh, K., Granville, M., & Dika, S. (2002). Mathematics and science achievement: Effects of motivation, interest, and academic engagement. Journal ofEducational Research 95, 323-332
43. Sorensen, C., Knudsen, P., Sorensen, P., Damgaard, T., Molgaard, M., & Jensen, J. (2018). Rethinking Coastal Community Approaches to Climate Change Impacts and Adaptation. Journal of Coastal Research, 1521-1525.

44. Tarakeshwar, N., Swank, A., Pargament, K., & Mahoney, A. (2001). The Sanctification of Nature and Theological Conservatism: A Study of Opposing Religious Correlates of Environmentalism. Review of Religious Research, 42(4), 387-404. doi:10.2307/3512131
45. White, L. (1967). The Historical Roots of Our Ecologic Crisis. Science, 155(3767), 1203-1207
46. Xiao, C., & Hong, D. (2010). Gender differences in environmental behaviors in China. Population and Environment, 32(1), 88-104.
47. Xu, J., Coats, L., & Davidson, M. (2012). Promoting Student Interest in Science: The Perspectives of Exemplary African American Teachers. American Educational Research Journal, 49(1), 124-154.
48. Zelezny, L., Chua, P. P., & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. Journal of Social Issues, 56(3), 443-45
49. Zimbardo, P., Haney, C., et al (1971). The Stanford Prison Experiment: A Simulation Study of the Psychology of Imprisonment. Stanford University.

Гоу С.

Дослідження екологічної освіти і обгрунтування ролі мотивації

Аналіз попередніх досліджень дозволив сформувати складну систему кореляції екологічного ставлення та занепокоєння ситуацією. Пропонована наукова робота досліджує, як релігійна та екологічна освіта співвідноситься з екологічними інтересами та ставлення на основі оптування 65 студентів середньозахідного релігійного коледжу. Увагу зосереджено на структуруванні ролі інтересів, а нові теоретичні підходи ґрунтуються на основі теорії планової поведінки. Теорія зворотніх інтересів, що її також було використано, ґрунтується на твердженні, що як добровільна так і недобровільна поведінка впливатимуть на інтерес до певної теми, що потім формує ставлення і стурбованість. Дослідження ґрунтувалось на добровільному і обов'язковому відвідування курсів з екологічної тематики. Аналіз виявив істотну негативну кореляцію між відвідуваністю курсів студентами та інтересом до екологічних тем, та зворотну тенденція щодо кількості добровільних екологічних курсів. Інтерес студентів до екологічних тем виявився відмінним предиктором для екологічного ставлення. Повна модель зворотного інтересу була коротко представлена наприкінці як інструмент для вивчення ролей, що представляють інтерес (порівнянний з наміром в Теорії планового поведінки) у поясненні та прогнозуванні людського ставлення, суб'єктивних норм та сприйнятого контролю поведінки.
Ключові слова: *екологічна освіта, екологічне ставлення, інтерес, теорія зворотного інтересу, релігійність.*

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A NEW LOOK AT THE RELATIONSHIP BETWEEN HUMAN CAPITAL AND SOCIAL COHESION IN A COUNTRY

The importance of strong national social cohesion for a country's socio-economic development is hard to exaggerate. Strong social cohesion is associated with increase in economic development, increase in abilities to deal with economic downfalls, increase in social health and many other positive outcomes. This article suggests a way of strengthening national social cohesion through strengthening of the national human capital. According to the article, the most effective way of doing this is via strengthening of the national identity awareness factor of national human capital.
The research questions of the analysis are as follows:
Research Question 1: Is the level of education in a country associated with the level of NSC in that country?