

Environmental Sensitivity among Wisconsin High School Students

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SUMMARY A two-phase study was conducted to assess influences on environmental sensitivity (ES) in Wisconsin high school students. Phase I employed a focus group methodology; phase II employed a paper survey. Three categories of influences emerged from phase I: environmental, role model, and personality. Other results were consistent between both study phases. The influence most frequently cited by students as most important was time spent outdoors. The second most frequently mentioned influence was male teachers. The most frequently mentioned trait of role models was that they were 'friendly/personable'. A profile of environmentally sensitive high school students was developed.

Introduction

A key goal of environmental education is environmental literacy (EL), which consists of cognitive and affective attributes that lead individuals toward environmentally responsible behaviors. Indicators of EL include knowledge and concern about the environment, perception of ability to bring about change, and citizen action skills and experience. Environmental sensitivity (ES) is another variable that appears to be an important precursor to EL (Hungerford *et al.*, 1980; Marcinkowski, 1987; Sia *et al.*, 1985–1986; Sivek & Hungerford, 1989–1990). Environmental sensitivity is 'an empathetic or understanding view of the environment', and is characterized by the individual who 'refuses to litter highways and natural areas ... conserves natural resources ... works to preserve ecologically important natural areas ... strives for a stable and appropriate human population level ... respects hunting and fishing laws ... insists on rational zoning requirements ... etc.' (Hungerford *et al.*, 1992). As a precursor to EL, it is important for educators to better understand ES and to facilitate its development in learners.

There is a paucity of research on ES. Two of the earliest and most often cited studies in the area—Peterson (1982) and Tanner (1980)—involved interviews of

professional environmental educators and officers of conservation organizations, respectively. These studies began to define ES and open it up to additional research. Since Peterson and Tanner's studies, a number of other ES-related studies have been conducted (e.g. Chawla, 1998a; Palmer, 1993; Palmer *et al.*, 1998). Few if any of these studies, however, involved respondents younger than college age. Given that one's adult level of ES appears to be reached during the teen years (Peterson, 1982), it seems prudent to assess a sample from this population.

Though a number of studies have addressed ES, relatively few (e.g. Hungerford *et al.*, 1980; Marcinkowski, 1987; Peterson, 1982; Sia *et al.*, 1985–1986; Sivek & Hungerford, 1989–1990) have used the term exactly. Many, as Chawla (1998a) pointed out have used other terms that may not necessarily equate to ES. Peterson and Hungerford (1981), appear to be the first to use the term environmental sensitivity in published research. Their study sought to identify those variables 'which are perceived by professional environmental educators as being of prime importance in developing their own environmental sensitivity' (p. 111). They conducted interviews of 22 North American environmental educators. Their conclusions were that: major ES-related factors were of a long-term nature, outdoor experiences were important, frequent visits to 'natural areas' were important, role models were instrumental, and familial sensitivity was also important. Later in the 1980s, under the direction of Harold Hungerford and Audrey Tomera, several dissertation studies were conducted that sought to identify predictors of responsible environmental behavior (Marcinkowski, 1987; Sia *et al.*, 1985–1986; Sivek & Hungerford, 1989–1990). In each study, ES was found to be an important precursor to responsible environmental behavior.

Nearly concurrent with Peterson's (1982) study, Tanner (1980) conducted a study in which he sought to identify 'significant life experiences' (SLE) leading to conservation work among leaders of several North American environmental organizations. Results were similar to Peterson's assessment of ES. That is, outdoor experiences and role models tended to be the most important influences cited by respondents.

Palmer (1993) conducted a study on the development of concern and of formative experiences of educators in the UK. As with the Peterson and Tanner studies, time spent outdoors as a youth was cited most often as an important influence. A recent study (Palmer *et al.*, 1998a) of ES among adults in nine countries also supported the importance of outdoor experiences and role models. With a sample size of 1259, Palmer *et al.* grouped influences on 'environmental awareness'. 'Experiences of nature' was the most frequently mentioned influence (by over 50%). Three categories were also mentioned by 38–40% of respondents: people, education, and negative influences. The categories of work and media were mentioned by about 30% of respondents.

In summary, the influence of outdoor experiences has consistently shown up as the most important influence (or SLE) on adult ES (or environmental awareness) in studies published over the past 20 years. Role models also have been consistently mentioned as an important influence. Other variables (e.g. negative experiences, media) also appear consistently, but with varying degrees of importance placed on them. Also consistent in the research published to date is an emphasis on adult populations. Gough (1999) stresses the need for studies of ES in youth, stating that 'working with young people who have chosen to be

environmental activists/educators is much more meaningful for replicability of the experiences than working with old people'. Another element largely missing from studies to date is examination of the 'internal environment of the child who receptively responds to these places and people', that is 'the characteristics of the person who ultimately gives external events their significance' (Chawla, 1998b). The current two-part study sampled a youthful population and to some extent examined the child's internal environment. In doing so, it has addressed some of the gaps in ES literature.

For additional analysis of ES in the research literature, see Chawla (1998b), and the special issues of *Environmental Education Research* devoting large portions to ES and SLE research (Volume 4, Number 4; Volume 5, Number 2; and Volume 5, Number 4).

Based on the review of literature, the author undertook a two-phase study to expand understanding of ES in high school aged students in Wisconsin. Phase I was a qualitative study, using focus group methodology. Phase II employed a pencil-and-paper survey based on findings of phase I. Environmental sensitivity in this study was defined as 'having empathy for or relating to other living things or ecosystems'. This definition was adapted from Hungerford *et al.* (1992) to be more clearly understood by high school students.

Phase I—Method

Since youthful populations had not been studied in prior ES research, a qualitative methodology was deemed most appropriate for the first phase of this study. A focus group design was chosen after examining several qualitative methods. Advantages of the focus group design include: allowance for the moderator to probe, high face validity, rapid results, and allowance for a larger sample size than some qualitative methods (Krueger, 1994). The focus group design also was especially appropriate for the sample population identified for research—150 students preregistered for a 1-day, high school environmental action conference in central Wisconsin. This population allowed the researcher to create four focus groups, with no two students in any group from the same school. It was believed that students' responses in mixed-school groups would be less influenced by others than if grouped with peers from their own school.

Questions for the focus group interviews were developed using a methodology described by Krueger (1994). Krueger suggested that an opening question be one that introduces the general topic, is factually based, and focused on common traits. Next, an introductory question further focuses the topic and allows participants to reflect on past experiences or connections with the overall topic. Next come transition questions. These move the conversation into key questions. Key questions follow. These focus squarely on the topic of interest. Krueger then suggests three types of ending questions, the first being an 'All things considered ...' question where participants state their final position on the topic. The second ending question starts with the interviewer summarizing the interview, then asking, 'Is this an adequate summary?' The final ending question is 'Have we missed anything?' Table 1 shows the questions asked in this study.

Prior to the focus group interviews, five graduate students were recruited to assist in the interviews—four females and one male. All five graduate students were individually introduced to the study and its methods, assigned readings

TABLE 1. Focus group questions

Opening question: 'One action I've recently taken to improve environmental quality is ...'
Introductory question: 'How active and concerned do you think most students at your high school are about the environment?'
Transition question: 'What experiences have you had that contributed to your feeling of concern or sensitivity/empathy toward the environment?'
Key questions:
'How did the place you grew up in influence your environmental sensitivity?'
'What people have influenced your sensitivity toward the environment? (What about these people influenced you?)'
'In what ways has the media influenced your sensitivity toward the environment?'
'Think for a moment about your personality. How does your personality relate to your sensitivity toward the environment?'
'How have negative events or experiences influenced your sensitivity toward the environment?'
Ending questions:
'All things considered, what do you believe has been the most important influence on your environmental sensitivity?'
'In summary, you've suggested that [summary of key ideas]. Is this an adequate summary?'
'Have we missed anything?'

relevant to conducting focus groups, and attended a training session where they were given specific procedures for running a focus group (see Krueger, 1994; especially Appendices 6A and B). The researcher also gave out and explained each of the interview questions and distributed tape recorders. The two female interviewers had the assistance of a female assistant whose role was to take notes and operate the recording equipment. Since only one male graduate assistant was available, he and the principal researcher were to rely on their own notes and taped transcription. Female interviewers were assigned to interview female students, while the male interviewers were assigned to interview male students. It was believed that respondents might be more open to share gender-sensitive information with a same-gender interviewer.

The focus group interviews were conducted 20 November 1997 on the University of Wisconsin—Stevens Point campus. Participants in the focus groups had been nominated by teachers, who were asked to identify students believed to be highly environmentally sensitive. Students willing to be interviewed were told by their teachers that they would receive a waiver of the conference registration fee and a conference t-shirt. Students from nine central and west-central Wisconsin high schools were nominated. From these, four focus groups were created, consisting of two groups of six females and two groups of four males. No more than two students of either gender were accepted from any school to insure anonymity within focus groups. Focus group students were greeted as they registered for the environmental conference and taken by the interviewers to one of four conference rooms for the interviews. Respondents were asked to sign a consent form and to complete a demographics sheet that also defined ES for them. Interviewers then began the questioning. All interviews were completed in 45 min or less.

TABLE 2. Demographics

Gender: Males = 8	Females = 12
Size of home town:	Rural area = 9 Small town up to 10,000 population = 7 Large town of 10,001–50,000 = 4
Year in high school:	Junior/11th grade = 6 Senior/12th grade = 14
Age:	16 = 3 17 = 14 18 = 3
Average self-perceived level of environmental sensitivity = 7.47 ^a (SD = 1.3533)	

^a1 = lowest/least; 10 = highest/most.

Students participating in the interviews were typical of the students attending the environmental conference. All were from cities of 50,000 or less, or rural areas (see Table 2). Most were accompanied by a teacher educated in and highly involved with environmental education (EE). Five of these teachers had an MS degree in EE, two were working on an MS in EE, and one was a long-term environmental educator active in Wisconsin statewide EE.

Data from the interviews consisted of a set of taped transcripts and notes. These were initially open-coded (Strauss & Corbin, 1990) using the interview questions as organizers. Concurrently, data were inspected for phrases or terms, which indicated other concepts (e.g. 'contrasting experiences'). After initial coding, the categories were compared to determine if categories could be grouped under broader, more inclusive concepts.

The methodology for phase II of the study is described at the end of the next section.

Limitations

There are several limitations to the study, given the sampling method (i.e. a sample of convenience) and the self-reporting method of data collection.

1. Results are generalizable only to the population sampled.
2. Environmental sensitivity score was one self-reported item. Peterson (1982) ascribed some degree of validity to this means of assessing ES in that such an item was able to discriminate between the ES of professional environmental educators and that of preservice elementary teachers.
3. Data were self-reported by subjects.

Phase I—Results

Coding resulted in three broad, conceptual categories: environmental influences, role model influences, and personality influences. Environmental influences were defined as external influences other than role models. Role model influences were defined as any person having an influence on ES. Personality influences were defined as internal psychosocial factors. Each of these categories subsumed a number of subcategories. Subcategories were analyzed for the

TABLE 3. Categories and subcategories of influences on environmental sensitivity

ROLE MODEL INFLUENCES
Most important role models
Teacher or their environmental club advisor
Parents
Relatives
Friends
Others (e.g. actors, politicians)
Important characteristics of role models
Knowledgeable
Open-minded
Active/involved in environmental matters
 ENVIRONMENTAL INFLUENCES
Accessibility to or frequency of visits to outdoor areas
Opportunities for <i>in-depth</i> learning and/or involvement
Freedom of choice and/or thought
Experiences with animals
 PERSONALITY INFLUENCES
Locus of control
Interpersonal communication style
Future orientation
Independence of thought

various properties they might hold (e.g. a property of 'contact with animals' was whether the contact was positive or negative). Properties were then examined for dimensionality or degree (e.g. a dimension of a positive experience with animals was how positive the experience was). For the most part, dimensionality was difficult to determine and played a minor role in analysis. Table 3 illustrates the categories and subcategories that emerged from the interviews.

A description of the categories and subcategories of influences resulting from the above coding process follows. Categories and subcategories are described in descending order of frequency of mention as 'most important influence on environmental sensitivity'.

Role Model Influences

Students' responses fell into five subcategories when asked which role models most influenced their ES. The greatest number of students (15 of 20) said that a teacher or their environmental club advisor was important. Nine of 20 said that one or both of their parents were important. Six said other relatives; five said friends; and four said an actor/movie (e.g. Sean Connery in *Medicine Man*), a politician (whom the student helped campaign), or some other famous person.

Students were also asked what it was about the role models that influenced them. Responses fell into four subcategories. The first subcategory was 'knowledgeable'—'I admired how [my dad and uncle] were so knowledgeable with the environment', and 'Teachers [were the ones] who provided knowledge.'

The second subcategory describing role models was 'open-minded', with responses such as 'What I liked about him was he was really open-minded and taught me to do the same.'

The third subcategory describing role models was that they were active or involved. Typical responses were 'He follows through' and 'He goes out and does what he believes in.'

The fourth subcategory was 'friendly/accessible', with student responses such as 'We always sit down and talk about current issues that [are] facing us', and '[He's] a good friend. [We] hike together.'

Environmental Influences

The first subcategory to emerge under environmental influences was accessibility to or frequency of visits to outdoor areas. Some students said they lived where they had easy access to the outdoors—'[I] could go outside every day' and 'I grew up and still live in a woodland environment. Our house is ... way back in the woods.' Eight of 12 girls and 6 of 8 boys mentioned this subcategory.

The second subcategory of environmental influences was opportunities for in-depth learning and/or involvement. All 12 girls and 4 of 8 boys mentioned this factor, 'We're creating habitat for Karner blue butterfly [*sic*], which is an endangered species' and 'I got to volunteer on a campaign a couple years ago for state assembly.' It was impossible to ascertain from the responses if ES preceded or followed these opportunities. Likely these experiences sometimes preceded and strengthened ES, while at other times ES may have fostered a desire to participate.

A subcategory mentioned frequently in ES research, negative experiences, also emerged from the focus group interviews as an important influence. Students mentioned a great variety of negative influences including: the Exxon Valdez oil spill, littering/waste, sprawl/loss of a cherished 'natural' area, cutting of rainforests, harming/killing animals, air or water pollution, and the Crandon mine (a proposed copper/zinc mine in northern Wisconsin). Four of 20 students mentioned the Exxon oil spill, a distant event that occurred when the students were between 8 and 10 years old: 'I think the biggest negative effect [*sic*] that I've witnessed is the Exxon oil spill.' The cutting of rainforests, also a distant event, accounted for four responses.

The pervasiveness of electronic media prompted the researcher to ask about its influence on students. Responses varied greatly, with some students saying it was a major influence, e.g. 'It influenced me greatly, like a stab in the heart when [I] see disastrous things that have happened to the environment.' Conversely, four students said the media had little or no influence on their ES, e.g. '[I'm] not sure media has influenced [me]' and 'Not sure. It doesn't really have an impact.' On the whole, media appeared to have a relatively small influence on ES. No students mentioned media in response to any open-ended questions.

Freedom of choice and/or thought was another subcategory under environmental influences, though only three students mentioned it. However, it appeared to figure strongly in influencing these students. '[I'm] always out there [in the woods]', 'Freedom of the farm—walk or "four-wheel" whenever I want ... wish everybody had the opportunity', and 'Could go outside every day.'

The last subcategory under environmental factors was experiences with animals. Six of 12 females and 7 of 8 males mentioned animals. Some mentions were positive, while many were negative. Negative responses included those related to observing maimed animals at a rehabilitation center and unethical hunters, e.g. '... disapprove of [my cousin] because he shoots anything ...'

Personality Influences

Several subcategories were grouped under the personality category. Over half the students mentioned experiences related to the subcategory, locus of control. Experiences listed under this subcategory were those that the literature has suggested are related to locus of control, i.e. having an in-depth understanding of issues, a feeling that action on issues is needed, and knowledge and skills regarding citizen action (Hungerford *et al.*, 1992).

A second subcategory under personality was interpersonal communication style. Seven of 12 females and 5 of 8 males mentioned that they were assertive, talkative and/or outgoing, as opposed to 2 females who considered themselves reserved. 'I'm assertive so if [I] see something, [I] won't just look over it', and '... opinionated, want to try to influence people'.

Four of 12 females and 6 of 8 males displayed a future orientation, another subcategory. Some said outright 'I'm future oriented', while others displayed it in statements such as 'Caring that children have a good place to grow up' and 'Watching the tropical rainforest being cut down [got me] thinking "keep up with this, [and] 50 years from now there won't be anything left".'

A final subcategory under personality, which was mentioned by four students, was independence of thought, e.g. 'I like to be an independent thinker. I like to make up my own mind on certain issues.' Independence of thought was also a trait attributed to role models by some students (see role models category below).

Most Important Influences

When asked what was the most important influence on their ES, students' responses were almost evenly split between two subcategories. Four students mentioned two or more most important influences. Most important influences are summarized in Table 4.

Nine students said accessibility to or frequency of visits to outdoor areas was the most important influence. Five of these experiences were school-related field trips. Four of these experiences were related to where the students lived or 'grew up'.

The other large groups of responses fell into the subcategory of role models. Eight of 20 students said a role model was the most important influence. Among role models, school-related role models were most often mentioned. Two said a teacher or club advisor was most important, while one said people in their environmental club. Four students mentioned parents or family as the most important ES influence. One said relatives and one said the Boy Scouts.

Three of the four remaining most important influences fell into the subcategory of school. These students responded 'school', the 'environmental group at school', or 'education'. Due to the ambiguity of these responses, it was difficult

TABLE 4. Most important influences on environmental sensitivity^a

ACCESSIBILITY TO/FREQUENCY OF VISITS TO OUTDOOR AREAS
School related
Home/family related
ROLE MODELS
School related
Teacher/club advisor
People in environmental club
Parents
Relatives
Boy Scouts
SCHOOL (imprecisely described)
'Education', 'school'

^aIn descending order of frequency of mention.

to tell whether these influences were teachers or students, or whether they were school-related experiences.

One student's response to this question was extremely ambiguous and impossible to categorize.

Phase II—Method

A pencil-and-paper survey was developed, based on the results of phase I. The first section of the survey collected demographic data and had students identify their own perceived level of ES. The second section requested information regarding role models and their traits. The third section requested information regarding outdoor experiences; while the fourth section gathered information regarding environmental issues. The fifth section gathered information on personality and 'other experiences', and the sixth section gathered information on media influences. The seventh and final section had students rank order a list of eight influences on ES.

The survey instrument was shared with a panel of four professors of environmental education and with subsequent revisions was determined to have content validity. Guttman split-half reliability of the instrument was calculated at 0.6624; Cronbach's alpha was 0.6944 (SPSS, 1999). Surveys were then mailed to all teachers/advisors in the 13 schools preregistered for the 1998 Wisconsin High School Environmental Action Conference. One hundred and fifty surveys were sent out. Teachers brought the completed surveys to the conference. Sixty-four students from nine schools completed the survey, for a response rate of 43%.

Respondents included 38 females, 25 males, and one who did not identify gender. Thirty-four percent were 17 years old, with an equal percentage 18 year olds. Twenty-two percent were 16 and 9% were 15. Half of the students were seniors, 30% were sophomores, 17% juniors, and 2% freshmen. When asked if they'd taken at least one environmental course, 80% responded affirmatively. Sixty percent of the students belonged to a school environmental club.

Data from the survey were analyzed using SPSS (1999).

TABLE 5. Students' rating of importance of role models, $n = 64$

Role model	Mean rating of importance ^a	Standard deviation
Male teacher	3.39	1.16
Father	3.00	1.28
Mother	2.98	1.19
Male friend	2.73	1.16
Male relative	2.55	1.18
Female friend	2.50	1.10
Unrelated male adult	2.45	1.25
Female relative	2.31	1.10
Female teacher	2.31	1.17
Unrelated female adult	2.20	1.21

^a5 = critical/extremely important; 4 = very important; 3 = moderately important; 2 = somewhat important; 1 = not at all important.

Phase II—Results

Role Model Influences

The influence of role models was first assessed using Likert-type items. The first question addressed the importance of various role models in influencing students' ES. Mean scores are reported in Table 5. Among the role models identified, male teachers were reported as being the most influential role models (mean = 3.39). Fathers (mean = 3.00) and mothers (mean = 2.98) were also rated as being 'moderately important' influences.

When the students were asked to rank order the listed role models, male teachers were again ranked as the most important influence (see Table 6). Nearly 44% of the students who responded to this question ranked male teachers as most important. Parents and other relatives accounted for another 42% of role models ranked as most important. Only seven students (13.7%) ranked unrelated people other than male teachers as most important role model influence.

The last aspect of role models that was examined was traits that students in the focus groups suggested were descriptive of their role models. Seven vari-

TABLE 6. Students' rank ordering of most important role model, $n = 48$

Role model	Ranking ^a	Percent of students ranking most important	Weighted ranking ^b
Male teacher	1	43.8	1
Mother or stepmother	2	12.5	3
Father or stepfather	2	12.5	2
Other female relative	2	12.5	8
Other male relative	5	4.2	5
Unrelated female adult	5	4.2	10
Male friend	5	4.2	4
Female teacher	8	2.1	8
Unrelated male adult	8	2.1	7
Female friend	8	2.1	6

^aWhen only the number one ranked role model is considered.

^bWhen all ranked role models are considered.

TABLE 7. Extent to which traits describe most important role model

Trait	Mean ^a	Standard deviation
Friendly/personable	4.30	0.94
Knowledgeable about the environment	4.19	1.10
Passionate about the outdoors	3.97	1.14
'Lets me make up my own mind on environmental matters'	3.91	1.00
Open-minded	3.83	1.06
Active in environmental problem solving	3.70	1.2
Tells me what's right or wrong	3.64	1.21

^a1 = does not describe the role model; 5 = describes the role model extremely well.

ables were measured using Likert-type items to assess how well the trait described their most important role model (which was male teachers for 43.8% of the students). These traits and the extent to which they describe the most important role model are shown in Table 7. All the listed variables were perceived as describing the role model 'very well'.

Environmental Influences

Environmental influences, as used here, include outdoor experiences and other external influences other than role models. Environmental influences were assessed using Likert-type items. Spending time outdoors was the environmental influence perceived as most important by students. Ninety-five percent of the students strongly agreed or agreed that this was an important influence on ES (mean = 4.44). Sixty-seven percent of the students strongly agreed or agreed that the time they spent outdoors was usually spent alone or with a few friends (mean = 3.70). Ninety-six percent of the students strongly agreed or agreed that they had ready access to the outdoors (mean = 4.23).

Work or volunteer experience with animals (mean = 2.81) and having wild animals as pets (mean = 2.77) were both perceived as moderate influences on ES.

Books and other print media were perceived as moderate influences on ES. Magazines were rated most highly (mean = 3.52), followed by textbooks (mean = 3.38), nature identification books or field guides (mean = 3.31), and fiction and nonfiction books (both having means of 3.08).

Finally, 78% of the students said that seeing bad things happen to the environment has influenced their ES.

Personality Influences

Students tended to describe themselves as outgoing (mean = 3.94). Seventy percent of the respondents agreed or strongly agreed that they were outgoing. Only 6% disagreed or strongly disagreed, and 23% neither agreed nor disagreed. Students also agreed that they were independent thinkers (mean = 3.64) and that

TABLE 8. Students ranking of most important influences on environmental sensitivity^a

Influence	Rank	Mean	Median	Mode	Std dev.	Weighted rank
Time spent outdoors	1	2.30	2	1	1.81	1
Role model(s)	2	3.32	3	1	2.04	2
Personality	3	4.32	4	3	2.05	3
Experience working with animals	4	4.41	4	4	2.46	4
Feeling that I can bring about change	5	5.19	6	6	2.04	5
Media (books, magazines, TV, newspapers)	6	5.32	6	8	2.14	6
Freedom to make my own choices	7	5.50	6	7	1.84	7
Negative experiences	8	5.60	6	8	2.05	7
Other ($n = 4$)	–	5.20	4	4	2.17	–

^a1 = most important influence; 9 = least important influence.

they usually consider the long-term consequences of environmental issues and actions (mean = 3.65).

Ranking of Most Important Influences

The final portion of the instrument asked students to rank order the most important influences on their ES (see Table 8). Time spent outdoors ranked as the most important influence on environmental, followed by role models. Personality was ranked as the third most important influence, closely followed by experience working with animals. (The remaining four variables all ranked fifth or lower using any of the three measures of central tendency.) Negative experiences were ranked as the least important influence. Correlations between the most important influences are shown in Table 9.

Discussion

This study supports some of the earlier research in this arena. In particular, it appears that Wisconsin high school students in this population with a high level of ES are influenced by the same factors that Peterson and Hungerford (1981) and Tanner (1980) identified nearly 20 years ago. In other words, influences of the outdoors and of role models are as important today as they were then. However, it appears the relative importance of specific influences may be different than in the earlier studies. Further, the current study offers new insights relative to characteristics of role models and of the influence of media on youth ES.

In earlier studies, influence of the outdoors was the major influence on respondents' level of ES. Phase I of the current study, however, noted that role models were mentioned about as often as the outdoors as the most important influence on ES. Respondents also mentioned teachers and school-related role models more often than parents or other familial role models, in contrast to earlier studies. It's important to note again that students in this study were a

TABLE 9. Correlations between influences on environmental sensitivity

Influence	Personality	Experience working with animals	Negatives experiences	Time spent outdoors	Role model(s)	Feeling that I can bring about change	Freedom to make my own choices
Personality	1.00	–					
Experience working with animals	– 0.05 $p = 0.70$	1.00					
Negative experiences	– 0.09 $p = 0.52$	– 0.03 $p = 0.84$	1.00				
Time spent outdoors	– 0.32 ^a $p = 0.02$	0.17 $p = 0.22$	– 0.03 0.85	1.00			
Role model(s)	– 0.33 ^a $p = 0.02$	– 0.19 $p = 0.15$	– 0.29 ^a $p = 0.03$	– 0.11 $p = 0.42$	1.00		
Feeling that I can bring about change	0.10 $p = 0.48$	– 0.40 ^a $p = 0.00$	0.09 0.54	– 0.30 ^a $p = 0.03$	– 0.11 $p = 0.43$	1.00	
Freedom to make my own choices	– 0.05 $p = 0.70$	– 0.34 ^a $p = 0.01$	– 0.32 ^a 0.02	– 0.08 $p = 0.56$	– 0.16 $p = 0.25$	0.16 $p = 0.25$	1.00

^aStatistically significant at 0.05 level of probability (two-tailed).

very select group. All were attending a high school environmental action conference, most with a teacher highly trained in EE. Thus, while the sample is biased in this regard, it may be inferred that teachers well trained in EE can have an influence on the development of ES.

A second area that the current study fleshes out is characteristics of important role models. These influences are described in the hypothetical profile of an environmentally sensitive Wisconsin high school student described below.

A third area not discussed in early studies regards the influence of media, though it appears as an important category of influence in a multi-national study of adults by Palmer *et al.* (1999). While some students suggested that media are important, no student mentioned media as the most important influence on ES. Thus, it may be inferred that media are not a major influence on developing ES, but instead serve a smaller, supporting role. It follows then that educators should not rely on media as a major means to develop ES.

Finally, it was noted that one event—the Exxon Valdez oil spill of 1989—appeared to have a profound effect on the ES of four of the students in phase I of the study. Though not a large proportion of the sample, the ES of these teenage students was influenced by this negative event when they were between 8 and 10 years old (i.e. in 3rd through 6th grade). Further research is needed to: (a) determine if there might be an age at which children are particularly receptive to being influenced by negative environmental events; and (b) determine whether such an event most often precedes the development of some level

of ES, or whether some level of ES usually precedes such an event in order for it to further influence ES.

The results of these surveys and interviews indicate the following profile of highly environmentally sensitive Wisconsin high school students in this population. These students grew up where they had ready access to 'natural' areas and/or were given opportunities to visit these areas with an important role model. Teachers and parents tended to be the most important role model influences. Students' most important role models were perceived to be knowledgeable about the environment and active in trying to maintain environmental quality. These role models tended to give their children or students considerable freedom to explore nature. They encouraged in-depth investigation of environmental matters and let students make up their own minds. Finally, the most important role models were often friendly or at least available to talk to about the environment. In summary, environmentally sensitive students themselves tend to be more outgoing than reserved. They have a future orientation. They consider themselves independent thinkers and have experiences that point toward development of an internal locus of control.

Implications

Additional research is needed to describe the phenomenon of ES. Larger and more random samples of students should be surveyed about the extent to which the profile proposed above describes them. Neither urban students nor non-white students (with two exceptions) were assessed in this study. Further research is needed to more exactly show the ages at which various influences take effect. Effects of gender and socio-economic status should also be studied, for which more stratified samples would be needed. Differences between influences on male and females regarding ES influences should be investigated. Nabhan and Trimble's work (1994; see chapter entitled 'A Land of One's Own') makes a logical, albeit not empirical, case for this assertion. Both qualitative and quantitative studies are needed to further describe characteristics of environmentally sensitive individuals. Techniques such as multiple regression analysis may be helpful in refining variables related to ES and determining the extent to which they are predictive of ES.

Conclusion

Results of this study suggest that high school teachers and programs can provide experiences and serve as role models for developing ES, which raises the following concerns: first, as wild and natural areas continue to become inaccessible to school groups or even disappear, role models have fewer opportunities to offer students. Wisconsin wetlands, for example, disappeared at a rate of 1200 acres per year between 1982 and 1991 (Wisconsin Department of Natural Resources, 2001). Wisconsin's population has also become more urbanized; it was 65.7% urban in 1990 compared with 57.9% in 1950. Population density during the same period rose from 62.7 to 90.1 persons per square mile (Wisconsin Legislative Reference Bureau, 1999).

Second, too little is known about the effects of such natural areas, especially those operated by schools. Finally, it seems that ES accompanies environmental

action, but other variables may be more significant factors, including perceived knowledge of and perceived skill in using environmental action strategies. Since these variables seem more developmentally appropriate for middle and high school curricula (Engleson & Yockers, 1994), it may well be that more responsibility for facilitating the development of ES must fall to teachers, parents and other role models of *younger* students.

Notes on Contributor

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