

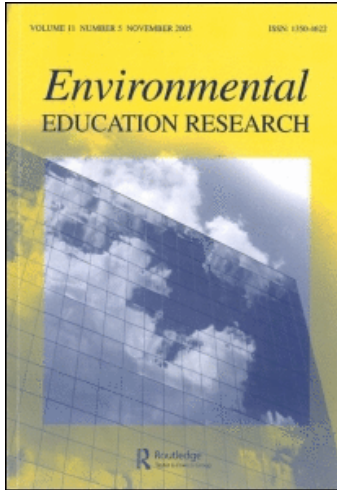
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Research methods to investigate significant life experiences: review and recommendations

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This article reviews different research approaches to understanding the significant experiences that influence people's environmental concern and behaviour, with an emphasis on identifying the strengths and weaknesses of existing studies. It also reviews relevant findings regarding the validity of autobiographical memory, as memory is the medium which selects and interprets the significant events reported to researchers. The review notes promising new directions in recent studies, but makes several concrete suggestions regarding how researchers in this field can refine existing methods and broaden their approaches.

A Qualitative Research Tradition

The field of environmental education has always contained two sides: one that emphasizes scientific knowledge and technical or managerial solutions to environmental problems; and another that seeks to instill a sense of care and responsibility for the earth among the general population. These correspond to two sides of our human nature: our rational drive to know the world, for the pure satisfaction of discovery and in order to adapt it to our ends, and our emotional need for identification and affiliation with the earth. That environmental education should span these two dimensions is entirely fitting. In the words of Cobb (1977), one of the first persons to study the meanings of childhood experiences of nature across the life course, the goal of our highest maturity is to live and work in the world with a 'compassionate intelligence' that combines a deep identification with nature with an understanding of its processes.

In their comprehensive review of research into the antecedents of responsible environmental citizenship, Hungerford and Volk (1990) noted that research reveals

several important variables that appear to combine to determine responsible action: environmental sensitivity, in-depth knowledge about an issue, a personal investment in the issue, an internal locus of control, knowledge and skill in using environmental action strategies, and an intention to act. Like the different sides of environmental education, these variables cover feeling and motivation (environmental sensitivity, personal investment, an internal locus of control, an intention to act) and knowledge (knowledge about an issue, and knowledge and skill in using action strategies). Hungerford and Volk observed, however, that many environmental education programs are constructed on the false premise that knowledge about issues is sufficient, and that knowledge by itself will lead to action. In a similar vein, Marcinkowski (1993, p. 39) observed that environmental education research has been overwhelmingly quantitative. It has primarily focused on what students know or think, with little attention to the feelings and self-understandings that transform their knowledge and attitudes into action, or bind them to inaction. Only qualitative research can probe this motivational side of environmental learning.

There is, however, a growing body of qualitative research that explores this dimension: research into the significant life experiences which people themselves believe to have shaped their environmental attitudes and actions. As this issue of *Environmental Education Research* demonstrates, this body of work has accumulated to the point where it warrants review and reevaluation. This article evaluates this research according to criteria for the sound practice of qualitative research published in handbooks like Denzin and Lincoln (1994), Miles and Huberman (1994), and Strauss and Corbin (1990).

Qualitative research is generally assumed to focus on the emotional and interpretive side of human experience; and it is, in fact, designed to do so. To associate it only with this side of our experience, however, is a fallacy; because its interpretive powers can be turned to explore critical events in the development of people's knowledge and behavior. Therefore the topics that qualitative research covers bridge the rational and emotional sides of environmental learning. At its best, the character of its practice also bridges these two sides. In order to understand what people say or do, its practitioners must know how to question sensitively, and listen and observe sympathetically: in other words, to demonstrate skills that the psychologist Goleman (1995) has termed 'emotional intelligence'. Gaining respondents' honest, willing cooperation in this way is the first foundation for validity. At the same time, as an approach within science, qualitative research is preeminently rational, and pledged to the many rules of reliable, valid data collection and analysis that justify all scientific work. Therefore just as the ultimate goal of research into significant life experiences is to understand how people gain the combination of compassion and knowledge that guides effective environmental protection, research in this field needs to combine emotional and rational skills.

This article will review how well research into significant life experiences meets these twin challenges of attention to rules of reliability and validity with an openness to subjects' emotional life and self-understanding. That it attempts to cover different dimensions of human experience is a mark of this field's 'ecological validity', or its

reflection of the actual characteristics of the people-environment transactions that it studies (Winkel, 1985). Whether it does so according to the canons of best scientific practice, however, will ultimately determine the strength of this tradition within environmental education research. By reviewing current strengths and weaknesses, this article hopes to improve the foundation for future research in this field.

The Strengths of Existing Research

The most important strength of research about significant life experiences is that it is qualitative, within a wider tradition of environmental education research which is predominantly quantitative. Thus it is equipped to explore the emotional and interpretive side of environmental experience that research has otherwise avoided, but which forms a necessary complement to a full understanding of not only what people do, but why. (See Table 1 for a summary of this field's main strengths.)

Another strength is that this work takes a life-span perspective, seeking to understand how experiences that may have occurred 20 or 30 years ago continue to influence people's feelings or behavior. Although cross-sequential longitudinal designs may be the most rigorous way to study life span development (Baltes *et al.*, 1979), this retrospective approach is a necessary preliminary that suggests the type of formative events that longitudinal research should monitor. Lacking the high level of funding and institutional commitment that longitudinal studies require, up to this point environmental education research has been limited to, at best, 3- or 6-month follow-ups of the effects of a curriculum or program intervention. Under these conditions, memories about significant life experiences provide the longest range glimpse into lifespan learning that the field of environmental education currently enjoys.

Another major strength of this research is that it has become a cohesive, self-referencing tradition that centers around the common goal of understanding people's own explanations of their environmental feelings and actions. This body of work began with a study by Tanner (1979, 1980). By the late 1990s, the field can point to a replication of findings across a variety of research settings, a variety of populations, and a variety of research designs. The fact that the same cluster of results emerge under most conditions suggests that, across countries and cultures, people understand the sources of their environmental attitudes and actions in similar ways.

Table 1. Current strengths of significant life experience research

-
- Qualitative, in a field dominated by a quantitative paradigm
 - Cumulative, building on a coherent tradition
 - Lifespan perspective
 - Complementary open- and close-ended methodologies
 - New interest in sample diversity
 - New interest in cohort differences
 - New interest in longitudinal designs
 - Coherent results across diverse methods and populations
-

This work is cumulative not only in its findings, but also in its methodological development. The subjects of the earliest investigations were predominantly white, male, and dedicated to environmental education or the preservation of wilderness and wildlife. Whereas most subsequent studies have continued to focus on educators or wilderness preservationists, they have branched out by including more women and people from other cultures, countries, and ethnic backgrounds. Palmer and Suggate are coordinating comparative surveys of environmental educators in 12 countries (see the articles by Palmer *et al.* in this issue). This author (Chawla, forthcoming) compared the backgrounds of environmentalists in Norway and the United States. James (1993) interviewed US environmental educators from Asian, Hispanic, and African-American backgrounds. Sward (forthcoming) interviewed environmental professionals from El Salvador. In addition, Palmer and Suggate (1996) have directed attention to the important subject of cohort differences.

In his original study, Tanner recommended that environmental education research enlarge its perspective to include a broad definition of environmental action. Beyond the preservation of wilderness and wildlife, he urged that future work should explore 'the origins of those who are active in other kinds of environmental issues, such as urban environmental problems or alternative energy sources' (1980, p. 23). The most recent studies have reflected this wider definition. Chawla (forthcoming) interviewed environmentalists in the United States and Norway whose work ranged across recycling and waste management, pollution and radiation prevention, transportation and land use planning, habitat and wildlife preservation, and education. Sward's (forthcoming) sample of El Salvadoran professionals worked in the areas of environmental education, conservation planning, environmental action or research, and sustainable development. These more diverse samples better reflect the actual diversity of environmental issues and activism.

Enough research about significant life experiences has accumulated for studies to begin to build upon each other by alternating between open and close-ended questions, and by moving from interviews or open-ended surveys to questionnaires. Interviews allow for in-depth probing and follow-up questions, which are critical to thorough qualitative work. Open-ended mail surveys have the advantage of allowing respondents time to reflect and compose their answers at length. Both methods, however, involve time-intensive analysis which necessarily limits study samples to small numbers, given the typically low budgets of research in this field. McKnight (1990), Sia (1984), and Scholl Wilder (1983) have turned the results of preceding interview studies into close-ended questionnaires that can be administered efficiently to large populations. This has allowed McKnight and Sia to take the important step of broadening their samples to include comparison groups, followed by Marcinkowski (1987) and Sivek (reported in Sivek & Hungerford 1989/90), who adopted Sia's questionnaire.

Finally, researchers' confidence in the future of significant life experience research is shown by the fact that the first longitudinal studies have recently been initiated. The Emergent Environmentalism Project directed by Palmer (1994) is tracking the development of schoolchildren's environmental awareness and understanding beginning

with the preschool years. It may offer insights into not only how participating children think about the environment, but events that influence their thinking. Myers (1997) has initiated interviews with ethnic minority and nonminority students in environmental studies and other programs at Western Washington University, whom he hopes to continue to track through a cross-sequential longitudinal design. These initiatives present opportunities for potential new methodological strengths that can build on the advantages but avoid the shortcomings of retrospective research.

The Scope of Retrospective Research

Research into significant life experiences is only as valid as the autobiographical memory on which it is based, because up to this point all studies have asked respondents to reach into the past to recall formative events. This dependence on autobiographical memory characterizes all survey and interview research, as even studies that examine people's experience of immediate events, such as a political campaign or a school reform, draw upon long-term memory and interpretations of life events. Life-span studies like investigations of significant life experiences, however, ask people to reflect upon everything from the present—such as their current career—to events that may have happened decades ago—such as play in a favorite place in childhood. There is a large body of research which examines the validity of memory of this kind, with which researchers exploring significant life experiences should be familiar. For this purpose, this section provides a brief introduction to this work.

In popular perception, autobiographical memory is notorious for its deceptions. In a charming scene in the movie *Gigi*, an elderly man and woman reminisce about their first evening out together as young lovers, each recalling details such as the location, hour of dining, and color of her dress vividly but differently. Research on memory confirms this inaccuracy with regard to details (Ross & Buehler, 1994; Ross, 1997). The problem is accentuated when people are forced to recall details of events which were sudden and unexpected or which occurred on the periphery of their attention, as in the case of many trial witnesses (Loftus, 1979).

When it comes to the broad outline of life events and their significance, memory's reputation fares much better. The elderly couple are unlikely to forget, for example, that they *were* in love or the changing phases of their feelings for each other over time. Research confirms this popular assumption as well. Although memories may often confuse the precise details of what happened during a specific event, they are usually accurate about the general course of events (Neisser, 1981; Linton, 1982; Wagenaar, 1986). Events of high personal importance produce more vivid and accurate memories than events of low importance (Bower, 1992; Conway & Beckerian, 1988; Reisberg & Heuer, 1992). Paradoxically, events are remembered better either when they are rare or unique or when they were repeated so often that the different episodes blend together into one 'generic' recollection of this habitual occurrence (Linton, 1982). It is important that environmental education research recognize this distinction: that significant events may be repetitive, although recalled as one generic representation; or a single specifiable occurrence.

Research conditions influence the accuracy of recall. When people can practice unconstrained recall—elaborating their own account of the past at their own pace—they are much more accurate than when they are forced to report on the past under time limits or regardless of an event's personal importance (Neisser, 1988). When people are given prompts or cues related to the original event (such as words, images, sounds, smells, or a return to the original location), their memories increase in number and detail (Wagenaar, 1986). Under conditions of free recall, people tend to remember more events from childhood and young adulthood than from more recent middle age (Rubin *et al.*, 1986); but given adequate cues, older respondents can remember an approximately equal number of episodes from all segments of life (Howes & Katz, 1992). Under these conditions, when autobiographical memory is unconstrained and it can avail itself of multiple cues, it is durable and roughly accurate.

These results suggest that research about significant life experiences explores memories of the most reliable kind: through mail surveys or interviews, it invites people to engage in unconstrained recall about past experiences of personal importance, with a focus on general facts about major periods of their life. These conditions characterize most existing studies. This research also suggests why questionnaires—which in effect prompt respondents with cues in the form of the questionnaire items (for example, 'Check the following nature activities in which you engaged in childhood and adolescence') yield higher response rates than entirely open-ended questions (such as, 'What experiences in the past encouraged your interest in the natural world?'). It also indicates that researchers can increase the number and accuracy of memories by encouraging respondents to follow up answers that they initiate by drawing upon cues like old photographs, letters, or newspaper clippings about formative events.

Neisser (1988), a cognitive psychologist who fostered a renewal of interest in autobiographical memory within his discipline, has observed that most work on this topic has focused on the *verity* of memory, or the degree to which it mirrors more objective measures of the past. This emphasis, he has argued, misses memory's most important function, which is its *utility*. As we move through our lives, what matters most to us are not precise details about the past, but how we interpret and use the past in meeting the challenges of the present and in anticipating the future. These two types of validity are similar to the distinction between asking whether a particular memory is 'true to the facts' or 'true to character'.

Researchers concerned about the verity of memory are preoccupied by questions such as, 'To what degree do errors enter the reconstruction of the past?' or, 'What conditions increase or decrease accuracy?' Those concerned with the utility of memory, however, ask a more phenomenologically rich set of questions. 'What is the meaning and use of memories during different periods of life?' 'How does the interpretation and use of memories reflect gender, class, culture, or other life conditions?' 'How is remembering guided by different purposes on different occasions?' According to phenomenological investigations of the meaning of childhood memories of nature, all of these questions are critical to consider (Chawla, 1986, 1990, 1994).

These questions point to new directions that future research into significant life experiences can productively pursue.

Since the early research on memory carried out by Bartlett (1995 [1932]), it has been evident that people's interests and anticipations shape their processes of remembering. In asking people to recall a story at successive points in time, Bartlett found that people quickly selected particular details for emphasis. In effect, they transposed the story into a form of their own, and once their memory had made this transformation, it showed general consistency over time. Although each person, in consequence, recalled the story in an individual way, as a rule people kept within the boundaries of the story's main theme.

More recent research confirms this tendency to vary memories within limits. Sanitioso *et al.* (1990) found that when people are motivated to possess a certain trait, for example, they access more memories of behaviors, thoughts, or feelings consistent with that trait and fewer that conflict with it. In the case of research into significant life experiences, these results suggest that if respondents are encouraged to seek out memories related to environmental concern and action, they may emphasize memories of this kind at the expense of memories of environmental apathy or exploitation. Nevertheless, Sanitioso *et al.* found that this bias was constrained by the actual content of memory. Although people were able to access more memories of the kind that they believed to be advantageous, their fundamental self-concepts remained stable.

The above results indicate that although memories may tend to conform to the 'truth' of somebody's character, they are not free to vary regardless of the 'truth' of the facts. Researchers into significant life experiences can take confidence from these results that they can attend simultaneously to validity in both senses. They can use prompts and cues, and give respondents time to elaborate memories fully and accurately, while attending to how memories reflect respondents' particular life conditions, goals, and interests.

Current Research Weaknesses

Despite its considerable strengths, research on significant life experiences is characterized by several recurring weaknesses in design and analysis. Given the coherent, self-referencing nature of this research tradition, much can be done to improve comparability among studies. There is also a great need for more studies with built-in comparison groups. (See Table 2 for a summary of major weaknesses.)

Table 2. Weaknesses in significant life experience research

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- Inconsistent questions
 - Inconsistent criterion measures (attitude, interest, action, etc.)
 - Inconsistent categories of analysis
 - Lack of testing for intercoder reliability
 - Lack of control of multiple mentions per respondent
 - Little recognition of memory's interpretive function
 - Lack of comparison groups
-

Despite the fact that all studies in this tradition cite the pioneering work of Tanner as the forerunner of their own approach, there have been a surprising number of variations in the specific aims that researchers have announced and in their wording of key questions. The main difference is that some researchers have sought to understand the origins of committed *action* on behalf of the environment, whereas others have focused their interest on the origins of environmental feelings and *attitudes*. Even within these divisions, researchers have posed their questions in a variety of ways.

From the beginning of this work, researchers divided into those interested in action and those interested in attitude. In the introduction to his 1980 article, Tanner announced that his goal was 'to examine retrospectively the lives of citizens who have demonstrated amply their informed and responsible activism' for the sake of 'the maintenance of a varied, beautiful, and resource-rich planet for future generations' (p. 20). Therefore he restricted his sample to 45 leaders in conservation groups, and asked them, in an open-ended mail survey, to identify the formative influences that led them 'to choose conservation work'. They also provided resumés of their conservation activities, with which he could confirm or disconfirm their activism. Similarly, James (1993) interviewed environmental educators from nonmajority ethnic backgrounds, taking their career choice as their demonstration of action, and asked them about the influences on their path to work in their field. Chawla (forthcoming) interviewed leading environmentalists in the United States and Norway, asking them to describe what they considered their most significant efforts to protect the environment (which served as a way of verifying their activism), and then asked them to identify what influenced them to make their commitment to protect the environment. Palmer (1993) initiated a verification of what she termed 'practical concern'—a concern that demonstrates itself through action—which has been followed in subsequent studies by Palmer and colleagues. She first asked her respondents, who were members of the National Environmental Education Association of the United Kingdom, to complete a checklist of environmental activities in which they regularly engaged, such as wildlife gardening, green purchasing, recycling, or membership in other environmental organizations. Over 90% reported that they took part in at least some of these actions. Through some means, all of these studies verified that respondents not only felt concern for the environment, but took action.

Peterson, in contrast, initiated a series of studies that stopped short of an interest in action itself. Her topic of interest was 'environmental sensitivity', which she defined as 'a basic appreciation and concern for the natural environment, yet this appreciation and concern is not of enough intensity to motivate them to alter their behavior in behalf of environmental quality' (1992, p. 5). In a series of questions, she asked the environmental educators in her sample about the factors or experiences that they felt were instrumental in developing their attitude toward the natural environment, and later about the sources of their development of 'environmental sensitivity', and 'interest in or dedication to the field of environmental education' (p. 97). Sward (forthcoming) used Peterson's interview, translated into Spanish; and Peters Grant (1986) interviewed volunteer docents at a coastal ecology center about the influences on their 'interest in the environment'.

Although concern and interest may always accompany committed action on behalf of the environment, the reverse is not necessarily true. A survey of 1000 respondents in each of 22 countries (Dunlap *et al.*, 1993) showed generally high levels of public concern about environmental protection, but given any issue in any country, a relatively small group of people invest their time in persistent, dedicated action to bring about improvements. It is ultimately people's actions that make a difference. It can be argued that despite the questions posed by Peterson, Sward, and Peters Grant, the fact that their subjects had chosen to work as environmental educators, environmental professionals, or volunteer marine docents demonstrated committed action. In the future, key questions will more accurately reflect environmental volunteers' or professionals' lives if they probe sources of behavior, not just interest, attitude, or sensitivity.

An emphasis upon action would also increase comparability among what might otherwise be divergent populations. As it stands, research on significant life experiences involves environmental leaders and professionals, educators, members of environmental organizations, and environmental studies majors. Some teachers, organization members, or students may have awareness and concern for the environment without proceedings to take action; and in this case, they may differ from committed activists on a number of measures. With these populations, it is important to include a check list of environmental activities, as Palmer has done, or self-reports of environmental actions, as in the studies of Sia (1984), Marcinkowski (1987), or Sivek (Sivek & Hungerford, 1989/90). These measures have the added advantage that they make it possible to compare the backgrounds of respondents who demonstrate different levels of action.

Nevertheless, despite different sample groups and differently worded questions, most studies have yielded similar answers regarding formative influences: positive experiences in natural areas, usually over a sustained period of time; family members who set examples of attention and respect for the natural world; teachers; books and other media; environmental organizations; and experiences of habitat destruction (Chawla, 1998). There is a large body of research on the construction of survey instruments which shows that even slight variations in the wording of questions may have significant effects on the type of responses received (Schwarz & Sudman, 1993). The fact that research on significant life experiences has elicited similar results despite variously worded questions suggests that it is tapping a valid and widely shared self-awareness regarding formative environmental experiences. These robust results, however, do not excuse researchers from the good practice of using similarly worded questions to seek similar information.

Just as research on significant life experiences is characterized by inconsistent questions, it is also characterized by inconsistent categories of analysis. Again, although later studies have cited the growing tradition of work in this field, beginning with Tanner's study, they have often failed to report their results in comparable categories. Tanner's largest category of responses—positive experiences of 'natural areas'—turns into the more ambiguous category of the 'outdoors' in a number of subsequent studies: but the 'outdoors' is difficult to interpret. It can include streets, basketball courts,

and atheletic fields, which are very different experiences than play and exploration in natural areas.

Similarly, whereas Tanner reports 'teachers' as a single category of responses, other studies report the 'study of natural systems' (which could be done in or outside of school) (Peterson, 1982), separate the category of 'education' from the influence of individual teachers (Palmer, 1993), or group teachers with 'friends' or 'peers' (Swad, forthcoming). Considering that the ultimate end of environmental education research is to discover the most effective means of education for the environment, a distinct category for 'education and teachers'—which cannot be separated in practice—will be useful. 'Family role models', including parents, will be another important category to keep constant. Finally, few studies define what they mean by 'childhood' when they report categories like 'childhood play' or 'childhood outdoors'. The official United Nations definition of children as all people under the age of 18 serves as a convenient demarcation, as it covers the period through secondary school, when many people live in the same home before leaving for school, work, or marriage. In the same way, all categories require careful definition.

These variations in categories of analysis may in part reflect the fact that only three studies report checks for intercoder reliability (Peters Grant, 1986; Palmer & Suggate, 1996; Chawla, forthcoming). Tanner sought to avoid threats to reliability by being conservative in his analysis. For example, in any case in which the experience of 'natural areas' was an implied but not directly stated influence (as when people briefly mentioned outdoor youth groups or parents' love of nature), he avoided the assumption that natural areas were involved. The most effective means of ensuring the reliability of analyses, however, is to develop qualitative coding via trial and error work in research teams (Miles & Huberman, 1994). The discussion and reevaluation that go on among judges tends to simplify and clarify analyses. As it stands, it is not evident how outside judges could distinguish some of the seemingly overlapping categories presented in some studies, such as 'teachers' from 'education' 'community health issues' from 'community concern', or 'outdoor experiences' from 'affinity toward nature'.

Another area of analysis that needs attention is the control of multiple answers by one respondent. Only Chawla (forthcoming), Palmer and Suggate (1996), and other publications by Palmer *et al.* (1998; forthcoming), report the average number of significant experiences per respondent (which range from an average of three to five). All studies of this topic, however, show results that indicate multiple answers. In Palmer and Suggate, answers ranged from as few as one experience to as many as 13. Without controls, the aggregate results would reflect the talkative respondent 13 times more than the laconic one. Some ways to manage this problem are to ask people to identify a specified number of experiences, or a number within a limited range. As a guide to interpretation, the average number of mentions per respondent and range should always be reported.

Beyond these aspects of question design and analysis, the major weakness of existing research in this field is that few studies have been comparative. Most are simply descriptive reports of single samples. They show how people who are involved in the

environmental movement understand the sources of their own attitudes and actions; but without comparison groups, they provide no way to rule out the possibility that people who are apathetic about the environment, or overtly destructive, might not have had similar experiences. If this were revealed to be the case, it would be necessary to search further for the factors that account for differences.

The most extensive attempt to relate personal background to differing levels of activity is the work of Sia (1984), who created what he termed an 'environmental sensitivity index' based on Peterson's results. He asked samples of Sierra Club members and Elderhostel participants at a nature center to check whether they had had the experiences that emerged in Peterson's results: such as hunting, fishing, or hiking in childhood or adulthood; parent or teacher role models; or formative books. He also divided respondents between high and low levels of self-reported environmental actions. For the combined groups, he found that the most significant predictors of environmental behavior, in rank order, were perceived skill in using environmental action strategies, level of environmental sensitivity, and knowledge of action strategies. For the Elderhostel and Sierra Club samples separately, the first and second-ranking predictor, respectively, was level of environmental sensitivity. Using Sia's index, level of environmental sensitivity ranked among the top three predictors of behavior in Sivek's study of members of Trout Unlimited, Ducks Unlimited, and the Wisconsin Trappers' Association (reported in Sivek & Hungerford, 1989/90). These studies suggest that the significant life experiences identified by Peterson and others do discriminate more from less environmentally active people. There remains a great need, however, for more contrasting groups, such as environmentalists versus people who justify unlimited environmental exploitation.

The need for careful comparisons is suggested by the work of McKnight (1990) and Myers (1997), who compared undergraduate majors in environmental studies with majors in other fields. Some background factors discriminated these groups, such as more positive wilderness experiences and more references to family role models, but other experiences, such as childhood play in natural areas, did not. These studies suggest a need for more fine-grained research that will relate different types of environmental interests and behaviors to different types of background experiences.

Recommendations

The preceding sections imply a list of recommendations for strengths to build upon and weaknesses to avoid in future research about significant life experiences. These 'do's' and 'don'ts' of sound research practice have been summarized in Table 3, along with some broader considerations which this section will advocate.

There are encouraging signs that, as a cumulative body of research, recent studies are already taking steps to correct some of the deficiencies of this work in the past. There is a new attention to cohort differences (Palmer & Suggate, 1996), and a new broadening of sample diversity to include ethnic minorities (James, 1993; Myers, 1997) and people from other nations beyond North America and Britain (Palmer, *et al.*, 1998; Sward, forthcoming; Chawla, forthcoming). There are signs of important

Table 3. Recommendations to improve significant life experience research

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- Emphasize responsible environmental action rather than merely concern
 - Measure levels of concern and activism
 - Whenever possible, use consistent questions, categories of analysis, and criterion measures across studies
 - Define categories clearly
 - Check for intercoder reliability
 - Report multiple mention rates and ranges
 - Continue to broaden sample diversity
 - Include comparison groups (including contrasting groups)
 - Integrate research on autobiographical memory
 - Record estimated age at the time of events
 - Use prompts and cues to increase memory accuracy
 - Use a dynamical analysis to build 'grounded theory' by distinguishing context, action, consequence
 - Add new research approaches (naturalistic experiments, observation, reactions to environmental stories and dilemmas, longitudinal designs)
 - Pay attention to cohort differences
 - Look for gender and cultural differences
 - Notice individual differences
-

analytical controls like checks for intercoder reliability and multiple answers by single respondents (Palmer & Suggate, 1996; Chawla, forthcoming). An inventory of significant experiences has been related to different levels of environmental activity in research designs that include comparison groups (Sia, 1984; Sivek & Hungerford, 1989/90). Finally, there is a new interest in initiating longitudinal research (Palmer, 1994; Myers, 1997). All of these signs indicate positive directions for the future.

Another general recommendation is that research on significant life experiences should not ignore the large body of knowledge that now exists about the operation of autobiographical memory itself. Autobiographical memory is the material of this work; and therefore researchers should be aware of the conditions under which it tends to be reliable or fallible. The power of memory to interpret and construct life identities also needs to be acknowledged and integrated into analysis. There is an open frontier of work ahead about how and why people draw upon different types of environmental memories under different situations.

The field also invites more dynamic analyses that go beyond simple description to the construction of what Glaser and Strauss (1967) have termed 'grounded theory'. They advise that, as researchers categorize responses, they should determine whether each category constitutes an action, its context (such as the setting or manner in which it occurs) or its consequence, in order to determine the conditions under which experiences occur, and these experiences' effects. Past research, for example, has not distinguished the consequences of an introduction to nature through purely spontaneous actions, such as childhood play, from a more formal introduction through school or youth organizations. Nor has it given close attention to the contexts under which spontaneous engagement or effective teaching leave deep impressions. More

fine-grained analyses can illuminate why some experiences become particularly memorable.

In the same way, future analyses will be enriched if researchers try to identify the ages at which significant events occur, as the basis for models of the life-span development of environmental concern and action. This approach has been introduced in the study of Norwegian and United States environmentalists by Chawla (forthcoming); and the results suggest that certain experiences have particular importance at certain ages.

Up to this point, research on significant life experiences has generally ignored individual differences among respondents. To do so, however, is to proceed as if certain experiences regularly produce certain outcomes, regardless of the person involved. There is a great deal of evidence, however, that people come into the world with strong innate differences that affect the way in which they respond to events (Hamer & Copeland, 1998). In the terms of Cromwell (1988), in an autobiographical paper examining the sources of her own environmental activism, a person's individual needs, interests, and patterns of response constitute an inner environment, which reacts with the outer environment. Individual differences present a new dimension for research about significant life experiences to explore.

Finally, research on this subject does not need to be confined to interviews, surveys, and questionnaires. It could benefit from the example of the much more extensively developed field of research into the origins of prosocial behavior (Olweus *et al.*, 1986; Damon, 1990; Eisenberg, 1992). In addition to retrospective studies, this work includes careful naturalistic observation, quasi-experiments, and story projections which could be adapted to the purpose of better understanding formative influences on environmental behavior as well. For example, children could be observed during outdoor play in settings that allow more or less exposure to the natural world, and then asked to express their experience through interviews, writing, and drawing, as measures of how they represent these experiences shortly after they occur. Longitudinal research could investigate whether these representations change over time. Children with different types of exposure to nature, including parents with different environmental attitudes, could be compared in terms of how they react to real or hypothetical dilemmas related to environmental protection.

In a review of research into prosocial behavior entitled *Roots of Caring, Sharing, and Helping*, Mussen and Eisenberg-Berg (1977, p. 5) identified five essential components of prosocial action: (1) knowing norms of responsibility; (2) perceiving another's needs and interpreting them accurately; (3) recognizing that help is possible; (4) feeling competent to do what is needed; and (5) estimating that the cost entailed in helping will not be prohibitive. Pro-environmental behavior appears to involve a similar complex of components. In their review of research into antecedents of responsible environmental behavior, Hungerford and Volk (1990) proposed that the development of environmental responsibility involves a set of factors that include empathic perception of the 'other' (in this case nature), knowledge, and feelings of competence. Gardner and Stern (1996) documented that people's behavior toward the environment is best predicted through a combination of knowledge, attitudes,

beliefs, and reaction to barriers to action. It can be assumed that each of these factors that influence action develops through a series of significant experiences.

Research into significant life experiences has begun to reveal what this cluster of experiences may be; but there is still much to be learned about how they operate and interact. Given the original goal of the study of significant experiences as it was introduced by Tanner (1980, p. 20)—to understand the kinds of learning experiences that produce persons who are committed to ‘the maintenance of a varied, beautiful, and resource-rich planet for future generations’—research on this topic has indicated the broad outlines of answers. Much is yet to be learned, however, about the varied forms that experience takes as it provides people with the personal resources that they need in order to protect the planet and future generations.

References

- Baltes, P.B., Cornelius, S.W. & Nesselroade, J.R. (1979) Cohort effects in developmental psychology, in: J.R. Nesselroade & P.B. Baltes (Eds) *Longitudinal research in the study of behavior and development*, 61–87 (New York, Academic Press).
- Bartlett, F.C. (1995 [1932]) *Remembering* (Cambridge, Cambridge University Press).
- Bower, G. (1992) Emotion and memory, in: S.A. Christianson (Ed.) *Handbook of emotion and memory*, 3–31 (Hillsdale, NJ, Lawrence Erlbaum).
- Chawla, L. (1986) The ecology of environmental memory, *Children's Environments Quarterly*, 3(4), 34–42.
- Chawla, L. (1990) Ecstatic places, *Children's Environments Quarterly*, 7(4), 18–23.
- Chawla, L. (1994) *In the first country of places: nature, poetry, and childhood memory* (Albany, NY, State University of New York).
- Chawla, L. (1998) Significant life experiences revisited, *Journal of Environmental Education*, 29(3), 11–21.
- Chawla, L. (forthcoming) Life paths into effective environmental action, *Journal of Environmental Education*.
- Cobb, E. (1977) *The ecology of imagination in Childhood* (New York, Columbia University Press).
- Conway, M.A. & Beckerian, D.A. (1988) Characteristics of vivid memories, in: M.M. Gruneberg, P.E. Morris & R.N. Sykes (Eds) *Practical aspects of memory*, Vol. 2, 519–524 (New York, John Wiley).
- Cromwell, M. (1988) The evolution of environmental values, unpublished manuscript.
- Damon, W. (1990) *The moral child* (New York, Free Press).
- Denzin, N.K. & Lincoln, Y.S. (1994) *Handbook of qualitative research* (Thousand Oaks, CA, Sage).
- Dunlap, R., Gallup, G. jr. & Gallup, A. (1993) Global environmental concern, *Environment*, 35(9), 7–15.
- Eisenberg, N. (1992) *The caring child* (Cambridge, MA, Harvard University Press).
- Gardner, G.T. & Stern, P.C. (1996) *Environmental problems and human behavior* (Boston, MA, Allyn & Bacon).
- Glaser, N. & Strauss, A. (1967) *The discovery of grounded theory* (Chicago, IL, Aldine).
- Goleman, D. (1995) *Emotional intelligence* (New York, Bantam Books).
- Hamer, D. & Copeland, P. (1998) *Living with our genes* (New York, Doubleday).
- Howes, J.L. & Katz, A.N. (1992) Remote memory: recalling autobiographical and public events from across the lifespan, *Canadian Journal of Psychology*, 46(1), 92–116.
- Hungerford, H.R. & Volk, T.L. (1990) Changing learner behavior through environmental education, *Journal of Environmental Education*, 21(3), 8–21.

- James, K. (1993) A qualitative study of factors influencing racial diversity in environmental education, unpublished doctoral dissertation, University of Minnesota.
- Linton, M. (1982) Transformations of memory in everyday life, in: U. Neisser (Ed.) *Memory observed*, 77–91 (San Francisco, CA, W.H. Freeman).
- Loftus, E. (1979) *Eyewitness testimony* (Cambridge, MA, Harvard University Press).
- Marcinkowski, T. (1987) An analysis of correlates and predictors of responsible environmental behavior, unpublished doctoral dissertation, Southern Illinois University at Carbondale.
- Marcinkowski, T. (1993) A contextual review of the ‘quantitative paradigm’ in environmental education research, in: R. Mrazek (Ed.) *Alternative paradigms in environmental education research*, pp. 29–79 (Troy, OH, North American Association for Environmental Education).
- McKnight, M. (1990) Socialization into environmentalism, in: D. Simmons, C. Knapp & C. Young (Eds) *Setting the environmental education agenda for the '90s*, 135–40 (Troy, OH, North American Association for Environmental Education).
- Miles, M.B. & Huberman, A.M. (1994) *Qualitative data analysis* (Thousand Oaks, CA, Sage).
- Mussen, P. & Eisenberg-Berg, N. (1977) *Roots of caring, sharing, and helping* (San Francisco, CA, W.H. Freeman).
- Myers, G. (1997) Significant life experiences and choice of major among undergraduate minorities and nonminority students majoring in environmental studies and other disciplines, paper presented at the *Annual Conference of the North American Association for Environmental Education*, Vancouver, Canada.
- Neisser, U. (1981) John Dean’s memory, *Cognition*, 9(1), 1–22.
- Neisser, U. (1988) Time present and time past, in: M.M. Gruneberg, P.E. Morris & R.N. Sykes (Eds) *Practical aspects of memory*, Vol. 2, 545–560 (New York, John Wiley).
- Olweus, D., Block, J. & Radke-Yarrow, M. (Eds) (1986) *Development of antisocial and prosocial behavior* (Orlando, FL, Academic Press).
- Palmer, J. (1993) Development of concern for the environment and formative experiences of educators, *Journal of Environmental Education*, 24(3), 26–30.
- Palmer, J. (1994) Acquisition of environmental subject knowledge in pre-school children, *Children’s Environments*, 11(3), 204–211.
- Palmer, J. & Suggate, J. (1996) Influences and experiences affecting the pro-environmental behaviour of educators, *Environmental Education Research*, 2(1), 109–121.
- Palmer, J., Suggate, J., Bajd, B. & Tsaliki, E. (1998) Significant influences on the development of adults’ environmental awareness in the UK, Slovenia and Greece, *Environmental Education Research*, 4(4), 429–444.
- Palmer, J., Suggate, J., Robottom, I. & Hart, P. (forthcoming) Significant life experiences and formative influences on the development of adults’ environmental awareness in the UK, Australia and Canada, *Environmental Education Research*, 5(2).
- Peters Grant, V.M. (1986) The influences of life experiences on the vocational interests of volunteer environmental workers, unpublished doctoral dissertation, University of Maine, Orono.
- Peterson, N. (1982) Developmental variables affecting environmental sensitivity in professional environmental educators, unpublished master’s thesis, Southern Illinois University at Carbondale.
- Reisberg, D. & Heuer, F. (1992) Remembering the details of emotional events, in: E. Winograd & U. Neisser (Eds) *Affect and accuracy in recall*, 162–190 (Cambridge, Cambridge University Press).
- Ross, M. (1997) Validating memories, in: N.L. Stein, P.A. Ornstein, B. Tversky & C. Brainerd (Eds) *Memory for everyday and emotional events*, 49–81 (Mahwah, NJ, Lawrence Erlbaum).
- Ross, M. & Buehler, R. (1994) Creative remembering, in: U. Neisser & R. Fivush (Eds) *The remembering self*, 205–235 (New York, Cambridge University Press).
- Rubin, D.C., Wetzler, S.E. & Nebes, R.D. (1986) Autobiographical memory across the lifespan, in: D.C. Rubin (Ed.) *Autobiographical memory* (Cambridge, Cambridge University Press).

- Sanitioso, R., Kunda, Z. & Fong, G.T. (1990) Motivated recruitment of autobiographical memories, *Journal of Personality and Social Psychology*, 59(2), 229–241.
- Scholl Wilder, M. (1983) Significant childhood environmental learning experiences of suburban/urban environmentalists, in: J.H. Baldwin (Ed.) *Crossroads: society and technology*, 125–129 (Troy, OH, National [now North American] Association for Environmental Education).
- Schwarz, N. & Sudman, S. (Eds) (1993) *Autobiographical memory and the validity of retrospective Reports* (New York, Springer Verlag).
- Sia, A. (1984) An investigation of selected predictors of overt responsible environmental behavior, unpublished doctoral dissertation. Southern Illinois University at Carbondale.
- Sivek, D.J. & Hungerford, H.R. (1989/90) Predictors of responsible environmental behavior in members of three Wisconsin conservation organizations, *Journal of Environmental Education*, 21(2), 35–40.
- Strauss, A. & Corbin, J. (1990) *Basics of qualitative research* (Newbury Park, CA, Sage).
- Sward, L.L. (forthcoming) Significant life experiences affecting the environmental sensitivity of EI Salvadoran environmental professionals, *Environmental Education Research*, 5(2).
- Tanner, T. (1979) Formative influences in the lives of citizen conservationists, in: A.B. Sacks & C.B. Davis (Eds) *Current issues V: yearbook of environmental education and environmental studies*, 189–200 (Columbus, OH, Educational Resources Information Center and National [now North American] Association for Environmental Education).
- Tanner, T. (1980) Significant life experiences: a new research area in environmental education, *Journal of Environmental Education*, 11(4), 20–24.
- Wagenaar, W.A. (1986) My memory, *Cognitive Psychology*, 18(2), 225–252.
- Winkel, G.H. (1985) Ecological validity issues in field research settings, in: A. Baum & J.E. Singer (Eds) *Advances in environmental psychology*, Vol. 5, 1–41 (Hillsdale, NJ, Lawrence Erlbaum).