CHILDREN'S CONCERN FOR THE NATURAL ENVIRONMENT

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ABSTRACT

Children's concern for the natural world is placed in the context of surveys of adult environmental knowledge and concern. Recent surveys of children's environmental dispositions and their knowledge and attitudes regarding animals and vegetation are reviewed and integrated with the results of surveys conducted in the 1970s. Drawing upon social learning theory and psychoanalytic theory, explanations of the patterns found are suggested.

INTRODUCTION

In addition to his many professional accomplishments, Joachim Wohlwill gave his support to the Sierra Club. With Amnesty International, it was the organization that he asked that friends contribute to in his memory in the event of death. In keeping with his personal commitment to environmental protection, in 1980, when he co-edited a theme issue on environmental psychology for the West-German *Journal of Environmental Policy*, he asked Roger Hart to review theories relevant to the development of children's concern for the natural world. As a graduate student, this author became involved in this project. At Wohlwill's prompting, the article that resulted, "The Development of Children's Concern for the Environment" (Hart & Chawla, 1981; reprinted in abridged form in Chawla & Hart, 1988), may be said to have initiated the formal study of this subject within environmental psychology. Just before his death, in his 1987 review chapter on "The Physical Environment and the Development of the Child" that he co-authored with Harry Heft (Wohlwill & Heft, 1987), Wohlwill noted the work that had been done; but he urged psychologists to give more attention to the origins and developmental history of people's attraction to nature.

The present article will update the work begun in 1980 by placing children's development within the context of surveys of adult concern and by reviewing some major surveys of children published since that time. It will also discuss recent attempts to reconceptualize the origins of basic environmental dispositions within psychoanalytic theory.

In approaching this topic, a first critical issue is how concern is to be defined and measured. As Murch (1974) noted, early research quickly dispelled any illusion that there might be a direct correspondence between awareness of an environmental problem and concern about it, or that passive concern (protective feelings for nature) necessarily manifests itself as active concern (attempts to improve the situation). Acknowledging that awareness, feeling, and action are tenuously related, this review will give only brief attention to children's knowledge of ecological processes and to their environmental behavior. It will focus upon feelings for the natural world, drawing primarily upon surveys of children's attitudes and preferences.

In the case of children, the relationship between feeling and action is especially problematic. Since the environmental movement of the 1970s, there have been extensive surveys of environmental concern among adults; but for the most part they have relied upon issues and actions which have little relevance to children's lives, such as whether people are prepared to go to the trouble of recycling or buying non-polluting products, or whether they support pro-environment measures in local and national politics. Children, however, are not voters and they are limited consumers. In view of this discrepancy, two major questions have yet to be confronted. What are the most valid indicators of children's environmental feelings and behaviors at different ages? And how do these indicators relate to adult expressions of concern?

If the development of environmental concern is interpreted as development toward the end point of informed consumerism and political action, then some might argue that the degree to which children endorse these behaviors is an appropriate measure—assuming that endorsement in childhood predicts consistent action in adulthood. It is possible, however, that issues such as pollution or overpopulation may not be salient to children, but they may still have strong feelings on other issues. A friend of this author, for example, who grew up in a rapidly expanding Seattle suburb, recalls setting up a crude sign that read, "Please don't take this field! This is where we play." Because the protection of natural play sites is not a standard survey item, this dimension of concern would normally go undetected. In the absence of phenomenological measures of issues which spontaneously motivate children's concerns, most of the research reported below will describe the extent to which children share the attitudes and behaviors that environmentalists have deemed most important in adulthood.

The development of environmental dispositions has been approached from three primary perspectives: survey research, social learning theory, and psychoanalytic theory. The first approach has gathered information on demographic and personal correlates of expressions of concern.

Although this paper is one author's work, it would not have been written without the interest and support of Roger Hart, who has encouraged this author's continuing involvement in this topic. Readers of Hart and Chawla's 1981 article on "The Development of Children's Concern for the Environment" will recognize that this paper picks up where this earlier collaborative effort left off. It has also benefited from Dr. Hart's careful reading of an earlier draft.

The second and third have proposed how different dispositions may be explained. This review will take up each of these areas in turn, with particular attention to common threads among them.

Before proceeding to the following summary of surveys, it should be noted that there are different bases for environmental concern: fears for self-preservation; responsibility for the welfare of present and future generations; and a sense of the intrinsic worth of the natural world itself. Because survey questions tend to tap all three sources of concern indiscriminately, attempts to distinguish them will be postponed until later in this paper.

CORRELATES OF ENVIRONMENTAL CONCERN

During the environmental movement in the 1970s, surveys proliferated to monitor adults' knowledge, attitudes, and actions regarding a host of environmental issues. This body of work has established parameters within which children's expressions of concern should be considered. Therefore some of its principle findings will be briefly summarized here.

In a review of studies conducted in the 1970s, Van Liere and Dunlap (1980) found a few consistent patterns: a negative association between expressions of concern and age, and positive associations with education and political liberalism. They found inconsistent relationships between concern and social class or place of residence. To explain college students' and young adults' greater support for environmental reform than older adults, they drew upon the argument of Malkis and Grasmick (1977) and Hornback (1974) that the young are more receptive to change because they are less integrated into the established economic system and social order, and upon Mannheim's (1952) theory of generations that salient historical events may affect a cohort for the duration of its existence. Van Liere and Dunlap suggested that information on environmental deterioration in public media and environmental education may have created more ecology-minded recent generations.

In an effort to test the preceding theories regarding age effects, Honnold (1984) submitted national survey responses regarding support for environmental spending, taken over a seven year span, to an aging-cohort-period analysis. Although she found some evidence that environmental fervor tends to decline with age, the strongest effect appeared to be the period effect that environmental support generally declined as the nation as a whole moved toward greater political conservatism. Considering that both adults (Murch, 1971) and children (Alaimo & Doran, 1980; Melton, 1976; Richmond & Morgan, 1977) have listed public media as a major source of environmental information, it appears prudent to evaluate children's levels of concern against the backdrop of the changing climate of public feeling.

Borden and colleagues have drawn attention to a number of significant correlates of concern. According to Borden (1984/85), attitudes to the environment must be considered in relation to attitudes to technology. Comparing semantic differential scores of college students who had reported low, moderate, and high degrees of environmentally committed behavior, he found that the best predictors of action were concern about pollution and attitudes to technology, and that both concern over pollution and corrective action increased as trust in the effectiveness of science and technology declined. Borden has hypothesized that faith in technology operates to diffuse responsibility, much as the presence of other onlookers inhibits helping in interpersonal situations. In this case, responsibility for action is diffused to a generalized other—technology.

Opening another area for research, Borden and Francis (1978) compared undergraduates' personality profiles on the California Psychological Inventory to their scores for environmental concern. Those who showed high levels of concern were more socially mature, responsible, conscientious, and value oriented than those who showed little concern. Feeling more socially effective, they appeared to be ready to devote their energy to larger, less personal matters. The study also revealed an interesting gender difference. Highly concerned females were more extraverted, males more introverted, than their counterparts of the same sex. Borden and Francis speculated that women may find the environmental movement an open forum for their leadership talents, whereas men are able to find recognition in traditional male-dominated organizations. Alternatively, it can be proposed that men who value ecological goals, which are intrinsically cooperative rather than competitive, must distance themselves from normal competitive male affiliations.

Exploring these gender differences more fully, Powell and Borden (1978; cited in Borden, 1985) compared traditionally sex-typed men and women with others who combined masculine and feminine qualities. Traditional men were high in knowledge but low in concern and ecologically responsible action. Traditional women were high in concern but low in knowledge and action. Those who were high in knowledge, concern, and action combined masculine and feminine characteristics.

Accumulated results have supported this pattern of traditional sex-typing. As a rule, men have shown greater knowledge of environmental facts than women (Gifford, Hay, & Boros, 1982/83; Arcury, Scollay, & Johnson, 1987) but women have shown stronger general environmental feeling (Baca, 1976; Gifford et al., 1982/83) and verbal commitment to reform than men (Gifford et al., 1982/83; Borden & Schettino, 1979). Even after controlling for age, education, income, and place of residence, McStay and Dunlap (1983) discovered higher measures of concern in women.

Another important issue is the relationship between environmental knowledge and concern. When Borden and Schettino (1979) focused on this issue, they found virtually no correlation between scores for environmental affect and knowledge in a large sample of undergraduates. When the effects of knowledge and feeling were compared in an analysis of variance design, both knowledge and affect showed a positive influence on actual and verbal commitment to pro-environmental behavior, but these influences appeared to operate additively rather than interactively. The more important determinant of commitment was level of feeling rather than level of knowledge.

How do surveys of children's and young adolescents' environmental knowledge, attitudes, and actions compare with

the preceding results? In some areas, no comparison is possible because no equally systematic body of information exists. For example, no one has attempted to relate personality profiles to environmental responses in this age group—although this is a significant topic to pursue. In other respects, however, this work fits within the larger pattern outlined above; and it also suggests what some major age-related steps in the development of environmental concern may be.

In keeping with the research on age effects, McTeer (1978) found higher levels of concern about environmental problems in teenagers than in adults. When Kellert (1985) compared attitudes to animals among adults and among children aged 7 through 17, a Naturalistic attitude of interest and affection for wildlife and the outdoors was more common among children, a Utilitarian attitude far more typical of adults. When Bunting and Cousins (1985) measured environmental dispositions in a large sample of 9 to 16 year olds, the most highly endorsed orientation was Pastoralism—an attraction for natural settings and open spaces, and the least endorsed was Environmental Adaptation—a belief in humans' unlimited right to dominate nature through technology.

As Van Liere and Dunlap (1980) suggested, these positive attitudes among the younger generation may partially reflect the incorporation of environmental education into the schools. Jaus (1984) found that as little as two hours of direct instruction regarding pollution, recycling, and conservation in third grade resulted in significantly more protective attitudes to nature when the treatment group was compared to a control group in the fifth grade.

Within the context of children's relatively elevated levels of concern, some consistent differences have appeared with respect to age, sex and place of residence. These differences have been examined in two major cross-sectional studies by Bunting and Cousins (1985) and Kellert (1985).

Kellert tested 267 second, fifth, eighth, and eleventh graders in urban and rural Connecticut regarding their knowledge and attitudes toward animals and the history of their contacts with animals. He found three major transitions with age.

The period from second to fifth grade was most significantly characterized by a major increase in emotional concern and affection for animals. The years between fifth and eighth grades witnessed a dramatic improvement in factual knowledge and cognitive understanding of animals. Finally, the change from eighth to eleventh grade was marked most of all by a major expansion in ethical and ecological concern for animals and the natural environment. (p. 29).

Second graders, Kellert noted, "consistently placed the needs of people over animals and expressed minimal concern for the rights of animals" (p. 33). They also expressed the highest level of fear. As information about animals and the natural world increased, these utilitarian, dominionistic, and fearful attitudes declined.

These transitions conform to the theory of cognitive development of Piaget (1960; Inhelder & Piaget, 1958) that preoperational children tend to consider their own perspectives, needs, and desires absolute, and that they only gradually attain a more objective, reciprocal world view as they move through the stage of concrete operations from approximately 6 to 12 years of age. That ethical concern and ecological appreciation increased after age 12 conforms to the stage of formal operations, in which adolescents begin to conceive of an abstract universe of relations. Hart and Chawla (1981; reprinted in Chawla & Hart, 1988) have argued that ecological thinking is especially dependent upon the attainment of abstract thinking because most ecological cycles are too extended in time and space or too microscopic to be directly perceived.

It is to be noted that Kellert found that attraction and respect for wildlife and the natural world increased as fear diminished. This result is not surprising, considering that most young children are more familiar with wild places through stories about witches and wild beasts than through direct experience. When Kaplan (1976) introduced inner city children to a wooded area, they were unable to appreciate its resources until they overcame initial high levels of anxiety. Even in rural Vermont, Hart (1979) found that young children were simultaneously tantalized by the woods and afraid to enter them.

Kellert's findings with respect to age are similar to those of Bunting and Cousins (1985), who measured environmental dispositions in 1,100 fourth, sixth, eighth, and tenth graders. Scores for Pastoralism peaked in sixth grade, but scores for Environmental adaptation generally declined with age. The authors interpreted this growing bias against technological interference with nature to reflect a growing respect for ecosystems.

With respect to sex differences, just as men have shown greater environmental knowledge than women, boys in Kellert's study showed greater factual knowledge about the environment than girls. Girls, on the other hand, were more inclined to oppose the subordination and domination of animals and showed greater affection for "lovable" animals. Bunting and Cousins made the interesting observation that although Pastoralism peaked in sixth grade among both male and female students, boys' scores dropped abruptly after this age, whereas girls' scores remained high. In a study focused upon student attitudes to vegetation by Harvey (1988a), girls' attitudes were consistently more positive than boys'.

These surveys did not examine the relationship between ability and knowledge or concern. Previous student surveys, however, have found positive correlations between scholastic ability (Dyar, 1975), I.Q. (Horvat, 1974), and verbal ability and logical reasoning ability (Iozzi, 1976).

With respect to place of residence, Bunting and Cousins found that rural dwellers were consistently more predisposed to nature and the outdoors and more resistant to environmental adaptation than their urban peers. In Kellert's study, rural children were more interested and knowledgeable about animals.

These geographic differences may be explained by an "access" model proposed by Dyar (1975) after she discovered that rural seventh graders that she surveyed were most concerned and active with regard to the environment, urban students least so. According to this model, the more exposure and access to clean environments that students have, and the more confident they feel about their ability to persevere or improve the environment, the more concerned and active they will be. As a first precondition for concern, it predicts

that students will be more sensitive to environmental degradation if they have a basis for comparison. When Swan (1970), for example, showed slides of smog to teenagers who rarely ventured from inner city Detroit, they were less aware of the pollution than peers who had experienced a broader variety of places. As a second precondition, the model predicts that students need to know that they can act effectively within the environment. This fact is substantiated by the finding of Kellert that children who engaged in birdwatching or hunting, or who belonged to animal-related clubs were generally more appreciative, knowledgeable, and concerned about animals than those who learned about them primarily through "hands-off" methods in school or zoos. Similarly, Bunting and Cousins found that camping, hiking, and taking care of pets were significantly associated with high scores for Pastoralism.

The importance of direct involvement with nature has been emphasized by Harvey (1988a), who compared the environmental dispositions of 8 to 11-year-old British children with their experience of vegetation. Scores for Pastoralism increased along with the variety, frequency, and pleasure associated with their contacts with plants. In another phase of this study, Harvey (1988b) found that students with access to diversely vegetated school grounds scored higher in Pastoralism and lower in Environmental Adaptation than students with barren school yards, after controlling for socioeconomic status.

Another issue of interest is the relationship between environmental concern and knowledge among children and adolescents. When Iverson (1975) compared measures of these variables among eleventh graders, results paralleled those of Borden and Schettino (1979) with college students. In general, there appeared to be an additive rather than a cause-effect relationship. There were small but significant correlations only when students had high scores.

Kellert's work with a greater age range suggests that concern and knowledge succeed each other in importance with age. He has described a progression from an egocentric heedlessness of animals' own situations and needs to a growing interest, affection, and recognition of another creature's rights, to beginning understanding of interdependent communities. Emotional identification appears to serve as a corrective to initial uninformed, unfeeling attitudes, preceding the acquisition of more sophisticated ecological concepts. As Kellert has noted, "These results suggest educational efforts among children 6 to 10 years of age might best focus on the affective realm, mainly emphasizing emotional concern and sympathy for animals" (p. 33). This conclusion conforms to the frequently expressed conviction in environmental education that "the very young should first be friends with and love and feel the natural world..." (Sheryl Schoenfeld, quoted in Tanner, 1977, p. 49). Kellert has recommended that from fifth grade on, factual knowledge should be stressed.

The primacy of feeling is supported by a hierarchical analysis of the environmental questionnaire responses of English secondary school students by Richmond and Baumgart (1981). Results indicated that students are unlikely to favor controls over use of the environment unless they have first expressed concern for the environment.

The following section will explore how this affective foundation for ecological thinking and action may be established in the course of socialization.

SOCIALIZATION INTO ENVIRONMENTAL CONCERN

Survey research may reveal that environmental responses vary with age, gender, ability, and place of residence, but it cannot explain why respondents answer as they do. For this purpose, experiments in natural settings, interviews, and observations are required. To resolve developmental questions, longitudinal research is indispensable. As a sad reflection of the status of this field, no intensive research of this kind has yet been done. Therefore what follows will be speculation to suggest what some of the critical formative processes might be.

It was noted at the beginning of this paper that people may express concern over the environment because they fear for their own safety or for the welfare of present and future generations. These are legitimate fears, which increasing knowledge about pollution, careless land use, and the complexity of ecosystems should magnify. They are one source of emotion that survey questions probe. Yet these fears primarily reflect concern for human well-being. They may be expected to develop like other personal and social concerns, and to depend upon environmental education and media coverage of dangers and disasters. The remainder of this paper will concentrate upon the possible basis of a third, more elusive component of concern which invests the natural world with intrinsic value. This appreciation of nature, beyond its value as a source of human health and comfort, can be expected to outlast fluctuations in publicity and environmental education funding. It is the only form of true concern for the nonhuman world itself.

The essential assumption that will be made here is that concern for nonhuman things follows a course of development similar to that of concern for other people. In this case clues to the origins of environmental concern may be found in models of the development of human sympathy.

According to Hoffman (1976), the foundation of human sympathy is a young child's initial failure to differentiate itself from the surrounding world. When young children laugh when another laughs, or cry when another cries, they appear to show a conditioned response in which they associate their own past experiences of pain or pleasure with signs of pain and pleasure in another. As they come to recognize another's situation, this spontaneous empathic arousal, or feeling with another, can be combined with sympathy, or feeling for another. By adolescence, it can broaden into a recognition of the history of another's plight through time.

In moving from empathy to a combination of empathy and sympathy, the critical catalyst is social teaching. Hoffman has observed that as a child learns its separateness from another, its natural response on seeing someone in distress should be merely relief that it is another, and not oneself. At this point it is necessary for some person to step in to affirm the other's feelings and to teach that they merit attention and assistance.

Hoffman's scheme is limited to the social world. As such, it only directly addresses how a sense of responsibility for the welfare of present and future generations may evolve. Elsewhere (Hoffman, 1979), has suggested that as adolescents become able to comprehend the circumstances of an entire group or class of people through time, they become capable of a generalized sympathy that he equates with social responsibility. Combined with an understanding of ecological interdependence, the logical extension of this sense of responsibility should be concern to maintain the earth as a viable human habitat.

It can be argued, however, that each stage of the preceding scheme can be applied to sympathy for the natural world. In the case of animals, their expressions of fear, pain, and pleasure resemble human responses. In an early series of experiments which established the importance of modeling and imitation in learning concern for others, Yarrow, Scott, and Waxler (1973) assumed this equivalence by asking children to respond to pictures, dioramas, and events involving animals as well as people in distress. Their experiments showed that children were more helpful when they had a role model who was nurturant and who gave reasons to help, explicitly identifying distress cues and drawing inferences.

The importance of instruction has also been emphasized by Kohlberg (1976) in his work on moral development. The means of movement to higher levels of moral reasoning that he has identified are mental role-taking and exposure to someone who exemplifies more advanced thought.

It is reasonable to expect that children will encounter models who will reinforce sympathy and helpfulness toward animals. But is it reasonable to talk about sympathy for plants? For rocks? For rivers?

An unexplored area for research is how children may be influenced by observing and participating in gardening, which involves the admiration and nurturing of plants. There are many opportunities for children to learn by example in school or at home that plants are alive and need care. But what about rocks and rivers?

Hart and Chawla (1981) have speculated that the basis of general concern for the nonhuman world may be childhood animism. Because young children begin by discovering intention and consciousness throughout their world, only gradually limiting their categories of the living and nonliving, this extension of consciousness may form the affective ground for sympathy for the natural world. In *The Child's Conception of the World*, for example, Piaget (1960) repeats examples from Sully of a child who always gathered several pebbles at a time so that they would not feel lonely, or another who occasionally moved stones in a path so that they would not always have the same view.

Autobiographical reminiscence bears out the importance of experience with nature, social teaching, and the sense of an alive world. Tanner (1980) asked 45 dedicated conservationists to describe formative influences. Peterson and Hungerford (1981) presented similar questions to 22 environmental educators. In both studies, the most frequent responses were many free hours spent outdoors in natural habitats in childhood or adolescence; and the example of a parent, teacher, or other adult who fostered their interest in nature. A quarter to a third of the respondents also cited the inspiration of books.

In an analysis of autobiographies by Chawla (1985), authors attributed an inner sense of calm and connection to nature to profound feelings of communion with the natural world in childhood. In these descriptions, individual elements of a place were remembered in sharp detail. Encompassing these objective pieces was an over-arching sense of the whole which was felt to be responsively alive. In these memories, the early childhood tendency to animate individual objects appeared to have been subsumed by a sense of the aliveness of the setting as a whole.

In all three studies, a sense of connection to nature was traced back to positive experiences outdoors. As Tanner has commented, not one of the conservationists that he surveyed explained his or her dedication as a reaction against exposure to an ugly environment.

Concern by itself is ineffective unless it can be translated into action. In the review text *Roots of Caring, Sharing, and Helping*, Mussen and Eisenberg-Berg (1977, p. 5) identified five essential components of prosocial action:

1. Knowing norms of reciprocity and responsibility
2. Perceiving another's needs and interpreting them accurately.
3. Recognizing that help is possible
4. Feeling competent to do what is needed
5. Estimating that the cost entailed in helping will not be prohibitive

If this list is transposed into the context of environmental behavior, environmental knowledge and identification may satisfy the first, second, and fifth prerequisites. They may not by themselves, however, ensure the third and fourth conditions for action.

A comparison of three eighth grade classes by Ramsey, Hungerford, and Tomera (1981) suggests that to know that action is possible and to feel competent to act, specific instruction in action skills is effective. For seven months, one class was exposed to general science instruction; one to lectures and discussions about environmental issues; and one to environmental action training. The third group not only learned skills but applied them to two local problems. Two months afterwards, when parents were asked to describe their children's environmental behaviors both during and after instruction, the group practiced in action skills showed significantly greater gains in environmentally responsible behavior than either other group. An area for future research is how activism is learned in more informal settings.

THE DEVELOPMENT OF ENVIRONMENTAL CONNECTIONS IN PSYCHOANALYTIC THEORY

One of the salient findings of survey research is that men tend to have greater knowledge about the natural world, but women tend to express greater concern for it (McStay & Dunlap, 1983). As this paper has shown, this pattern of more positive feelings for nature among females is already evident in childhood (Bunting & Cousins, 1985; Harvey, 1988a; Kellert, 1985). This final review section will consider psy-

choanalytic attempts to explain these gender differences. If it is accepted that gender is a social construct, then an understanding of why females tend to show greater concern should suggest how it can be fostered in males and females alike.

A primary assumption of psychoanalytic theory is that an infant initially fails to differentiate itself from its caretaker and the surrounding world. For Freud, (1961), the sense of oneness with the world that an infant feels when it nestles and nurses at the breast serves as a paradigm for later desires for mystical reunion with the world, and as a threat. He believed that just as the ego must form through separation from the mother, culture must form through the domination and control of nature. For Freud, a sense of oneness with nature signified infantile regression or inevitable, inescapable death.

According to recent revisions of psychoanalytic theory, Freud's fear of women and nature was less a law of nature than a construct of culture. Dinnerstein (1976), Chodorow (1978), and Balbus (1982) have argued that men face these fears whenever society draws rigid divisions between the sexes, assigning child care to women alone. Under this condition, as girls attain a growing awareness of themselves and their mother, they realize that they have identified with someone with whom they are essentially similar. For them, gender development fosters nurturance and a sense of connection with the outer world. Boys, in contrast, learn that they have identified with someone whom they are unlike, who is denied the status and power to which they are taught to aspire. The result is a defensive emphasis upon autonomy and a sense of the world as something separate from the ego, which must be subdued and controlled.

This theory predicts greater identification with the natural world among girls and women. It also predicts greater empathy in general, which is what a review by Hoffman and Levine (1976) has found. According to this review, girls show greater empathy than boys as early as age four. In response to people and animals in distress, boys tend to express problem-solving alternatives rather than feelings. Environmental issues urgently require problem-solving; but feelings for both the human and the nonhuman world appear necessary to motivate problem-solving for the good of the whole.

Once these early predispositions are established, Western cultural stereotypes reinforce them by identifying women with nature and masculinity with the mastery of women and nature (Dinnerstein, 1976; Merchant, 1980). This reinforcement may explain the dispositions toward nature that Bunting and Cousins (1985) uncovered in their sample of 9 to 16 year olds. Although both sexes showed relatively positive regard for nature, girls' scores for Pastoralism remained high, whereas boys' scores dropped abruptly after sixth grade. This drop coincides with the beginning of adolescence, when pressure to conform to adult gender stereotypes intensifies.

According to Balbus (1982), the timing of gender identification is critical. He has argued that when rigid gender divisions are postponed until pubertal initiation rites, men maintain identification with nature despite their defensive fears of women. In those societies in which language and other symbol systems are learned before separation is demanded, these symbols express identification with nature for both sexes. In contrast, in modern Western societies males are expected to learn separate self-identities at the same time that they learn language.

These recent revisions of psychoanalytic theory suggest the developmental paths that will foster a caring sense of connection to nature. Concern will be encouraged when a daughter identifies with a mother, or a son with a father, who provides nurturance and who models relatedness to nature. It will also be encouraged when a son is allowed to remain among women who teach him a language of connection to nature, in the absence of competing male role models. Conversely, alienation from nature and a defensive need to dominate it will be learned if a daughter identifies with a mother who models these behaviors, or if either a son or daughter identify with an exploitative father.

It is important to remember that in the previously cited study by Powell and Borden (1978), those who translated concern into committed action combined "feminine" relatedness with a "masculine" assertiveness and sense of agency. According to Dinnerstein (1976) and Balbus (1982), this desirable outcome will be widely achieved if men and women share the nurturing demands of child care. This sharing will free women to participate in the spheres of business, politics, and culture where critical environmental decisions are enacted, and children will have both male and female models for nurturance, connection, and action.

Using personality profiles, interviews, and family observations, the associations that this theory predicts are open to empirical investigation; but work of this kind has yet to be begun. How the development of basic orientations to nature is related to the development of gender roles remains an important area for future research.

DISCUSSION

In the preceding review, two themes have been salient: that concern for the natural world is shaped through social learning, and that it is shaped by opportunities for direct contact with nature. Both processes urgently need to be better understood, because whether the earth's ecosystem can continue to support life as we have known it depends upon whether we can change our attitudes and behavior toward it. Both processes remain largely unexplored.

Given this neglect, this review has covered diverse forms of theory and research, based upon diverse, sometimes tangential, measures of concern. One of the first tasks that must be faced is the creation and adoption of common measures. Bunting and Cousins (1985) have risen to this challenge with regard to the evaluation of environmental dispositions, but other more direct measures of the degree to which children understand and respect ecological processes and feel responsibility to protect nature are still required.

Equipped with common measures, psychologists need to turn their attention to the learning of pro-environmental behavior with the same fervor with which they have pursued the acquisition of prosocial behavior. In addition to experiments, observations, interviews, and personality inventories with cross-sectional populations, longitudinal research also needs to be begun. The ultimate measure of environmental concern will be lifestyle choices, consumer choices, and polit-

ical activity in adulthood. Only longitudinal research can reliably establish their antecedents.

In several studies, more positive orientations to nature have been associated with greater free contact with it. This aspect of experience raises an interesting possibility for psychology: that there may be a direct "environmentalization" into concern as well as socialization. Wordsworth raised this possibility more than one hundred years ago in his own longitudinal self-study, *The Prelude*. Having acknowledged his debt to his mother who first connected him to "the filial bond of Nature," and to the company of like-minded friends, he declared his debt to his childhood world itself:

> *Yet were I grossly destitute of all*
> *Those human sentiments which make this earth*
> *So dear, if I should fail with grateful voice*
> *To speak of you, ye mountains and ye lakes*
> *And sounding cataracts, ye mists and winds*
> *That dwell among the hills where I was born*
>
> *Wordsworth*, The Prelude
> *(Book 2, lines 421-426; 1805 edition)*

Our society has not been structured to admit that nature may provide more-than-material necessities. This blindness is reflected in developmental psychology's lack of a vocabulary, theoretical framework, or research agenda to deal with children's experience of nature. What kernels of connection may be contained in childhood animism that should not be dismissed as childish error? What does it mean, for example, to say that a place is felt to be "alive?" What are the conditions and effects of this experience? What happens when a natural habitat is loved? By its avoidance of these questions, psychology has shown itself uncomfortable with them.

In his path-breaking work on *The Nonhuman Environment*, the psychotherapist Harold Searles (1960) amplified the argument of Erich Fromm (1955) that a full and constructive life involves two complementary ways of relating to people and things: abstractly, and in their concrete uniqueness. Developmental psychology has focused upon how children move out of intuitive, concrete immersion in the world to achieve abstract logical thought. According to Searles, the well-being of individuals and the world depends upon the degree to which people can integrate their ability to think abstractly with secure bonds of affection for particular people, animals, places, and things. For psychology to value children's evolving sensitivity to the concrete as much as their manipulation of the abstract, it must restructure its own fundamental assumptions about human relationships with the physical world. It must define developmental paths that are optimal not just for the individual, or for society, but for local habitats and the earth's ecosystem as a whole.

This blindness to more-than-material values of nature is also reflected in planners', designers', and developers' relentless destruction of natural sites in residential communities. This review suggests that children care about nature more when they are more familiar with it, at a time when this opportunity is becoming less and less available. The environmental philosopher Rene Dubos (cited in Tanner, 1974, p. 39) warned that the greatest crime committed in poor urban neighborhoods may be "the wholesale and constant exposure of children to noise, ugliness and garbage in the street, thereby conditioning them to accept public squalor as the normal state of affairs." Although suburban tracts may be neater, they are often sterile and restrictive in their own way (Hart, 1979). Research into how children learn to care about nature needs to be combined with efforts to create communities which give them something to care about.

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