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# The Impact of Study Abroad on the Development of Pro-environmental Attitudes

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*Abstract: This study examines both the efficacy and durability of changes in student attitudes toward the physical environment as a result of a semester-long study abroad program. Consistent with previous studies, we find that study abroad has a positive impact on a student's eco-worldview as measured by Dunlap's (2000) revised New Environmental Paradigm Scale. We find, however, that student attitudes continue to evolve and change after returning to their home institution, in some instances exhibiting unexpected improvement, and in other cases there is evidence of a decline in attitudes towards the environment. Gender is also found to be a significant moderator of student attitudes towards the environment.*

*Keywords: Study Abroad, Environmental Attitudes, Assessment*

## Introduction

There is a growing body of evidence that study abroad has a positive impact on student development including cross-cultural sensitivity (Vande Berg, Connor-Linton and Paige, 2009; Medina-Lo'pez-Portillo 2004) and attitudes toward the physical environment (Rexeisen and Al-Khatib 2009; Wynveen, Kyle and Tarrant, 2012). The importance of documenting the educational impact of study abroad, however, continues to evolve with the rapid growth of international programing (National Center for Education Statistics, 2010), burgeoning competition for scarce educational resources, especially given the direct and indirect costs associated with study abroad (Expanding Study Abroad Capacity at U.S. Colleges and Universities, 2009) and the increasing attention to global scholarship and assurance of learning standards promoted by the various accrediting bodies of higher education (e.g., the Higher Learning Commission, Criteria for Accreditation, 2012). While there is growing evidence that study abroad will have a positive impact on a student's worldview, there is little research into whether changes in worldview will endure, continue to evolve or perhaps even erode after the student returns to their home institution. This study seeks to address this shortcoming by examining student attitudes toward the physical environment prior to, at the conclusion of and then four months following a semester long study abroad experience.

Acury and Christianson (1990) have reported that environmental experiences can accelerate a change in eco-worldview. Furmon (1998) also supports this finding by observing that there is a positive relationship between environmental knowledge and the development of pro-environmental attitudes. More recent research finds that study abroad, with or without a specific environmental focus, has a positive impact on the development of attitudes toward the physical environment (Rexeisen and Roffler, 2005; Wynveen, Kyle and Tarrant, 2012). Employers already recognize a number of benefits that are associated with international experience (Shaftel, Shafter and Ahluwalia, 2007) and the prospect of having a more informed attitude concerning the physical environment is expected to contribute in many cases to a student's overall employability.

The three most widely adopted approaches for measuring environmental attitudes as reported in the literature are the New Environmental Paradigm (NEP) scale (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000), the Ecology scale (Maloney, Ward and Braucht, 1975) and the Environmental Concern scale (Weigel and Weigel, 1978). In a recent meta-analysis, Hawcroft and Milfont (2010) conclude that both the Ecology scale and the Environmental Concern scale risks becoming outdated as a consequence of referring to specific

environmental topics. By contrast, the New Environmental Paradigm (NEP) (Dunlap et al., 1978) and more recently the revised NEP (revNEP) scale (Dunlap et al., 2000) avoid this problem by measuring more general values and beliefs concerning the relationship of the environment to human beings. Given the problems that can be associated with method and/or scale variance in long-term assessment studies, the more popular revNEP scale offers significant advantages for researchers and educators when investigating student-learning outcomes associated with the development of eco-values.

Dunlap and Van Liere's (1978) original work based the NEP scale on twelve Likert items that focused on assessing three major constructs: 1) people's beliefs about how easily the balance of nature is upset (Balance), 2) the existence of physical limitations for growth of the human population (Limits), and 3) the right of humanity to rule over the rest of nature (Anthropocentrism). The original NEP underwent several adaptations over the years (e.g., Pierce et al., 1992) but remained a popular instrument until the introduction of a revised scale in 2000 by Dunlap et al. They proposed an additional refinement by extending the measurement to assess two additional ecological worldview constructs: 1) human "exemptionalism", or the belief that humans are exempt from the constraints of nature (Exemptionalism), and 2) the possibility of an eco-crisis (Eco-crisis).

Dunlap et al.'s (2000) revised NEP scale is comprised of fifteen Likert scale questions that measure each of the five hypothesized facets of an ecological worldview (Balance, Limits, Anthropocentrism, Exemptionalism and Eco-crisis). Seven of the items load negatively and eight load positively on a pro-environmental scale. Questions continue as to whether the revised NEP scale measures a single dominant or several underlying factors. As Dunlap et al. (2000) note: "differing populations will no doubt vary in the degree to which the revNEP beliefs are organized ... (hence it may) be more appropriate to treat the revNEP as multidimensional." Overall, there is compelling evidence to support the construct validity of the instrument and for including its use in the current study.

For consistency, Hawcroft et al. (2010) recommend that researchers in the future continue to use the five-point scale format. They also recommend that researchers use all 15 items in the revised NEP scale as it tends to give a more conservative and therefore defensible measure of environmental attitudes than do studies employing fewer items.

Gender also continues to be a variable of interest to study abroad researchers. Although a few studies have found that gender does not impact the study abroad experience (Pederson 2010), most evidence favors the position that gender will have an impact on a student's learning outcome (Medina-Lopez-Portillo, 2004; Rexeisen et al., 2009; Vande Berg et al., 2009). Zelezy, Chua and Ladrich (2000) have, for example, reported small gender differences using the NEP scale and Blaike (1992) and Maineri et al. (1997) suggest that women in general have stronger environment attitudes and behaviors than men.

In addition to gender, various other student characteristics (e.g., previous international experience, college major, language skills) have been used as control variables in research into study abroad (Nichols 2011). Given that many schools report using GPA as a screening criterion for study abroad (Thomas and McMahon, 1998) the authors wanted to test whether worldview development is in fact moderated by student aptitude, as measured by cumulative GPA.

Finally, there is emerging evidence that a student's worldview may continue to evolve and change upon return home from study abroad (Rexeisen et al., 2008). As a consequence it was of particular interest in this study to explore whether attitudes toward the environment will continue to evolve after the student returns home from the study abroad experience. Evolution is interpreted within this context to include both improvements in eco-values as well as the regression or the erosion of values to pre-departure levels.

## Research Hypotheses

Based on our review of the literature the following hypotheses will therefore be tested in the current study:

**Hypothesis 1:** A semester long, faculty-led study abroad program will have a positive impact on environmental attitudes as measured by the revised new environmental scale at the conclusion of the semester.

**Hypothesis 2:** The impact of study abroad on student attitudes toward the environment will be moderated by gender.

**Hypothesis 3:** Student attitudes toward the environment will continue to evolve as measured four months after returning home from a study abroad experience.

**Hypothesis 4:** Student aptitude, as measured by cumulative undergraduate GPA is unrelated to attitudes toward the environment.

## Methodology

The subjects in this research were traditional undergraduate business students from a medium-sized private midwestern university in the United States. Data was collected over a two-year period and include pre, post and follow-up measures from two independent student cohorts participating in a semester-long study abroad program in London, England. The first cohort was composed of 49 students and the second cohort was composed of 46 students resulting in a total sample size of 95 students. The average age in each cohort was 21 years and the sample was composed of 66% women, a composition consistent with national study abroad trends over the last ten years (Bhandari, 2009). The average GPA of the group was 3.49 with a range of 2.9 to 3.9. Students were selected for the current program based on GPA, student essays, letters of recommendation and personal interviews.

The revised NEP instrument was administered four months prior to departure for London, one week prior to the student's return to the United States and then again four-months after the students returned to their home campus. A standard five-point Likert scale was used to measure student responses to the standard fifteen revised NEP scales. Contra-measures of eco-friendliness were reverse scored in the final analysis so that for all responses a higher score meant that the student held a more positive environmental attitude.

Students did not take any course while abroad that focused special attention on pro-environmental issues. Students had the option of taking course work ranging from principles of marketing, business law, finance, history, art history and economics and the European Union. Students lived in groups of two in homestay situations and were distributed throughout the greater London area. All students travelled independently to Europe at least once during the semester and the majority travelled two or more times during the semester.

## Results

Eighty-six students completed all three measurements for a usable response rate of 91% and the gender distribution in the study remained unchanged.

As illustrated in Table 1, there was a significant improvement in student attitudes toward the environment in three of the five, revNEP scales including Limits ( $p = .004$ ), Exemptionalism ( $.001$ ) and Eco-Crisis ( $.021$ ). The overall revNEP score was also significant ( $p = .009$ ). We therefore find strong support for Hypothesis 1 that attitudes toward the environment as measured by the revNEP instrument improved as a consequence of a semester long study abroad program.

**Table 1: Pre/Post Test of Scale Differences**

<b>Paired One-tailed t-tests of Pre-test vs. Post-test Results</b>							
<b>revNEP Scales</b>	<b>Pre-test Results</b>			<b>Post-test Results</b>			<b>p-value</b>
	<b>Ave.</b>	<b>Range</b>	<b>S.D.</b>	<b>Ave.</b>	<b>Range</b>	<b>S.D.</b>	
<b>Balance</b>	2.99	1.7-5.0	0.63	2.95	1.7-5.0	0.69	0.326
<b>Limits</b>	3.15	1.3-5.0	0.67	3.36	1.7-4.7	0.62	<b>0.004</b>
<b>Anthro</b>	3.16	1.3-5.0	0.71	3.14	1.3-4.7	0.61	0.463
<b>Exempt</b>	3.16	1.3-4.7	0.54	3.37	2.3-5.0	0.52	<b>0.001</b>
<b>Eco-Crisis</b>	3.27	1.3-5.0	0.72	3.43	2.0-5.0	0.65	<b>0.021</b>
<b>Overall Score</b>	3.14	1.9-4.9	0.43	3.25	2.6-4.7	0.35	<b>0.009</b>
<i>Note: The higher the mean the more positive the environmental attitude.</i>							

There was also evidence that gender moderates student attitudes toward the environment thereby supporting Hypothesis 2. As Table 2 illustrates, there were no differences observed between men and women’s attitudes prior to the study abroad experience. Significant differences were, however, observed at the conclusion of the study abroad semester specifically on the Balance ( $p = .003$ ) and Exemptionalism ( $p = .048$ ) scales.

Gender differences were also observed in both the degree and direction of attitude change (Table 3). Although men’s Balance score improved somewhat from pre-departure to the time the students returned home ( $p = .125$ ) there was a significant decline in women’s attitude ( $p = .03$ ) at the end of the study abroad experience. Both men and women, however, showed improvement on the Balance scale at the four-month follow-up. Only men improved with regard to their overall revNEP score from pre-departure to the end of the study abroad experience; a change that reversed itself when viewed from the perspective of the pre/follow-up measurement period.

Table 2: Gender Differences

Two-tailed Test of Gender Differences at Specific Points in Time											
revNEP Scales	n	Pre-test		Female vs. Male	Post-test		Female vs. Male	Follow-up		Female vs. Male	
		Mean	S.D.	p	Mean	S.D.	p	Mean	S.D.	p	
Balance	Female	57	2.98	0.65	0.935	2.80	0.58	0.003	3.36	0.55	0.700
	Male	29	2.99	0.59		3.25	0.80		3.40	0.44	
<b>Limits</b>											
Limits	Female	57	3.21	0.7	0.249	3.40	0.60	0.372	3.14	0.70	0.265
	Male	29	3.03	0.59		3.27	0.66		2.98	0.49	
<b>Anthro</b>											
Anthro	Female	57	3.15	0.7	0.956	3.18	0.48	0.474	3.14	0.74	0.255
	Male	29	3.16	0.73		3.08	0.82		2.95	0.62	
<b>Exempt</b>											
Exempt	Female	57	3.13	0.52	0.621	3.29	0.48	0.048	3.24	0.59	0.634
	Male	29	3.20	0.57		3.52	0.57		3.31	0.76	
<b>Eco-Crisis</b>											
Eco-Crisis	Female	57	3.27	0.72	0.978	3.40	0.66	0.567	3.41	0.71	0.875
	Male	29	3.26	0.74		3.48	0.63		3.44	0.62	
<b>Overall Score</b>											
Overall Score	Female	57	3.15	0.44	0.843	3.21	0.33	0.172	3.26	0.44	0.664
	Male	29	3.13	0.42		3.32	0.39		3.22	0.36	

*Note: The higher the mean the more positive the environmental attitude.*



**Table 3: Change of revNEP Scores by Gender**

<b>Two-tailed T-Test of Changes within Gender Between Time Periods</b>							
<b>revNEP Scales</b>		<b>Pre-test</b>	<b>Post-test</b>	<b>Follow-up</b>	<b>Pre vs. Post-test</b>	<b>Post vs. Follow-up</b>	<b>Pre vs. Follow-up</b>
<b>Balance</b>	<b>n</b>	<b>Mean</b>	<b>Mean</b>	<b>Mean</b>	<b>p =</b>	<b>p =</b>	<b>p =</b>
Female	57	2.98	2.80	3.36	<b>0.030</b>	<b>0.000</b>	<b>0.001</b>
Male	29	2.99	3.25	3.40	0.125	0.301	<b>0.004</b>
<b>Limits</b>							
Female	57	3.21	3.40	3.14	<b>0.035</b>	<b>0.015</b>	0.495
Male	29	3.03	3.27	2.98	0.101	<b>0.006</b>	0.703
<b>Anthro</b>							
Female	57	3.15	3.18	3.14	0.760	0.696	0.914
Male	29	3.16	3.08	2.95	0.619	0.471	0.240
<b>Exempt</b>							
Female	57	3.13	3.29	3.24	<b>0.037</b>	0.618	0.345
Male	29	3.20	3.52	3.31	<b>0.022</b>	0.236	0.556
<b>Eco-Crisis</b>							
Female	57	3.27	3.40	3.41	0.163	0.858	0.160
Male	29	3.26	3.48	3.44	0.137	0.669	0.117
<b>Overall Score</b>							
Female	57	3.15	3.21	3.26	0.165	0.332	<b>0.075</b>
Male	29	3.13	3.32	3.22	<b>0.051</b>	0.209	0.425

*Note: The higher the mean the more positive the environmental attitude.*

There was evidence to support the hypothesis that attitudes toward the environment continue to evolve after the conclusion of the study abroad experience. However, the pattern of attitude

change is complex in that depending on which revNEP scale you are referring to changes can either be positive or negative. For example, the significant gains on the Limits and Exemptionalism scales that were observed at the end of the study abroad experience (Table 1), were no longer present four months after the students returned home (Table 5). The Balance scale by contrast showed no improvement over the duration of the study abroad experience but then exhibited a significant improvement when viewed from the perspective of either the pre- or post measurement to that of the follow-up measure (Tables 1, 4 & 5). Evidence suggesting durable changes in the environmental attitude was found in the Eco-Crisis and overall revNEP scales where early gains remain unchanged at the time of the follow-up measure. (Tables 4 & 5). Only the Anthropocentrism scale appeared unaffected by study abroad. As a consequence we find overall substantial support for Hypothesis 3.

**Table 4: Post/Follow-up Test of Scale Differences**

<b>Paired Two-tailed t-tests of Post- vs. Follow-up Results</b>							
	Post-test Results			Follow-up Results			
<b>revNEP Scales</b>	Ave.	Range	S.D.	Ave.	Range	S.D.	p-value
<b>Balance</b>	2.95	1.7-5.0	0.69	3.37	2.0-4.7	0.51	<b>0.000</b>
<b>Limits</b>	3.36	1.7-4.7	0.62	3.09	1.0-5.0	0.64	<b>0.001</b>
<b>Anthro</b>	3.14	1.3-4.7	0.61	3.08	1.3-4.7	0.70	0.447
<b>Exempt</b>	3.37	2.3-5.0	0.52	3.26	2.0-4.7	0.64	0.239
<b>Eco-Crisis</b>	3.43	2.0-5.0	0.65	3.42	1.7-5.0	0.67	0.931
<b>Overall Score</b>	3.25	2.6-4.7	0.35	3.24	2.1-4.7	0.41	0.866
<i>Note: The higher the mean the more positive the environmental attitude.</i>							

**Table 5: Pre/Follow-up Test of Scale Differences**

<b>Paired Two-tailed t-tests of Pre- vs. Follow-up Results</b>							
	Pre-test Results			Follow-up Results			
<b>revNEP Scales</b>	Ave.	Range	S.D.	Ave.	Range	S.D.	p-value
<b>Balance</b>	2.99	1.7-5.0	0.63	3.37	2.0-4.7	0.51	<b>0.000</b>
<b>Limits</b>	3.15	1.3-5.0	0.67	3.09	1.0-5.0	0.64	0.434
<b>Anthro</b>	3.16	1.3-5.0	0.71	3.08	1.3-4.7	0.70	0.458
<b>Exempt</b>	3.16	1.3-4.7	0.54	3.26	2.0-4.7	0.64	0.268
<b>Eco-Crisis</b>	3.27	1.3-5.0	0.72	3.42	1.7-5.0	0.67	<b>0.054</b>
<b>Overall Score</b>	3.14	1.9-4.9	0.43	3.24	2.1-4.7	0.41	<b>0.061</b>
<i>Note: The higher the mean the more positive the environmental attitude.</i>							

As illustrated in Tables 6 and 7 there was no evidence that student aptitude as measured by cumulative GPA is associated with attitudes towards the environment or with any changes in attitudes as a result of the study abroad experience thereby supporting Hypothesis 4.

**Table 6: Correlations Between GPA and revNEP Scores**

<b>Correlations Between GPA and REVNEP Scores</b>			
<b>revNEP Scales</b>	Pre-test	Post - test	Follow-up
<b>Balance</b>	-0.140	-0.116	-0.012
<b>Limits</b>	0.025	-0.041	-0.092
<b>Anthro</b>	0.056	0.008	-0.118
<b>Exempt</b>	0.112	-0.069	0.079
<b>Eco-Crisis</b>	-0.240	-0.212	-0.152
<b>Overall Score</b>	-0.067	-0.184	-0.096

**Table 7: Correlations Between GPA and Changes in revNEP Scores**

<b>Correlations Between GPA and Changes in revNEP Scores</b>		
<b>revNEP Scales</b>	Change Pre-test to Post - test	Change Pre-test to Follow-up
<b>Balance</b>	-0.093	0.110
<b>Limits</b>	-0.059	-0.097
<b>Anthro</b>	-0.046	-0.124
<b>Exempt</b>	-0.156	-0.010
<b>Eco-Crisis</b>	0.051	0.097
<b>Overall Score</b>	-0.087	-0.022

## Limitations

As with all studies there are a number of limitations that need to be recognized. First, the study took place in a single location (London), over a fixed period of time (Fall semester), and focused exclusively on undergraduate business students studying in a faculty directed cohort model. The length of time between the end of the study abroad experience and the follow-up measure was also only four months long. Caution is therefore advised when attempting to generalize the findings of the study. Although a sample size of 86 students certainly supports the analysis conducted in this study, a larger and more diverse sample will add to the robustness and level of precision of future studies in addition to perhaps facilitating longer-term follow-up studies.

The students in the current study were selected to participate through a competitive selection process and therefore may not be representative of students in general that study abroad. There is also the question of whether students that decide to study abroad are somehow systematically different than students that do not study abroad. Finally, the current study did not use a control group.

## Discussion

This study finds strong evidence that a semester long study abroad can have a positive impact on the development of pro-environmental values. This finding will have particular importance to those institutions that have, as part of their mission, a desire to foster social responsibility within their students. The relative ease and low cost of administering the revNEP instrument also will have value to those responsible for outcomes assessment. The research also adds to the pool of evidence concerning the positive return on investment that parents, students and future employers may expect from students that study abroad.

Although gender is found to be a moderator of the study abroad experience, as of yet there is insufficient data to identify a consistent pattern of differences. Whereas Rexeisen and Al-Khatib (2009) found only for women a pre-/post difference in the Exemptionism scale, the current study found that both men and women improved. The current study also found that women experience a decline on the Balance scale (pre/post measurement) whereas men exhibit an improvement. It is noteworthy to observe that on follow-up however, for which there are no previous studies to compare, gender differences largely disappeared. Unlike previous studies (e.g., Blaikie, 1992) that suggested that women have stronger initial environmental attitudes, the current study found no significant differences prior to departure. The overall implication of these findings is that gender differences should continue to be a focus of inquiry for study abroad research.

A new finding for the literature is that environmental attitudes do continue to evolve after students return to their home institution. The Balance scale, which was unchanged between the pre- and post measures, was found to be significantly improved at the time of follow-up. Eco-crisis and the overall revNEP scale scores retained their improvement lending some evidence to the proposition that some of the benefits gained while abroad can endure over time. However, it is noteworthy that the Limits scale experienced a significant decline post- /follow-up and Exemptionism scale declined to such an extent that that when comparing the pre-departure with follow-up attitude, the benefits initially gained from the study abroad experience disappear on follow-up.

The attitude changes that occur in the post study abroad period should be of special interest and importance to educators. For example, the findings of this study raise the troublesome question as to whether institutional responsibility for student learning ends with giving a student a grade at the conclusion of a traditional semester? Is there a terminal educational responsibility? What on-going responsibility do educational institutions have for student learning when framed within a dynamic, life-long learning paradigm? What responsibilities are implied or conveyed by the student tuition contract?

College administrators and concerned faculty may also wish to consider the assessment issues raised by the findings of this study. For example, when is the proper time to measure student learning? Should assessment take place at the conclusion of a particular course, at the end of a program of study, or is some post-graduation measure even better? If the timing of the measurement is changed, what does this mean for instructional design and assessment? While this study in no way answers these questions, it does fuel their relative importance in our discussion of student learning.

This study also adds to the findings of previous studies that found cumulative GPA, as a measure of student aptitude, is unrelated to environmental attitudes. While there may be other good reasons for schools to restrict access to study abroad experiences based on GPA, this study does not provide any evidence that “smarter” students benefit more or less than students with a lower GPA.

## Summary and Conclusions

We hope that researchers, educators and administrators will find the results of this study provocative and, from a curricular design and resource acquisition/allocation perspective, challenging as well. Future research will of course want to consider the self-identified limitations of the current study. Nevertheless, we must now also turn some of our attention to systematically considering the long-term implications of international education and perhaps by extension, all other facets of the student/institution learning enterprise.

Overall the results add to the body of evidence that study abroad has a positive impact on student development. This is good news for parents, students and future employers of those that study abroad. Schools that require all of their students to study abroad will also benefit from

## **REXEISEN: IMPACT OF STUDY ABROAD ON DEVELOPMENT OF PRO-ENVIRONMENTAL ATTITUDES**

these findings in that it supports, from a “student assessment”/accreditation perspective, that study abroad enhances social responsibility insofar as the development of pro-environmental attitudes.

In closing, we hope that researchers, educators and international educational staff will focus even more attention on how we can systematically improve the experience of those that study abroad. In particular we must develop a greater understanding of the learning momentum that is created by the study abroad experience.

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