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INFLUENCES OF ECOLOGICAL CONSCIOUSNESS

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ABSTRACT

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This study examines six of these common influences of ecological consciousness, as well as e new feasible influence: economic concern. The New Ecological Paradigm scale was used to measure ecological consciousness and was found to be a valid measure of ecological consciousness (Dunlap, Mertig, Harding, & Jones, 2000). Results confirmed a person's desire to protect nature increases their ecological consciousness and placing economic concerns before environmental concerns decreases it. Results also supported previous studies findings that outdoor activities during childhood and appreciative forms of recreation have are positive relationship with people's ecological consciousness. Implications for professionals who are attempting to influence public opinion on the need for ecological consciousness are discussed as well.

Key Words: Ecological consciousness, environmental concern, childhood experiences, outdoor recreation, economic concern

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INTRODUCTION

Over the last few decades, there has been growing attention with respect to ecological consciousness, or in seeing the world ecologically (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000). Noted environmentalists John Muir and Aldo Leopold spent much of their time on rural farms, exploring the terrain, hunting and fishing, or just observing and reflecting on the ecological environments (Leopold, 1966; Muir, 1965). Leopold, especially, convinced many in society that there is value, ecologically, in protecting natural environments regardless of economic wants and needs of humans (Ewert, Place, & Sibthorp, 2005; Leopold, 1966). On a scale which measures "ecological consciousness", as Dunlap, Van Liere, Mertig, & Jones, (2000) labeled it, Leopold's perspective on the natural environment is considered the ultimate height of ecological consciousness and is defined as ecocentric. The opposite of ecocentric is an anthropocentric orientation which focuses on enhancing human endeavors, and not for nature's sake (Dunlap et al., 2000; Ewert et al., 2005; Gagnon, Thompson, & Barton, 1994). Numerous studies have found a positive relationship between study subjects' ecological consciousness and their nature experiences and participation in outdoor activities (Bagarinao, 1998 ; Chawla, 1999; Corcoran, 1999; Dunlap & Heffernan, 1975, Dunlap & Van Liere, 1978; Dunlap et al., 2000, Ewert, Place, & Sibthorp, 2005, Farmer, Knapp, & Benton, 2007; Geisler, Martinson, & Wilkening, 1977; Haluza-Delay, 2000; Jackson, 1987; McDaniel & Alley, 2005; Palmer, Suggate, Bajd, Hart, Ho, Ofwono-Orecho, et al., 1998; Palmer, Suggate, Robottom, & Hart, 1999; Pinhey & Grimes, 1979).

The following subsections describe the findings of previous studies which led to the composition and methodology of this study. The common influences on individuals' ecological consciousness found in some of these prior studies are categorized into the following subsections: childhood influences, adulthood influences, and personal opinions.

Childhood Influences

Studies by Louv (2005) and Ewert et al. (2005) support research on the significance of nature experiences during childhood where ecological consciousness increases as a result of nature exploration and participation in outdoor play activities. Another significant influence on ecological consciousness was exposure to environmental education in early childhood (Chawla, 1999; Corcoran, 1999; Ewert et al., 2005; Farmer, Knapp, & Benton, 2007; Hsu, 2004; Kruse & Card, 2004; Haluza-Delay, 2000; Palmberg & Kuru, 2000).

Outdoor Activities

Besides Louv (2005) and Ewert et al. (2005), there are other studies supporting the theory that participation in early childhood outdoor activities are indeed valuable experiences for instilling an ecological interest in nature (Chawla, 1999; Corcoran, 1999; Leopold, 1966; Muir, 1965; Palmer et al. 1998 & 1999; Palmberg & Kuru, 2000). Palmberg and Kuru (2000) found that participants with more outdoor experience had a deeper conception of nature and a more empathetic relationship with nature. In another study, it was found childhood recreational experiences in nature often result in children bonding with outdoor places, sometimes referred to as "place attachments" (Stedman, 2002).

Aldo Leopold (1966) makes a similar reference to place attachment when he says, "We can be ethical only in relation to something we can see, feel, understand, and otherwise have faith in." Both Stedman (2002) and Leopold (1966) believed that a connection with nature is necessary for ecocentric behavior. Chawla (1999) found further support for the relationship between participation in childhood outdoor activities and ecological consciousness. More specifically, Chawla (1999) found family members teaching children the value of the environment and participation in environmental or outdoor organizations increases ecological consciousness. Such experiences during childhood influence children's "primitive beliefs", which are conceptions "about physical reality, social reality, and the nature of the self" (Dunlap et al, 2000). Personal meanings and primitive beliefs are part of the construction of attitude, which may reflect on peoples' leanings toward ecocentrism or anthropocentrism.

Environmental Education

Environmental education during childhood may also be part of children's construction of attitude. Previous research studies found environmental education programs at the elementary level improved the ecological consciousness of children (Farmer et al., 2007; Kruse & Card, 2004). In these two studies environmental education programming outside of the classroom, where participants were able to have an interactive experience, were found to be effective in building ecological consciousness. Two other studies found environmental education programs to be ineffective due to the subjects' lack of interactions with, and experiences in nature. The programs were held in the wilderness, where they had the opportunity for that interaction, but it did not increase ecological consciousness due to the subjects' discomforts in nature and feelings of

separation from nature when at home (Haluza-Delay, 2001; Smith-Sebasto & Walker, 2005). Parks, museums, gardens, and zoos may be better places for environmental education (Bagarinao, 1998) because they give students an opportunity to have interaction, are easily accessible, and may be more relatable to students.

Direct experiences and relationships with nature are important in processing knowledge and attitudes related to ecological consciousness. This processing is based upon primitive beliefs, experiences, as well as reflecting on past and new knowledge (Stedman, 2002). Individuals who construct their knowledge from more ecocentric primitive beliefs tend to have more ecocentric attitudes, (Chawla, 1999; Gagnon-Thompson & Barton, 1994; Gotch & Hall, 2004; Kaiser et al., 1999; McDaniel & Alley, 2005), and those who construct their knowledge primarily from anthropocentric primitive beliefs tend to have less ecocentric attitudes (Gagnon-Thompson & Barton, 1994; Haluza-Delay, 2001; Jackson, 1987; Smith-Sebasto & Walker, 2005). Ecocentric attitudes are the basis of ecocentric intentions and behaviors (Dunlap & Heffernan, 1975; Gagnon-Thompson & Barton, 1994; Geisler et al., 1977; Gotch & Hall, 2004; Kaiser et al., 1999; Palmberg & Kuru, 2000, Palmer et al, 1998, 1999; Pinhey & Grimes, 1977; Schuett & Ostergren, 2003; Thapa & Graefe, 2003).

Adulthood Influences

Similar to the influences of childhood outdoor experiences, there appears to be a relationship between participation in adult outdoor activities and ecological consciousness. Previous studies on adults found those who never or rarely participate in outdoor recreation display lower levels of ecological consciousness (Geisler, Martinson, & Wilkening, 1977; McDaniel & Alley, 2005; Pinhey & Grimes, 1979; Teisl & O'Brien,

2003). As an example, those who rarely participate in outdoor recreation activities are less likely to join environmental organizations, and support public action to preserve natural areas (Geisler et al., 1977; Teisl & O'Brien, 2003). Schuett and Ostergren (2003) and Thapa and Graefe's (2003) findings demonstrated that recreationists place importance of habitat preservation ahead of recreation needs. Recreationists from these studies are not suggesting humans should never recreate in nature, but that natural places, at least in some places, should remain undisturbed by human intervention. Several previous studies have found that different types of outdoor recreationists tend to have different perspectives regarding natural resources, or different levels of ecological consciousness (Dunlap & Heffernan, 1975, Dunlap & Van Liere, 1978, Palmer et al, Bagarinao, 1998, Dunlap, Van Liere, Mertig, Jones, 2000, Ewert, Place, & Sibthorp, 2005, McDaniel & Alley, 2005; Thapa & Graefe, 2003).

Three categories of outdoor recreation have emerged and been examined for relationships with ecological consciousness. The first is appreciative recreation, which includes any activity with a "preservationist orientation." This means a person enjoys nature without altering it (Dunlap and Heffernan, 1975). Common forms of appreciative recreation are hiking, wildlife watching, and paddling (Dunlap & Heffernan, 1978; Ewert et al., 2000; Geisler et al, 1977; Jackson, 1987; Pinhey & Grimes, 1979; Thapa & Graefe, 2003). The second category is consumptive recreation which is defined as any activities that take something away from nature such as hunting or fishing. They were originally thought of as having a "utilitarian orientation," but some research findings have not necessarily supported this belief (Dunlap & Heffernan, 1975). The last category is mechanized recreation and is defined as any recreation activity that uses mechanized

equipment such as snowmobiling, boating, ATVing, or biking (Ewert et al., 2005; Jackson, 1987). From the viewpoint of surveyed natural resource managers, these recreational activities are thought to have an "abusive orientation" component to them (Geisler, Martinson, & Wilkening, 1977; Teisl & O'Brien, 2003). In other words, they have the potential to destroy and/or disrupt the natural environment. There is some question among researchers as to whether biking, skiing, and rock climbing should be placed in this category (Jackson, 1987; Thapa & Graefe, 2003; Schuett & Ostergren, 2003). Amongst mechanized recreationists the degree of ecological consciousness can vary greatly (Harding & Stuessy, 2009; Schuett & Ostergren, 2003). Those who exercise minimal impact on the environment and have a deeper appreciation of nature tend to score higher on an ecocentric scale. As an example, Schuett and Ostergren (2003) found members of the International Mountain Bicycling Association scored higher on the ecological consciousness scale than members of the National Off Highway Vehicle Conservation Council (NOHVCC). However, they also found NOHVCC members scored higher on the ecological consciousness scale than many other groups. Harding and Stuessy (2009) found several rock-climbers to be very ecologically conscious as well.

As was stated previously, there is some question as to whether less destructive recreation activities such as biking and rock climbing should be classified as mechanized recreation. For this study, biking and climbing will be classified as mechanized recreation for two reasons. First, they can impact the environment to some degree. Second, these forms of recreation all utilize some form of mechanical equipment.

Appreciative Recreation

Recreationists who participate in appreciative forms of outdoor recreation were found to be more ecologically conscious than the other two categories—consumptive recreation and mechanized recreation in previous studies (Teisl and O'Brien, 2003, Ewert et al., 2005, Thapa & Graefe, 2003, Dunlap & Heffernan, 1975, Geisler et al., 1977, Jackson, 1987, McDaniel & Alley, 2005).

Consumptive Recreation

Consumptive recreationists ranked second behind appreciative recreationists in ecological consciousness (Thapa & Graefe, 2003; Dunlap & Heffernan, 1975; Geisler et al., 1977; McDaniel & Alley, 2005), and they actually had higher ecological consciousness scores than appreciative recreationists in one of Pinhey and Grime's 1979 studies. There were other instances where consumptive or mechanic recreation participants scored higher than appreciative recreation participants on different ecologically conscious items (Geisler et al., 1977; McDaniel & Alley, 2005; Pinhey & Grimes, 1979; Teisl & O'Brien, 2003, Thapa & Graefe, 2003). For example, in Geisler et al.'s 1977 study, hunters and fishers were more likely than campers and hikers to support public action on issues pertaining to water quality control and preservation of marshes and wetlands. Hunters had higher ecological consciousness scores than hikers, and avid ATV users had similar scores to those of hikers. Pinhey and Grimes (1979) speculated as to why consumptive recreationists scored higher. Their thought was habitat preservation probably improved the quality of their hunting or fishing experience by increasing the chances of shooting or catching their chosen prey.

Thapa and Graefe (2003) found consumptive recreationists to be more politically active than appreciative recreationist. Further, the researchers found consumptive recreation can have a positive impact on aspects of the environment. For example, hunting and fishing are both utilized by resource managers as way to maintain proper population sizes amongst selected species of game.

Mechanized Recreation

Mechanized recreationists had the lowest level of ecological consciousness when compared with appreciative and consumptive recreationists (Geisler at al., 1977; Jackson, 1987; Schuett & Ostergren, 2003; Thapa & Graefe, 2003). In these studies mechanized recreationists were found to have a more anthropocentric view of nature.

In Geisler et al.'s (1977) study, however, there was significant ecological consciousness found among snowmobilers. They did not, however, support public actions such as water pollution control, public forest lands, and ect. Geisler et al. (1977) believed the public action opposition was because the study was done in a geographical location where they had been struggling economically for several decades.

Even in Dunlap and Heffernan's 1975 study, they found outdoor recreationists were more likely to support the protection of natural resources than the control of pollution. Again, perspectives, ecologically, demonstrated to have a relationship with individuals' outdoor activity of interest (Thapa & Graefe, 2003).

Researchers who investigate outdoor recreationists have found those who do not participate in outdoor recreation, have lower levels of ecological consciousness than other groups they have investigated (Geisler at al., 1977; Haluza-Delay, 2001; McDaniel & Alley, 2005; Pinhey & Grimes, 1979; Palmberg & Kuru, 2000; Teisl & O'Brien, 2003).

Therefore, they believe participation in outdoor recreation has a positive influence on a person's ecological consciousness. This appears to be true even for mechanized recreationists such as snowmobilers or ATV riders.

Personal opinions

The outdoor recreationist research findings might lead one to question what other influences might impact an individuals' ecological consciousness if they do not participate in outdoor activities or were not exposed to environmental education in their youth. With this in mind, researchers have investigated two other areas, reactions to the destruction of natural areas as a result of commercial development, and choices made between economic concerns and ecological concerns.

Human Development Concerns

Studies found the inspiration to protect natural areas sometimes occurs when people witness environmental degradation due to excessive human commercial development. Individuals in several countries were inspired to become environmental educators mainly due to witnessing the degradation of places which they used to live, recreate, or depend on (Palmer et al., 1998, & 1999). Ewert et al. (2005) also found positive ecocentric attitudes (i.e. strong ecological consciousness) amongst college students who witnessed human development of natural areas and environmental degradation. In other cases, becoming attached to a natural area can affect an individual's attitude and behavior. According to Stedman (2002), "Place-protective behaviors" will increase when attachment to a place is high, satisfaction with the current state of the place is low, and the place has personal meaning for the individual (Stedman, 2002). In other words, when

individuals witness the over development of natural areas, their level of place satisfaction plummets and their ecological consciousness rises.

Economic Concern

The use or development of natural resources for economic reasons is one example of anthropocentric thinking, and is the polar opposite of ecological consciousness (Ewert et al., 2005). One study examined the relationship between ecological consciousness and economic concerns. Studies of this nature often term individuals who place human endeavors (e.g. economic concerns) before the protection and preservation of the natural environment as anthropocentric, but an anthropocentric person can still have the desire to protect or preserve the natural environment. Anthropocentrism is defined as, "an attitude that promotes the protection of the environment because of its value in maintaining and enhancing the quality of life for humans" (Ewert et al., 2005). The following study by Haight (2007) supports some protection of natural areas for anthropocentric (human) reasons, but his research also carries a fair amount of ecological consciousness.

Haight (2007) proposed a new Product Possibilities Curve (PPC) called the Product and Ecosystem Possibilities Curve (PEPC) which considers the value of "ecosystem services" such as flood prevention, erosion control, oxygen generation, and so on. He found that ecosystems drop in productivity when overworked, so there is an increase in things like floods and erosion. Sustainable production is essential to the regeneration of natural resources to allow continued ecological services. As represented by the PEPC, with less ecological services to maintain ecological wellness, natural resources decrease, therefore, production decreases. The PEPC resembles the top half of a bow, or the upper right quadrant of a circle's perimeter. This shape suggests that an economy is most

productive when there is a balance between production and ecological services. The more production, the less ecological services possible, and the more ecological services, the less production possible. Unsustainable practices lead to an inward shift of this PEPC curve; as previously stated, less production and less ecosystem services are available.

The PPC currently used doesn't take ecosystem services into consideration. According to Haight (2007), when nations do things like clear cut a rain forest, they gain points on the PPC. The PEPC model suggests an economic measuring tool which is slightly anthropocentric but much more ecologically conscious than the previous PPC regarding ecological consciousness.

PURPOSE

The purpose of this study was to examine what nature related experiences and personal opinions about nature influenced the perceived ecological consciousness of college age subjects. There were seven possible influences examined. The first two examined childhood experiences: outdoor activities during childhood and environmental education during elementary education. The next three examined outdoor recreation during adulthood: appreciative outdoor recreation, consumptive outdoor recreation, and mechanized outdoor recreation. And, the last two examined views about human impact on the environment: development concerns and economic concerns.

METHODS

New Ecological Paradigm

The instrument for this study on ecological consciousness was selected from a number of models. The New Environmental Paradigm (NEP) by Dunlap and Van Liere (1978) used in this study was thought to be the most credible model because it has gone

through a series of studies and revisions. The NEP opposes the "Dominant Social Paradigm" (DSP) which "favors a society that uses its resources to benefit the present generation and supports material wealth, economic growth, and greater scientific and technical development to solve environmental problems" (Dunlap & Van Liere, 1978; Ewert et al., 2005). In contrast to the DSP, the NEP model rejects the "anthropocentric notion" that nature exists for humans. The NEP favors a steady-state economy and maintaining the balance of nature (Dunlap & Van Liere, 1978). A steady-state economy is a sustainable economy which does not exceed ecological limits. The balance of nature refers to things like stable population levels and oxygen generation counteracting carbon dioxide emissions. These beliefs are examples of the three main facets which represent the NEP: reality of limits to growth, antianthropocentrism, and the fragility of nature's balance. One inconsistency is this instrument was the dimensionality has been found in different studies to have from one to four dimensions.

The most recent revised version of the NEP was selected for use in this study because it is likely one of the more valid instruments currently available for measuring ecological consciousness and has both ecocentric and anthropocentric elements within the criterion measurements. Two additional facets were added in this revised measure of ecological consciousness: rejection of exemptionalism, or rejecting the belief that humans are exempt from the constraints of nature, and the possibility of an ecocrisis (Table 1). The term "mankind" was replaced by "humankind", and the survey was balanced to have 8 ecocentric and 7 anthropocentric questions. Since several studies have found the NEP to have from one to four dimensions, Dunlap et al.'s (2000) first agenda with the results was testing for internal consistency. The instrument was found to be a single measure of

ecological consciousness, or unidimensional. Dunlap, Van Liere, Mertig, and Jones (2000) recognize that this has been sample specific and recommended retesting the dimensionality when using the NEP scale.

Instrument

To measure ecological consciousness, this study used Dunlap et al.'s (2000) 15 question NEP survey used a four-point Likert scale—strongly agree, mildly agree, mildly disagree, and strongly agree (Table 1). There were three questions pertaining to each of the five facets, with even number statements representing anthropocentric views and odd number statements representing ecocentric views. The five facets items were: 1) reality of limits to growth (1, 6, 11), 2) anti-anthropocentrism (2, 7, 12), 3) fragility of nature's balance (3, 8, 13), 4) rejection of exemptionalism (4, 9, 14), and 5) possibility of an ecocrisis (5, 10, 15).

Table 1. New Ecological Paradigm Scale Items

1. We are approaching the limit of the number of people the earth can support.
2. Humans have the right to modify the natural environment to suit their needs.
3. When humans interfere with nature, it often produces disastrous consequences.
4. Human ingenuity will insure that we do NOT make the earth unlivable.
5. Humans are severely abusing the environment.
6. The earth has plenty of natural resources if we just learn how to develop them.
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. Despite our special abilities humans are still subject to the laws of nature.

continued

10. The so-called “ecological crises” facing humankind has been greatly exaggerated.
11. The earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature.
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it.
15. If things continue on their present course, we will soon experience a major ecological catastrophe.

To determine the influences of the subjects’ ecological consciousness (dependent variable), the following seven possible influences (independent variables) were examined:

1. Outdoor activities during childhood
2. Environmental education during elementary education
3. Participation in appreciative outdoor recreation
4. Participation in consumptive outdoor recreation
5. Participation in mechanic outdoor recreation
6. Development concerns
7. Economic concerns

A four-point Likert scale was used for all of these influences as well. For questions one through five the response choices were: never, rarely, occasionally, or regularly, and for questions six and seven the response choices were: strongly disagree, mildly disagree, mildly agree, and strongly agree.

Demographical questions were included: college major, place of childhood residence, age as well as a ranking of sources that most influenced their perceptions of the natural environment.

Sampling

Using electronic email software (Mail Merge), a survey was emailed to 1200 subjects. The subjects were randomly selected from the student populations of two western Wisconsin colleges, one public with a student population of 9,000 and the other private with a population of 3,100. The random selection included 700 from the public university and 500 from the private college. Both samples included a combination of full time, part time, undergraduate, and graduate students.

The subjects were each assigned a security code which served to protect their identity and also acted as an electronic informed consent signature. The subjects received a letter via email that included a link to the online survey. To ensure a good response rate, two follow up emails were sent to those not responding.

Data Analysis Method

The initial step in data analysis was to assess the dimensionality and internal consistency of the NEP scale. As recommended by Dunlap, Van Liere, Mertig, and Jones (2000), the NEP data set was factor analyzed to determine if the NEP scale was unidimensional for this sample. Before completing the factor analysis, a Pearson's correlation was tabulated to ensure the seven independent variables were discrete (Table 2), and Cronbach's alpha, corrected item-total correlations, and principal-components analysis were computed to assess dimensionality and internal consistency.

A hierarchal regression was used to determine significant relationships between ecological consciousness and the seven possible influences. With NEP scores as the dependent variable, the first block's independent variables were the childhood experiences: outdoor activities during childhood and environmental education during elementary education. The second block added the three adulthood experiences: appreciative, consumptive, and mechanic outdoor recreation. The third block added development concerns, and the final regression block added economic concerns.

RESULTS

Of the 1200 surveys sent out, 257 responses were submitted. Of those responses, 32 subjects took the survey twice. With these double submissions, only the respondents' first survey was used. Seven responses were removed because their survey was incomplete. Hence, the final N was 218, which was an 18.2 percent response rate. Of the respondents, 79.9% were between 18 and 24 and the remaining 20.1% were 25-52 years of age. Subjects' childhood residencies varied. Subjects' from small towns or rural areas had higher mean scores of ecological consciousness than those from urban or suburban areas.

The Cronbach's alpha for the 15 revised NEP items was .817, and the corrected item-total correlations ranged from (.22-.62). Internal consistency was also tested using principal-components analysis where the loadings in the component matrix ranged from .28-.72 on the first unrotated factor, which explained 31.3% of the variance. The eigenvalues were 4.4, 1.4, 1.2, and 1.0. Since the first is substantially larger than 1 and the others are close to 1, only the first factor was kept. Heavily loaded items on the first unrotated factor, strong item-total correlations, and a respectable alpha all similar to

Dunlap et al.'s, justified treating the NEP scale as a single-construct measure of an ecological consciousness and confirmed the validity of the NEP as a measure of ecological consciousness. The overall NEP mean score was 2.93, and the interquartile range was between 2.67 and 3.27. NEP scores lower than 2.5 were deemed anthropocentric and higher than 2.5 were deemed ecocentric.

The Pearson's correlation test was done to ensure the independent variables were discrete (Table 2). The results revealed the strongest positive correlation, or relationship, to be between consumptive and mechanic recreation. The strongest negative correlation was between development concern and economic concern. These correlations were all low enough to be deemed discrete variables.

Table 2: Pearson's Correlations of Independent Variables

	EOR	EEdEE	AOR	COR	MOR	DC	EC
EOR		.277 **	.297 **	.166 *	-.044	.120	-.176 **
EEdEE			.104	.136 *	.127	-.014	-.094
AOR				.294 **	.142 *	.295 **	-.205 **
COR					.336 **	.057	-.079
MOR						.121	.036
DC							-.340 **
EC							
* Correlation is significant at the .05 level							
** Correlation is significant at the .01 level							

EOR= Early Outdoor Recreation
EEdEE= Environmental Education during Elementary Education
AOR= Appreciative Outdoor Recreation
COR= Consumptive Outdoor Recreation
MOR= Mechanical Outdoor Recreation
DC= Development Concern
EC= Economic Concern

Respondents were asked to rank the three most significant childhood sources that influenced their view about the natural environment. Most respondents ranked family (58.4%) as the number one source, and another group of respondents (21.7%) ranked school as the number one source. The most common second choices were also school and family (55.8% cumulative). Finally, the third ranked choices with over 10% of the respondents were: school, media, friends, parks, and camps.

Ecological Consciousness Relationships

First, the models of the regression analysis were all found statistically significant at the .000 level except Model 1 was .002 (Table 3). Since Model 3 represents the influences examined in previous research, and Model 4 represents all of the influences of the present study, most attention shall focus on those two models.

Table 3: Comparison of Variables within Four Regression Models on Ecological Consciousness

Variable	Model 1	Model 2	Model 3	Model 4
Childhood Experiences				
EOR	.244 ***	.167 *	.139 *	.115
EEdEE	-.033	-.034	-.019	-.035
Adulthood Experiences				
AOR		.151 ***	.081 *	.067
COR		.001	.015	.009
MOR		-.021	-.047	-.029
Personal Opinions				
DC			.212 ***	.154 ***
EC				-.163 ***
Note. For Model 1, R^2 adjusted = .046, F (2, 218) = 6.21. For Model 2, R^2 adjusted = .091, F (5, 218) = 5.35. For Model 3, R^2 adjusted = .223, F (6, 218) = 11.45. For Model 4, R^2 adjusted = .313, F (7, 218) = 15.16. *p< .05, **p< .01, ***p≤ .001.				

The regression analysis of Model 4 showed developmental concern correlated positively (.154) and economic concern correlated negatively (-.163) with ecological

consciousness (Table 3). With all seven variables in the regression equation, Model 4 explained 31.3% of the adjusted variance in the NEP or ecological consciousness scores. This model included all three categories of variables—childhood experiences, adulthood experiences and personal opinions. In Model 3 early outdoor recreation experiences (.139), appreciative outdoor recreation (.081), and development concerns (.212) all correlated positively with ecological consciousness. This model had six variables, excluding the economic concern variable, and explained 22.3% of the variance.

The continuous increase in the adjusted R squared as variables are added suggests there is considerable complexity in explaining what influences ecological consciousness. This is especially compelling when only one-third of the total variance of ecological consciousness was explained with all seven variables included in the regression model.

DISCUSSION

The primary purpose of this study was to investigate whether certain nature related experiences and personal opinions about nature influence peoples' level of ecological consciousness. The study's results supported previous studies that found a positive relationship between a person's ecological consciousness and the influences of their extent of appreciative outdoor recreation, outdoor activities during childhood, and development concern, and a negative relationship between an ecological consciousness and economic concerns. The results reinforced the notion that anthropocentric influences can have a negative effect on a person's level of ecological consciousness. For example, in this study those who strongly agreed with the viewpoint that economic concerns should come before environment concerns tended to have lower levels of ecological consciousness.

Before the economic concern item had been added to the regression analysis in the last model, appreciative outdoor recreation and early outdoor activities were significant influences of ecological consciousness as found in 10 similar studies with different samples, two which also used a revised NEP (Ewert et al., 2005; Thapa & Graefe, 2003), three which conducted open interviews to environmentalists (Chawla, 1999; Palmer et al., 1998 & 1999), and five which created their own questionnaires to measure ecological consciousness (Dunlap & Heffernan, 1975; Geisler et al., 1977; Jackson, 1987; McDaniel & Alley, 2005; Teisl and O'Brien, 2003). Model 3 is similar to these studies where economic concern was not examined, like Ewert et al.'s (2005) study when appreciative recreation during childhood was a significant influence, supporting the findings of the first three models of this study. Findings demonstrate outdoor activities during childhood and appreciative recreation experiences influence higher levels of ecological consciousness, but the significance decreases as ecological consciousness is further explained by additional influences. In particular, once development concern is added in Model 3 and influences of ecological consciousness are better explained, early outdoor activities and appreciative recreation become less significant. When economic concern is added in Model 4 ecological consciousness is even further explained, and the significance of early outdoor activities and appreciative recreation decreases below the significant influence level. Development concern, on the other hand, remains a significant influence.

There were a few limitations to consider with this study. First, the low survey response rate and also the majority of subjects being young adults could be perceived as problematic. A higher response rate would likely have shown other independent variables to be statistically significant, especially in Models 3 and 4. Equally important,

having a sample of adults from a broader age range might have produced slightly different findings. Second, there is concern about how little the models in this study explained the influences of ecological consciousness. While the influences examined produced results higher than studies such as Ewert et al.'s (2005), the explanation of ecological consciousness is considered a weak. It is quite evident more items of influence need to be included in future models.

There is another topic of consideration for future studies. This study measured outdoor experiences and environmental education influences by asking subjects' degree to which they experienced each of the items--never, rarely, occasionally, or regularly. The personal opinion influence (development concern and economic concern) questions and the NEP questions, on the other hand, were statement of opinion questions and subjects were asked if they strongly disagree, mildly disagree, mildly agree, or strongly agree. It would be interesting to investigate if converting the experience questions to opinion questions like, "Outdoor activities like hiking, watching wildlife, and canoeing increase my desire to preserve and protect natural areas. Do you strongly disagree, mildly disagree, mildly agree, or strongly agree?" Constructing the entire model with opinion questions may or may not produce a model that better explains what influences a person's ecological consciousness.

One significant explanation of the subjects' ecological consciousness was development concern. This study further supports results found in Palmer et al.'s (1998 & 1999) and Ewert et al.'s (2005) studies which demonstrated that subjects bothered by witnessing human development of natural areas are often more ecologically consciousness. Results of this study as well as previous studies suggest exposing people

to the development of natural areas may be a method of increasing ecological consciousness. Future research should examine other specific types of ecological degradation. It may show observing things such as decreasing water quality or extinction of species increases people's ecological consciousness.

Environmental education in elementary school did not have a positive influence on college students' ecological consciousness in this study. In previous research, an inconsistency was evidenced of environmental education as an influence of ecological consciousness (Farmer at el., 2007; Haluza-Delay, 2001; Kruse & Card, 2004; Smith-Sebasto & Walker, 2005). Future research on environmental education programs like Farmer et al.'s (2007) 4th grade environmental education field trip, where the subjects witness environmental degradation first hand while learning about it, would be interesting in comparison with Haluza-Delay (2001) and Smith-Sebasto and Walker's (2005) educational programs, where witnessing environmental degradation was not part of curriculum. In general, continued research on various environmental education instructional techniques, such as measuring the impact of witnessing actual ecological degradation, would be useful information for environmental educators. Pretests, posttests, and even delayed posttests on ecological consciousness would demonstrate which techniques have an influence and which ones do not.

Lastly, this study revealed that those who placed economic concerns over environmental concerns, tended to have lower levels of ecological consciousness. While economic concern is clearly an anthropocentric concern, antianthropocentrism was only one of the five facets which made up the complete measure of ecological consciousness. Results confirm the notion that lower scores of ecological consciousness represent an

anthropocentric worldview. Future studies on the peoples' beliefs regarding economic concerns and values of ecological services such as flood prevention, erosion control, and oxygen generation similar to Haight's (2007) study in comparison with their ecological consciousness attitudes would further support the findings of this study. The results of this study suggest practitioners who wish to increase the public's ecological consciousness should emphasize the value of ecological services when addressing economic concerns. People with anthropocentric worldviews can still believe in the other facets of ecological consciousness such as the fragility of nature's balance or the possibility of an ecocrisis.

In addition to economic concerns, development concerns, and outdoor experiences, other influences that should be examined in future studies are family, schools, friends, media, parks, and camps. Over half of this study's subjects ranked family as the number one place they were exposed to thoughts regarding the environment. This strongly suggests family is an influence of the subjects' ecological consciousness. Equally important, subjects ranked school as either first or second most significant place where they were exposed to thoughts regarding the environment. Friends, media, parks, and camps were ranked by subjects as places where they were exposed to thoughts regarding the environment as well, so they could also be examined as influences of ecological consciousness.

SUMMARY

Overall, there were three important findings of this study. First, since economic concern had a significant negative influence on ecological consciousness, the conflictive nature between economic concerns and ecological consciousness should be addressed.

Second, subjects who said witnessing the development of natural areas made them want to protect natural areas, had higher levels of ecological consciousness. Last, the findings reveal that outdoor activities during childhood, as well as appreciative outdoor recreation experiences during adulthood had a modest influence on ecological consciousness. These findings demonstrated in addition to addressing economic concern and providing experiences which increase development concern, perhaps encouraging outdoor activities during childhood and appreciative recreation may also increase people's ecological consciousness.

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APPENDIX A

RESEARCH INSTRUMENT

ENVIRONMENTAL EXPERIENCES AND PERSPECTIVES

ENVIRONMENTAL EXPERIENCES AND PERSPECTIVES

1. What is the ID code given to you at the bottom of my email? ___

2. What is your area of study out of the following categories:
   - Health and Science
   - Liberal Studies
   - Industrial Technologies
   - Human Services
   - Education
   - Business?

2. Where did you live most of your childhood?
   - Big City
   - Suburb
   - Smaller City
   - Smaller Town,
   - Rural Area but not a Farm
   - Farm

3. What is your age? _____
   The value must be between 1 and 98, inclusive.

4. During childhood, were you exposed to ideas or thoughts regarding the natural environment?

5. Rank up to three sources of exposure. 1= Most Significant 2=2nd Most Significant 3=3rd Most Significant
   - School
   - Family
   - Media
   - Friends
   - Church
   - Scouts
   - Park
   - Conservation Organizations,
   - Camps
   - Books or magazines

6. Outdoor activities were part of my childhood.
   - Never
   - Rarely
   - Occasionally
   - Regularly

7. Environmental education was part of my elementary education.

- Never
- Rarely
- Occasionally
- Regularly

8. I participate in nature appreciation activities like watching wildlife, hiking, paddling, and ect.
   - Never
   - Rarely
   - Occasionally
   - Regularly

9. I participate in outdoor activities like game hunting, fishing, and morel hunting.
   - Never
   - Rarely
   - Occasionally
   - Regularly

10. I participate in outdoor mechanized activities like mountain biking, ATVing, snowmobiling, and boating.
    - Never
    - Rarely
    - Occasionally
    - Regularly

11. Watching an outdoor area being developed for human causes me to want to protect other natural areas.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

12. With conflicts between the economy and the environment, humans should place economic concerns before environmental concerns.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

13. We are approaching the limit of the number of people the earth can support.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

14. Humans have the right to modify the natural environment to suit their needs.

- Strongly Disagree
- Mildly Disagree
- Mildly Agree
- Strongly Agree

15. When humans interfere with nature it often produces disastrous consequences.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

16. Human ingenuity will insure that we do NOT make the earth unlivable.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

17. Humans are severely abusing the environment.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

18. The earth has plenty of natural resources if we just learn how to develop them.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

19. Plants and animals have as much right as humans to exist.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

20. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

21. Despite our special abilities humans are still subject to the laws of nature.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree

- Strongly Agree

22. The so-called "ecological crises" facing humankind has been greatly exaggerated.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

23. The earth is like a spaceship with very limited room and resources.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

24. Humans were meant to rule over the rest of nature.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

25. The balance of nature is very delicate and easily upset.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

26. Humans will eventually learn enough about how nature works to be able to control it.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

27. If things continue on their present course, we will soon experience a major ecological catastrophe.
    - Strongly Disagree
    - Mildly Disagree
    - Mildly Agree
    - Strongly Agree

28. Would you like me to email you the results of this study?
    - Yes
    - No

APPENDIX B

EXTENDED REVIEW OF LITERATURE

ECOLOGICAL CONSCIOUSNESS

While there has been a significant increase in ecological consciousness over the last several decades, there is not yet a consensus amongst members of society as to its importance. In the land ethic section of Aldo Leopold's (1966) A Sand County Almanac, he emphasizes the importance of ecological consciousness on peoples' sense of obligation towards the land. Ecological consciousness is a prerequisite to ecological ethics and behaviors. Since, ecological ethics appears to vary amongst people, several researchers have sought an explanation as to what influences ecological consciousness and ecological behaviors. Dunlap and Van Liere (1978) created an instrument to measure ecological consciousness called the New Ecological Paradigm (Dunlap, Van Liere, Mertig, & Jones, 2000).

There were also several research studies which thoroughly analyzed the relationship between ecological knowledge, attitudes, and behaviors (Gagnon Thompson and Barton, 1994; Kaiser, Ranny, Hartig, and Bowler, 1999; Gotch and Hall, 2004; Kruse and Card, 2004; Hsu, 2004). The relationship between ecological consciousness and ecological behaviors is fairly weak, but these studies give insight as to what might strengthen the relationship.

Books written by environmental philosophers Muir (1965), Leopold (1966), and Louv (2005), are examples of three people whose ecological consciousness coincided with their ecological behavior. These writers all suggested that child's outdoor experiences during childhood may have an influence on their level of ecological consciousness. Palmer, Suggate, Robottom, and Hart (1999), Palmer, Suggate, Bajd, Hart, Ho, Ofwono-Orecho et al. (1998), Corcoran (1999), Chawla (1999), Palmberg and

Kuru (2000), and Ewert, Place, and Sibthorp (2005) found a strong positive relationship between outdoor/nature experiences during childhood and ecological consciousness using several different methods.

While studies by Farmer, Knapp, and Benton (2007), and Bagarinao (1998) show that environmental education during childhood has intrinsic and long term benefits, there is also plenty of environmental education which failed to increase ecological consciousness as shown in studies by Haluza-Delay (2001) and Smith-Sebasto and Walker (2005) in the "environmental education weaknesses" section of this review.

Those who participate in outdoor recreation activities during childhood or adulthood often have higher levels of ecological consciousness (Bagarinao, 1998 ; Chawla, 1999; Corcoran, 1999; Dunlap & Heffernan, 1975, Dunlap & Van Liere, 1978; Dunlap et al., 2000, Ewert, Place, & Sibthorp, 2005, Farmer, Knapp, & Benton, 2007; Geisler, Martinson, & Wilkening, 1977; Haluza-Delay, 2000; Jackson, 1987; McDaniel & Alley, 2005; Palmer, Suggate, Bajd, Hart, Ho, Ofwono-Orecho, et al., 1998; Palmer, Suggate, Robottom, & Hart, 1999; Pinhey & Grimes, 1979). Researchers examined which activities had the strongest relationships with ecological consciousness. Activities were generally placed in three categories: appreciative outdoor recreation, consumptive outdoor recreation, and mechanized (or abusive) outdoor recreation. These categories represent the nature of the interaction with nature. Appreciative recreation had little to no impact on nature. Consumptive recreation is taking something from nature. Mechanized is when there is mechanized technology and the likelihood of human impact on the environment. While several studies address these relationships, there are nine research

studies which examine types of outdoor recreation and ecological consciousness beginning with a study by Dunlap and Heffernan (1975).

Concerns or opinions which can influence people's ecological consciousness are different than experiences. While these concerns may have roots in experiences, they are beliefs or tendencies of thoughts or actions. Palmer et al. (1998), and Ewert, Place, and Sibthorp (2005) found several of their study subjects said they wanted to protect natural areas as a result of witnessing negative ecological events such as development, pollution, or other forms of ecological degradation. When people are dissatisfied with a place with which they have personal connections, or "place attachments", they have the highest likelihood of displaying "place-protective behaviors" (Stedman, 2002).

Another concern or opinion referred to in previous studies in relationship to ecological consciousness was economic concern. Leopold (1966) believed economic concern to be a barrier, or a "substitute" for many farmers' ecological consciousness towards land. Haight (2007) proposed that there is ecological value in land such as flood prevention, erosion control, and oxygen regeneration. These ecological services should be incorporated into the evaluation economic possibilities and production. While economic concern addresses the anthropocentric side of ecological consciousness, most of the following previous research studies address the ecocentric influences of ecological consciousness.

NEP

Dunlap and Van Liere (1978) coined the phrase New Environmental Paradigm, or NEP, to describe a "new" ecological worldview which rejected the "Dominant Social Paradigm" (DSP), or worldview which has the anthropocentric notion that nature exists

for human use. The NEP, on the other hand, acknowledges limits of freedom of action, the importance of a balanced, steady-state economy, the importance of a balance in nature, and the ignorance of a DSP. Limits of freedom of action are things like resisting to develop natural areas or to mine rare or delicate ecosystems. A steady-state economy is a sustainable economy which does not exceed ecological limits, and maintaining the balance of nature refers to stable population levels and oxygen generation keeping up with carbon dioxide emissions. These beliefs are examples of the three main facets which represent the NEP: reality of limits to growth, antianthropocentrism, and the fragility of nature's balance. The NEP was deemed at that time to be a superior, deeper concern for the environment. The NEP scale was an instrument to examine the public's endorsement of this New Environmental Paradigm (Dunlap & Van Liere, 1978).

Dunlap and Van Liere (1978) conducted their study on the adult, general public of Washington State, as well as on the members of a statewide environmental organization in Washington. The NEP scale was presented with a four point Likert scale where four represented strongly agree (with the NEP) and one represented strongly disagree.

The study showed support for the NEP by both the members of the environmental organization as well as the general public, but significantly stronger support from the environmental group. The instrument was tested for internal consistency by examining corrected item-total correlations, Cronbach's alpha, and omega. The instrument also passed the unidimensionality test using principal factor analysis. Dunlap and Van Liere (1978) found the study to have predictive, construct, and content validity, and they hoped the questionnaire would be further validated by use in future studies. They also thought

that it would be important to study the relationship between the NEP, and other attitudes and behaviors, since ideals do not always represent their actual behaviors.

Over the next couple decades, the concept of the environment expanded from general local problems to global issues. There were also changes in politically acceptable terminology, such as the term "mankind" in the Dunlap and Van Liere's 1978 NEP. As a result, Dunlap, Van Liere, Mertig, and Jones (2000) revised the original instrument to address these timely issues. In addition to the reality of limits to growth, antianthropocentrism, and the fragility of nature's balance, the revised NEP also included rejection of exemptionalism, and the possibility of an ecocrisis. Exemptionalism is the belief that humans are exempt from the constraints of nature. The possibility of an ecocrisis facet is the belief that "if things continue on their present course, we will soon experience an ecological catastrophe." The survey was balanced to have three questions from each facet, 8 ecocentric and 7 anthropocentric. This revised NEP was renamed the New Ecological Paradigm.

Due to environmental samples consistently scoring higher on the NEP, Dunlap, Van Liere, Mertig, and Jones (2000) deemed the NEP as having known-group validity. Since several research studies found significant relationships between the NEP scale and intentions and behaviors, they also claimed predictive validity. These are both forms of criterion validity, so they claim criterion validity as well. A similar study found balance of nature, limits to growth, and antianthropocentrism (in different words) to be the three environmental beliefs which contribute to how they perceive environmental issues, which gave the NEP content validity. Previous studies have also given the NEP construct

validity by finding it to be a "primary component" belief system regarding the environment (Dunlap, Van Liere, Mertig, & Jones, 2000).

The New Ecological Paradigm questionnaire was mailed to Washington state residents, like the original NEP. Since several studies have found the NEP to have from one to four dimensions, Dunlap et al.'s (2000) first agenda with the results was testing for internal consistency. The corrected item-total correlations ranged from .33-.62, and Cronbach's alpha was .83. All items loaded heavily on the first unrotated factor (.40-.73), explaining 29.5% of variance. The eigenvalues (4.7, 1.5, 1.2, 1.1) revealed only one major factor, so Dunlap et al.'s (2000) instrument was deemed as a unidimensional measure, and the content validity of the NEP increased.

The researchers assumed validity of the original study except predictive validity. They included several questions regarding ecological attitudes and behaviors in addition to the NEP questions. The NEP scores correlated significantly with the other ecological attitude and behavior questions, confirming predictive validity. The expectancy of the results confirmed the revised NEP scale's construct validity.

Dunlap et al.'s recommendations for future research were simply continued testing the dimensionality and to examine the relationship between how worldviews influence attitudes, beliefs, and behaviors. This study supported Dunlap et al.'s (2000) internal consistency to treat the instrument as unidimensional and the notion that ecological consciousness has increased. The following studies examine the relationship between ecological worldviews, knowledge, attitudes, and behaviors.

Knowledge, Attitudes, and Behaviors

More specifically, the following research articles focus on the levels and sources of ecological consciousness by examining knowledge, attitudes, and behaviors. Gagnon Thompson and Barton (1994) examined the relationships between subjects' worldviews and their ecological beliefs, attitudes, and behaviors, as recommended by Dunlap et al. (2000). Gotch and Hall (2004) researched influences of nature-related behavioral intentions and ecological behaviors. Kruse and Card (2004) study knowledge, attitude, and behavior before, immediately after, and one month after a unique conservation education program in Florida. Kaiser, Ranny, Hartig, and Bowler (1999) are testing to see if feelings of responsibility towards the environment are what bridge the gap between environmental knowledge, attitudes, and intentions of environmental behavior. Hsu (2004) recognizes that environmental knowledge and environmental attitudes don't always necessarily lead to environmental behavior, so he conducts a study focusing on different environmental literacy variables.

According to Gagnon Thompson and Barton (1994), the purpose of their study was to develop the distinction between ecocentrism and anthropocentrism. They define "ecocentric individuals" as individuals who "value nature for its own sake and, therefore, judge that it deserves protection because of its intrinsic value." They define anthropocentric individuals as those who "feel that the environment should be protected because of its value in maintaining or enhancing the quality of life for humans"; anthropocentric individuals are, according to Gagnon Thompson and Barton (1994), utilitarians and instrumentalists.

Both ecocentric and anthropocentric individuals can have an interest in preserving

natural resources, and it is merely their motive which differentiates one from the other. Gagnon Thompson and Barton (1994) claim that anthropocentric individuals will be less likely to protect the environment if "human centered values such as material quality of life or the accumulation of welfare interfere." They conducted two studies.

In the first study, they study found that the more ecocentric subjects participated in more conservation and environmental organizations. They also had less apathy of environmental issues and more ecocentric explanations for having ecological consciousness. The more anthropocentric individuals had more environmental apathy and participated in simple conservation less often, but they did not belong to less environmental organizations or supply more anthropocentric explanations for their ecological consciousness. In their second study, ecocentric attitudes were significantly correlated with environmental apathy (negatively), self-reported conservation behaviors, and the environmental organization sign up, but anthropocentrism did not relate to any of these variables in this study (Gagnon-Thompson & Barton, 1994).

Gotch and Hall (2004) conducted a study using to examine what caused and prevented nature related behaviors of children. Attitude had a high relative influence for intentions of activity in nature, and somewhat less relative influence on intentions of nature-related information consumption. Attitude had a fair amount of influence on subjects actually seeking nature-related information, but it had very little influence on subjects actually following through with activities in nature in this study (Gotch & Hall, 2004). In general, children's attitudes play a significant role in their behaviors nature related behaviors (Gotch & Hall, 2004).

Kruse and Card (2004) also found that in their statistics that environmental behavior numbers were not as high as the scores for environmental knowledge and environmental attitudes, but they found that more hands on experience and animal husbandry brought up environmental knowledge, attitudes, and behavior scores. The study observed knowledge, attitude, and behavior changes from before the program, immediately after the program, and one month after the hands on conservation education program. There was an increase from pretests to posttests and a decrease from posttests to delayed posttests, but there was an overall increase from pretest to delayed posttest (Kruse & Card, 2004). Ratings from pretests indicated that subjects had retained some knowledge, attitudes, and behavior from prior conservation education, so it appears that repeated participation and/or follow-up sessions are necessary to keeps levels of knowledge, attitude changes, and behavior changes high.

The last two studies have the same idea, but the subjects in these studies are adults. Kaiser, Ranny, Hartig, & Bowler (1999) examined what made the difference when it came to environmental behaviors. They found variance of environmental behavioral intentions were due to environmental knowledge, environmental values, and feelings of responsibility regarding the environment; feelings of responsibility. Environmental behavior intentions and feelings of responsibility were the most significant influences of actual environmental behaviors.

Hsu (2004) conducted a study in search of what influences environmental behavior as well. Hsu found the components of education that appeared to be very effective in the promotion of environmental behavior for college students were issue investigation, action training, and empowerment.

Environmental Education

Benefits of Environmental Education

Following are three literature reviews where environmental education was found to increase ecological consciousness outside of the classroom. Farmer, Knapp, and Benton (2007) studied the benefits and long term effects of fourth graders experiencing environmental education hands on in Great Smokey Mountain National Park. Bagarinao (1998) conducted a study on why it is necessary to increase environmental education outside of schools in the Philippines, and what places would be the most accessible and beneficial for environmental education for the citizens.

The study of the fourth grade field trip conducted by Farmer et al. (2007) was to evaluate the usefulness and long-term effects of an experiential environmental education field trip. The researchers conducted interviews with subjects one year after the field trip. All interviewed except one were able to recall knowledge of ecological concerns in the park, and a large majority of them also remembered possible solutions to the issues. Several of the subjects expressed proenvironmental attitudes, and six specifically said to the researchers, "We need to change and take care of our forests."

This study showed that the environmental education field trip left a great impression on fourth graders for the long term. Subjects showed a great increase in ecological consciousness. Experiencing the environment and its threat hands on while learning about was very effective. While there could be more research on similar programs, teachers should take their students on an environmental education field trip. Park directors should make sure to have environmental education programs for school kids.

On that note, Bagarinao (1998) conducted a study researching the means of environmental experiences and education. Bagarinao found that the formal education system in the Philippines didn't address environmental issues, the illiteracy rate was high, and school attendance was low. She suggested environmental education must be implemented in informal settings to increase ecological consciousness. Parks, museums, gardens, and zoos are the most accessible places for people to learn more about the environment and the ecosystems at risk.

Environmental Education Weaknesses

There are weaknesses that should be mentioned that subjects in two studies have said to be downfalls of environmental education programs. The first is a study conducted by Haluza-Delay (2001) following a 12 day wilderness program; the second is a study conducted by Smith-Sebasto and Walker (2005) exploring subjects' perceptions of the environmental education program at a school of conservation.

Haluza-Delay (2001) examined an outdoor education adventure program to see if there was an increase in environmental sensitivity of suburban youth from outdoor recreation and education after a wilderness program. Few of the kids made any connection of how they learned to care for the environment on their trip and their lives in suburbia. Some said they were concerned about the environment and wanted natural places to remain as they were, but they didn't do anything differently when they got home. One kid stopped littering. All together, they just felt like nature was very separate and foreign from their lives. The results of this study further supports Bagarinao's (1998) study which found parks, museums, gardens, and zoos may be effective sights for environmental education.

The study conducted by Smith-Sebasto and Walker (2005) on an environmental education program in a wilderness setting as well. The study showed that the subjects felt confused initially with purpose; subjects expressed that they wanted to know the purpose and goals of activities. Naturally some were confused by facts and skills as well. It appears that initial explanation of purpose is important to prepare subjects for learning, and it is also important to teach skills needed for the learning activity prior to the activity so that they can focus on the content and/or experience opposed to frustration of the skills needed in the process.

The subjects in this study expressed safety to be the most meaningful category of the program by far, followed by social learning, scientific learning, and recreation (Smith-Sebasto & Walker, 2005). These results suggest subjects are concerned with their well-being (physical and emotional) before they are concerned with learning scientific or recreational things. Knowledge of how to be safe and of how activities will affect individuals prior to learning activities appears to be the most important factor to maximize learning and attitudes according to this study.

There was not an increase in ecological consciousness after these environmental education programs which could be for a variety of reasons. One possibility is weaknesses in the environmental education programs. Another possibility is the subjects lacking previous experiences in nature.

Childhood Outdoor Activities

Author of Last Child in the Woods, Richard Louv (2005), coined the term, "nature-deficit disorder", to describe a majority of the youth in the 21st century and their lack of connection with nature. With an increase in technology and the "criminalization of

natural play", youth in the 21st century have not had the opportunities to connect with nature the way Leopold or Muir did. A majority of the new generation learns about nature on the discovery channel rather than from direct experiences. Louv's (2005) study supports Haluza-Delay's (2001) findings that some of today's children perceive nature as abstract.

Unlike many of the children of this century which Louv (2005) speaks of, John Muir, similar to Leopold, spent much of his youth in nature. In the "Life on a Wisconsin Farm" section of My boyhood and youth (1965), he describes in detail the lessons learned from time spent in nature during childhood. He learned that snakes have no disposition to hurt him until threatened or provoked. He learned that cattle share the same motherly love for their young that women do.

Muir (1965) found:

> Of the many advantages of farm life for boys one of the greatest is the gaining a real knowledge of animals as fellow-mortals, learning to respect them and love them, and even to win some of their love. Thus godlike sympathy grows and thrives and spreads far beyond the teachings of churches and schools, where too often the mean, blinding, loveless doctrine is taught that animals have neither mind nor soul, have no rights that we are bound to respect, and were made only for man, to be petted, spoiled, slaughtered, or enslaved. (p. 89)

Muir's experiences in nature during childhood were clearly influential to his ecological consciousness, or as Palmer, Suggate, Bajd, Hart, Ho, Ofwono-Orecho et al. (1998) would say, his childhood outdoor experiences were "significant life experiences."

Palmer et al. (1998) interviewed environmental educators in nine countries regarding what they believed to be influences, or significant life experiences, inspiring them to become environmental educators. Direct experience with the natural world was a significant influence for over half of the sample. Nature experiences during childhood, in particular, were the most important influence; in four countries it was ranked the most significant influence, and second or third in three other countries. People, education, and negative experiences such as witnessing degradation of places that they used to live, recreate, or depend on influenced more than a third of the environmental educators. Negative experiences such as pollution, trees cleared, and negative literature, ranked as the most important in three countries and second in two. One of the top four ways that they felt they could make a difference was getting people involved in outdoor activities since it was influential in their inspiration to be more ecologically conscience.

The study by Palmer, Suggate, Robottom, and Hart (1999) also examined influences, or significant life experiences of environmental educators. They were asked to write an autobiographical statement regarding the experiences and influences leading to their ecological consciousness. They were then to narrow down one experience or influence which they considered to be the most influential, and the years of their life that they believe were most important in the development of their ecological consciousness.

In the Australian study, 71% of the subjects mentioned childhood experiences in nature/outdoors to have significantly influenced their ecological consciousness. In Canada, 75% of subjects mentioned childhood nature/outdoor experiences. Teenage and adult outdoor activities were considered significant experiences by 29%. The UK showed lower but similar results as Canada and Australia. People were ranked as the

second most important influence for Canada and Australia and third for the UK. Education and work were also very significant for all three countries. Palmer et al. (1999) also looked at the combined influence of childhood and adult outdoor/nature experiences a 70% influence rate from the UK, 83% from Australia, and 85% from Canada. These findings show the importance of recreating or spending time in nature or the outdoors.

Corcoran (1999) questioned NAAEE members on people and experiences which led to their ecological consciousness. Nearly half mentioned authors such as R. Carson, J. Muir, A. Leopold, E. Abbey, and R. Emerson, or their parents as influences, and there were also significant responses for teachers. Various activists, grandparents, camp counselors, environmental groups, political leaders, and more were mentioned as well. Over ninety percent of the responding NAAEE members were regularly active in outdoor recreation, recycling, and reading of environmental literature, but less than half were regularly politically active regarding the environment. Age made a difference in regards to the latter where people under 30 had slightly lower results.

There were a variety of narrative stories by these NAAEE members describing appreciation for nature, knowledge acquired from nature, inspiration to protect it. One person learned that the beauty of nature takes patience and cannot be controlled or forced after trying to open a daffodil bud and ruining it. A foster child related to nature as family. One person referred to forest canopies as her cathedral and the wind as the answer to her prayers. One environmental educator is continually given inspiration and strength by thoughts of Rachel Carlson's conviction and determination. Many connected with nature and gained appreciation and affection for nature while hunting or fishing.

One person felt that people needed natural places to feel free from societies rules to have an opportunity to maintain their sanity and develop their own spirituality and system of values; he or she had experienced the development of all of her/his favorite places. Corcoran (1999) concluded that like Palmer's studies, his studies also suggested childhood outdoor experiences to be the most important influence amongst his sample.

Chawla (1999) conducted a study to determine significant life experiences which inspired environmentalists in the United States and in Norway. Almost all of the subjects were over 30, with a majority between 30 and 49. Almost all of them went to college, and 77% of the Kentucky subjects and 38% of the Norway subjects had their master's or doctorate. The information was gathered via open-ended interviews.

Chawla (1999) pinpointed peoples' environmental aspirations as being a combination of the continuity of childhood experiences to adult perspectives, and chance, or random events or encounters. Chawla (1999) observed a chronological pattern of experiences leading to inspirations. They grew from subjects' upbringing to childhood "predispositions", which affected their reactions to chances events or opportunities later in life. After that, the events and opportunities which they experienced developed their knowledge and skills in the direction of their opportunities or choices.

The two most common explanations for environmental commitment by subjects were experiences in natural areas and the influence of family members who taught them the value of the environment. A majority of the places, people, and influential experiences were during childhood. The natural areas that subjects described were all places close to home, where the subjects developed a level of comfort in nature, confirming Louv's (2005) theory of the importance of children's time in nature. The

third and fourth ranked sources of commitment were participation in environmental or outdoor organizations (during childhood or adulthood) and negative environmental experiences or the fear thereof. Some subjects were directly affected by the nuclear accident, Chernobyl. This incident was not forgotten, and some of the subjects expressed fears of losing more places which were special to them, and natural privileges such as eating fish. Education ranked as the fifth influence to the subjects environmental commitment. Only one of the education references regarded elementary school; the rest referenced junior high, high school, or college.

Palmer et al. (1998 & 1999), Corcoran (1999), and Chawla (1999) reported outdoor activities during childhood to be significant life experiences for a majority of the subjects they studied, according to the subjects. Palmberg and Kuru (2000) take a different approach. Instead of asking adults who are environmental educators or environmental activists what influenced them, Palmberg and Kuru conducted their study on children in nature, gathering data by observation as well as interviews.

Palmberg and Kuru's (2000) studied eleven and twelve year old subjects selected from two schools based on having years of outdoor education experiences through school, as well as a small group selected from another school for having the least amount of outdoor education experiences through school. A majority of the subjects were more anthropocentric than ecocentric, but some that were concerned with the well-being of animals and felt nature does have intrinsic value. The subjects with more experience in nature showed a deeper conception of nature and had a stronger "empathetic relationship" with nature. Approximately half of the subjects expressed anxiety in concern for nature according to Palmberg and Kuru (2000). Some of the subjects' demonstrated fairly high

ecological consciousness, but many, especially the inexperienced subjects, showed very little ecological consciousness.

In response to studies like Palmberg and Kuru's (2000) study which found that outdoor experiences during childhood had an influence on subjects' ecological consciousness, Ewert, Place, and Sibthorp (2005) conducted a study to determine which outdoor recreation activities best explained environmental beliefs. Ecological consciousness was measured using their questionnaire based on the original NEP scale (Dunlap and Van Liere, 1978). The modified version was designed to distinguish between ecocentric and anthropocentric subjects. They examined influences of ecological consciousness such as consumptive outdoor recreation, appreciative outdoor recreation, media, education, and negative experiences in relationship to the destruction of a natural environment. They found more ecocentric scores amongst those who witnessed the development natural areas or participated in appreciative outdoor recreation, and more anthropocentric scores amongst those who participated in consumptive outdoor recreation.

Ewert et al. (2005) referred to "place attachments" as relating childhood experiences outdoors to ecological consciousness (Stedman, 2002). Stedman defines place as "a center of meaning or field of care based on human experience, social relationships, emotions, and thoughts."

Stedman's definition of "sense of place" theoretically may be placed within a human-environment interaction model of social-psychology (Stedman, 2002). Stedman articulates a distinct difference between place attachment and place satisfaction, as well as attachment verses meaning. Defining meanings as "the cognitive building blocks of

attitude", social psychology seeks understanding of the relationship between the cognitions of attitude and identity and the cognitions of attitudes, identity, and behaviors (Stedman, 2002). Cognitions or beliefs precede attitudes. While attitudes are often expected to precede behaviors, that relationship depends greatly on conditions and direct experience with the attitude object. Place attachment affects behavior in addition to attitude, but some individuals have stronger attitude to behavior relationships than others.

Stedman's (2002) study revealed approximately three quarters of the study subjects had very strong place attachments to their rural properties. In regards to protective behaviors towards lakes, a strong majority of subjects said they would vote to support water quality protection and would be willing to join or help form a group to fight against shore development. Place attachments were the reasoning behind nearly half of the sample demonstrating place protective behaviors.

Appreciative, Consumptive, and Mechanic Outdoor Recreation

The previous studies lead the researchers to five basic influences of ecological consciousness: development concern, environmental education, outdoor activities during childhood, appreciative outdoor recreation participation, and consumptive outdoor recreation participation. In the continued study of explaining ecological consciousness, outdoor recreationists are a target due to their direct contact with nature, and because outdoor recreation in itself is also a type of land-use. Different types of outdoor recreation coincide with different land values and limitations of freedom. The following studies further explore the relationship between ecological consciousness and the three types of outdoor recreation: Appreciative, consumptive, and mechanic.

Dunlap and Heffernan (1975) study and analyze how different types of outdoor

recreation relate to different levels of ecological consciousness amongst the general public. The study found a strong positive association between appreciative activities and ecological consciousness, and a strong positive association for a small portion of consumptive activities, and a negative association with hunting and ecological consciousness. They were aware that a new category of abusive recreational activities were emerging, but it was not included in the study.

Geisler, Martinson, and Wilkening (1977) conducted a restudy of Dunlap and Heffernan's (1975) study on the relationship between outdoor recreation and ecological consciousness, except they added the third outdoor recreation category, "abusive" recreation, which referred to activities like snowmobiling. They measured ecological consciousness based on subjects' environmental issue awareness and support for public environmental action.

The researchers found significant correlations between subjects' ecological consciousness and outdoor recreation participation. Overall, three quarters of ecological consciousness to appreciative recreation correlations were significant, and a tenth of the ecological consciousness to consumptive recreation correlations were significant. Ecological consciousness and snowmobiling, or abusive recreation, were significantly correlated for two-thirds of the ecological consciousness questions. The negative associations were mostly support for public action, which Geisler et al. (1977) believed suggested that snowmobilers were aware of environmental issues, but they did not support most of the public actions provided.

In comparing the results with Dunlap and Heffernan's (1975) study, Geisler, Martinson, and Wilkening (1977) recognized that their study area had been experiencing

economic difficulty for decades, and Dunlap and Heffernan's 1970 (1975) Washington study was done at a peak time in a very progressive place in regards to the environmental movement. They then minimized their conclusion to be certain forms of recreation are correlated with certain ecological consciousness at certain times in certain places.

Pinhey and Grimes (1979) also did a restudy of Dunlap and Heffernan's (1975) study using different measures for outdoor recreation and ecological consciousness, a different sample, and different data analysis techniques. The first ecological consciousness question regarding the value of natural areas found that participation in outdoor activities was a moderate to weak, but still significantly related to their ecological consciousness. The second question regarding land uses found no significant difference. When comparing appreciative and consumptive recreationists, Pinhey and Grimes (1979) found that there was no significant difference. A higher percentage of the appreciative group was ecologically conscious regarding land uses in comparison with the consumptive group. A higher percentage of the consumptive group were concerned about natural areas than the appreciative group; Pinhey and Grimes suspect this is related to their desire for better hunting and fishing opportunities. Therefore, their study did not support Dunlap and Heffernan's results, except the indication that on one of two measures, subjects who recreate were more ecologically conscious than those who didn't. Their tests found recreational activity to explain less than one percent of the ecological consciousness responses to both the value of natural areas, and concerns of land use.

Jackson's (1987) study was interesting in respect to Pinhey and Grimes (1979) study because it assessed the relationship between recreation types and preferences regarding natural resources. More specifically, the purpose of Jackson's (1987) research

was to assess public support of preservation compared to development for recreation, and if there is a relationship between these views and recreation preferences amongst the subjects.

Ecological consciousness was measured using the original NEP scale (Dunlap and Van Liere, 1978). As the land management concepts increased in anthropocentrism, the importance of them to subjects decreased, but still remained fairly high. At least 77% of the subjects thought that recreation development was at least somewhat important. As expected, those who participated in appreciative recreation preferred natural resources remain in an unaltered state. Those who preferred mechanized recreation were willing to sacrifice some of the "wilderness" to have the natural resource available for recreation. Subjects who participated in different types of recreation were found conflicted in their preferences.

Thapa and Graefe (2003) attempt yet another approach in attempt to find stronger results to this question regarding the association of outdoor recreation types and ecological consciousness.

.They conducted onsite interviews at 13 sites in a state forest, as well as mail in surveys placed on vehicles. A 1992 revised version of the original NEP scale by Dunlap, Van Liere, Mertig, Catton, and Howell was used. The study focused on 15 proenvironmental behaviors, preservationist-utilitarian attitudes, and the subjects most valued form of recreation in the park.

Roughly half of the subjects chose consumptive as their most valued type of recreation in the state forest, and roughly one-third chose appreciative recreation. Those involved in appreciative recreation were most likely to be ecocentric. Those involved in

consumptive recreation were most likely to be politically active, followed by those involved in appreciative recreation, and then motorized recreationists. Appreciative recreationists were most likely to recycle, buy greener products, and be involved in educational environmental activities, followed by consumptive recreationists. Mean scores showed that on average, all of the recreationists believed habitat to be more important than recreation; appreciative recreationists had the highest scores, then consumptive recreationists. Motorized recreationists were the most likely to support more timber harvest, then consumptive recreationists. Consumptive recreationists were the most likely to support additional fish stocking, and appreciative recreationists were the least supportive of the proposal (Thapa & Graefe, 2003).

Schuett and Ostergren (2003) took another different approach. Their study was conducted to compare the levels of ecological consciousness between two voluntary outdoor recreation associations: The International Mountain Biking Association (IMBA) and The National Off-Highway Vehicle Conservation Council (NOHVCC). This study is interesting due to the controversy of whether or not mountain biking should be considered an abusive/mechanic form of recreation. Ecological consciousness was measured by Dunlap & Van Liere's (1978) NEP scale, and environmental involvement was measured by levels of involvement and participation in environmental organizations. The IMBA subjects were mostly males with an average of 6 years mountain biking 2.5 times per week with self rated skill levels of intermediate to advanced. The top five reasons for their involvement in mountain biking were enjoyment, physical activity, natural environment, excitement, and personal fulfillment. The NOHVCC subjects were also mostly males with around 15 years of riding 1.5 times per week with a slightly

higher self rated skill level than the mountain bikers. The top five reasons for participation were fun, family enjoyment, stress relief, challenge, and natural environment (Schuett & Ostergren, 2003).

The IMBA members consistently had higher NEP scores than the NOHVCC members, and they were significantly more involved in environmental organizations. Both groups demonstrated a correlation between environmental involvement and endorsement of two of the ecological consciousness facets, balance of nature, and limits to growth. Only the IMBA members were found to have a correlation with the worldview that humans do not have power over nature.

Stuessy, Harding, and Anderson (2009) conducted a study on varying environmental ethics amongst rock climbers (mechanic recreationists). They found three ethic categories: a practical, weak, non-anthropocentric environmental ethic, a metaphysical, holistic environmental ethic, and a religiously-inspired, soft anthropocentric environmental ethic.

There are numerous opinions, ethics, and feelings which can differ amongst recreationists. Differences are expected amongst those who participate in similar as well as different kinds of outdoor recreation, but trends are expected among the different groups.

Teisl and O'Brien (2003) developed complex equations to estimate the association between outdoor recreation activities and ecologically conscious behaviors, membership and/or support of environmental organizations, interest in how forests are managed, opinion as to what percentage of U.S. forests are managed in an "environmentally

friendly" manner, and likelihood to purchase environmentally certified and labeled wood products.

Results of the study showed appreciative recreation activities being the majority of the top five to seven leaders for ecologically consciousness, but there were also both abusive and consumptive activities in the top five to seven as well. Consumptive and abusive recreationists were associated with higher satisfaction in the management of U.S. forests, and appreciative recreationists were associated with lower satisfaction.

Approximately one fourth of the sample did not participate in any outdoor recreation. They were on the higher end of the charts for satisfaction with the management of U.S. forests, and otherwise consistently on the lower end of involvement in environmental organizations, interest in forest management, and likelihood to purchase environmentally certified wood (Teisl & O'Brien, 2003). The conclusion of the authors, similar to that of Dunlap and Heffernan (1975) was that participation in outdoor recreation appears to have a significant influence on individual's ecological consciousness and involvement, especially appreciative activities.

Another study provided further support of the former research studies. Watersheds are transitional places where water drains into rivers. McDaniel and Alley (2005) examined ecological consciousness amongst different types of watershed residents (i.e. urban, rural, managed pine), males and females, education levels, income levels, land use, and participation in outdoor recreational activities.

The results showed that environmental knowledge was most influenced by the type of watershed (or residence) and participation in recreational activities in the outdoors. Rural watershed residents and managed pine watershed residents scored higher than

urban watershed and suburban watershed residents. The highest scores of environmental knowledge came from those who hunted, regardless of how often, and from those who were frequent bird watchers. Those involved in off road vehicle riding scored about the same, no matter how frequent, than those who were frequent hikers. Nonparticipants of any of the activities and those who had rarely hiked or bird-watched received the lowest scores for environmental knowledge. Income and formal education had very little of influence of environmental knowledge (McDaniel & Alley, 2005).

These studies all revealed that those who participate in outdoor recreation activities tended to have higher levels of ecological consciousness. These studies suggest that the outdoors is an appropriate and efficient setting for environmental education.

Development Concerns

Previous studies so far have found ecological consciousness amongst people who spent time outdoors during childhood, received effective environmental education, participated in appreciative, consumptive, and mechanic outdoor recreation, and people who have witnessed or read about the development or degradation of natural areas. So far, all of the influences found have been experiences; witnessing development or degradation are personal opinions related to experiences which influence ecological consciousness, attitudes, and behaviors.

This concern of natural areas was found to have a relationship with ecological consciousness is studies by Chawla (1999), Palmer et al. (1998), Palmer et al. (1999), Ewert, Place, Sibthorp (2005), and Dunlap, Van Liere, Mertig, and Jones (2000). Subjects of these studies either indicated that these negative experiences inspired them to become environmental educators (Palmer et al. 1998, 1999), become environmental

activists (Chawla, 1999), recognize the threat of ecological catastrophes (Dunlap et al., 2000), or simply to want to protect natural areas (Ewert et al., 2005). Dunlap et al. (2000) also found in their literature review that a previous longitudinal study using the NEP in Kentucky found an increase in NEP scores from 1984 to 1988, only in counties which experienced water use restrictions due to a drought prior to the second study.

Economic Concern

The other opinion item that may be an influence of ecological consciousness is economic concern in comparison with ecological environmental concern. Leopold (1966) has a section in A Sand County Almanac called "substitutes for a land ethic" referring to just this. He estimates that five percent or less of Wisconsin native species can be sold for profit. He then discusses his disappointment that concern for native species, at the time, often had to be justified economically to be taken seriously. Not only is it presumptuous to assume that ecosystems will function without the uneconomic biotic members (Leopold, 1966), but it far from ecologically conscious.

Haight (2007) criticized the current Production and Possibilities Curve (PPC), which is a standard diagram that illustrates the production possibilities of an economy. Haight's research and article was conducted in order to find a more inclusive diagram when looking at a country's PPC. Haight defines economics as "the study of the allocation of scarce resources among competing uses to satisfy unlimited wants." He states the problem to be the PPC diagram is the standard diagram for economics, but it treats "nonproductive" resources which aren't contributing to the Gross Domestic Product (GDP), as waste. This means that when ecosystems are cleared and turned over

for things like agriculture, or development, the PPC curve shows a positive improvement because there was an increase in production and possibilities of production for the GDP.

His literature review found there to be “real value” in “ecosystem services” (Haight, 2007). For example, ecosystems can absorb water for flood prevention, control erosion, generate oxygen, store carbon, regenerate aquifers, nurture wildlife, and maintain biodiversity (Haight, 2007, p. 225). There is also the scenic value which may increase property values, and at the very least brings income to communities through official or unofficial “ecotourism”. Land “in idle” is of value; ecosystems must regenerate. Increased consumption and pressure on ecosystems can lead to a decrease in productivity. Some idle time is essential for the most efficient productivity.

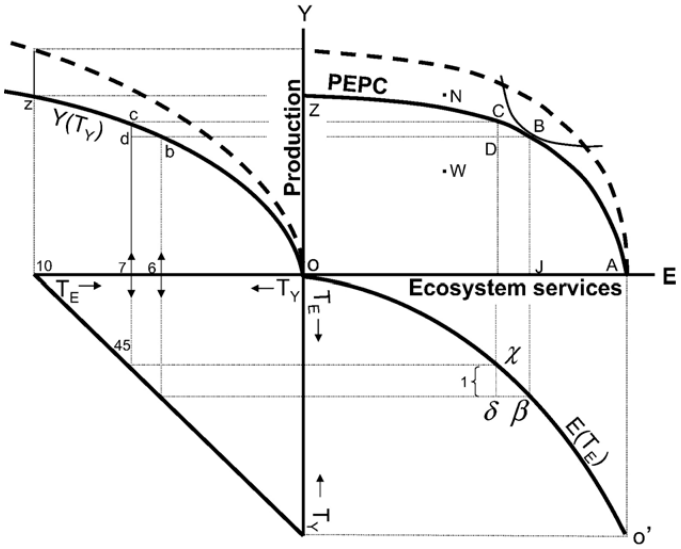


Figure 1. PEPC with Indifference Curve

Haight’s new Production and Ecosystem Possibilities Curve (PEPC) demonstrates this. With Ecosystem services on the x-axis and production on the y-axis, the PEPC curve bows out as shown in Figure 1. This is due to the need for idle time and leisure. Overworking land decreases productivity, therefore resulting in a small amount of

production gain, yet a large amount of ecosystem services loss due to the poor productivity. In Figure 1, the dotted line above the PEPC curve is the "indifference curve", or the "well being" or "happiness" function. The steeper slope represents the community's value of ecosystem services. If the public has a heightened ecological consciousness about the environment, it leads to a choosing less development for an improved environment and a lower GDP. "Small is beautiful" (Haight, 2007).

Although some GDP sacrifice is positive to the community and environmental services, it is still the bowed curve, so going too far in the idealistic direction will lead to a faster drop in production. There must be a balance, and the key is sustainable production. Unsustainable production results in fewer resources which are less able to regenerate. As shown in figure 2,

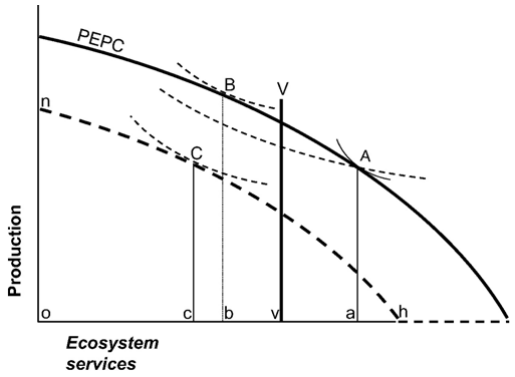


Figure 2. Unsustainable Production

fewer resources lead to less production possible and less environmental services possible, hence the PEPC shifting inward. It is important that countries consider environmental services not only for innate reasons, but as these diagrams also show, maintaining a balance between production and environmental services is necessary to prevent the PEPC from moving inward reducing both production and environmental services.

SUMMARY

These previous research studies lead the researchers of the present study to the question: what are significant influences of ecological consciousness amongst local college students? Are childhood experiences such as outdoor activities during childhood or environmental education during childhood significant influences? Are adulthood experiences such as appreciative, consumptive, and mechanic outdoor recreation significant influences? Also, are personal opinions such as development concern and economic concern significant influences of ecological consciousness. The previous studies found these influences to have an influential relationship with ecological consciousness, so it is recommended to re-examine these relationships with a different sample. The economic concern and ecological consciousness relationship is in the greatest need of further research. Second, further research regarding the influence of environmental education experiences on ecological consciousness is needed due to the inconsistencies in previous studies. Also, further examining development concern appears to be an important influence worth further investigation, according to the literature review. Support of the previous studies and further understanding of influences of ecological consciousness may provide valuable insight to recreation professionals, natural resource managers, and environmental educators.

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