The New Environmental Paradigm Scale: From Marginality to Worldwide Use

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ABSTRACT: The New Environmental Paradigm (NEP) Scale, published in *The Journal of Environmental Education* by R. E. Dunlap and K. D. Van Liere (1978), has become the most widely used measure of environmental concern in the world and been employed in hundreds of studies in dozens of nations. This article tells the story of the NEP Scale, beginning with how the author developed the notion of an environmental paradigm and then decided to measure it. The author describes the original NEP Scale and its 3 revisions, 1 of which is rapidly replacing the 1978 version in most studies. The author then reviews current uses of the various NEP Scales and examines major criticisms of them. Last, the author discusses the failure of an ecological worldview to become institutionalized in the United States, stemming from intense opposition to it since the 1990s, and the need to understand the sources of this opposition and monitor the situation.

KEYWORDS: ecological worldview, New Ecological Paradigm, New Environmental Paradigm, New Environmental Paradigm Scale

In 1975, when designing a survey that included what would become the New Environmental Paradigm (NEP) Scale (Dunlap & Van Liere, 1978), I never imagined that 30 years later I would have the opportunity to reflect on what has become the world's most widely used measure of environmental concern. I did sense that Kent Van Liere, my research assistant, and I were onto something new and potentially important, but to say that the success of the NEP Scale has surprised me would be a major understatement. I appreciate being given the opportunity to reflect on the history of our measure and tell the story of the NEP Scale.

First, I begin with some historical context, describing the evolution of my intellectual interests that led to the realization that by the mid-1970s, an ecological worldview was diffusing from scientific circles to the larger society, and the fact that this new social paradigm represented a challenge to our society's dominant social paradigm. Second, I focus on the development of the original NEP Scale

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and note why it took several years for it to attract significant use. Third, I turn to my efforts to develop three different versions of the original scale, the latest of which—labeled the New Ecological Paradigm Scale (Dunlap, Van Liere, Mertig, & Jones, 2000)—has become a widely and increasingly used alternative not only because of its stronger psychometric properties but because it is better grounded theoretically. Fourth, I present a quick overview of some ways in which the various versions of the NEP Scale are being used in new and creative ways, followed by a brief discussion of critiques of the scales lodged over the years. Last, I reflect on why an ecological worldview has diffused far more slowly throughout society than I would have predicted three decades ago.

What I cannot offer is a comprehensive summary of the studies that have used the various versions of the NEP Scale, as the large number makes this impossible. A check of the Social Sciences Citation Index reveals (as of September 1, 2008) 379 citations to the original NEP Scale (Dunlap & Van Liere, 1978) and 141 to the increasingly used revision (Dunlap et al., 2000), whereas the comparable figures for the more inclusive Google Scholar are 586 and 282, respectively. Although many of the studies citing one or both of the NEP Scales do not use them, a substantial proportion (my sense is a sizable majority) do report the results of empirical research using at least a subset of NEP items, and summarizing results from such a large number of studies is beyond the scope of this article. Fortunately, a team of researchers in New Zealand has recently conducted a relatively extensive meta-analysis of NEP studies that takes a major step toward a comprehensive summary, and I review their findings in this article.

From Political Ideology to Social Paradigms

I began graduate work in sociology at the University of Oregon in 1967, intending to become a political sociologist largely because I had long been curious about why some people were liberals and others were conservatives, and why some voted Democrat and others Republican. My master's thesis involved a comparison of a small group of Oregon students active in the left-wing organization Students for a Democratic Society (SDS) with a small group active in the conservative organization Young Americans for Freedom (YAF). About the time I was turning my thesis into a publication, a major environmental controversy erupted in the Eugene area. The Willamette Valley was home to a large number of farmers whose crop was grass seed used for lawns, and they burned their fields at the end of the harvest in the belief that doing so resulted in better crops the following year. Unfortunately, the valley was also prone to inversions, and in the fall of 1969, smoke from field burning was trapped for days. The resulting pollution was severe and generated a major controversy.

Letters to the editor in the *Eugene Register-Guard* made it clear that many city residents were indignant and wanted the burning banned, and then a few farmers responded by arguing the economic necessity of field burning. What caught my eye, though, was a subsequent set of letters from city residents who defended the farmers, typically with arguments about the need for farmers to make a living but also by invoking the rights of land owners to use their property as they wished and the ills of government regulations in general. Although I decided there were not enough letters to allow for a meaningful content analysis, the manner in which the farmers and especially their defenders drew on traditional American values such as property rights and a laissez-faire approach to government stuck in my mind, and an interest in environmental issues was planted.

A few months later, the University of Oregon campus began to prepare for our nation's first Earth Day (April 22, 1970), and my environmental interests shifted into high gear. I awoke one day wondering if the student eco-activists were SDS members with a new cause, as some conservatives were alleging, or a new group of students. I had begun talking with Richard (Dick) Gale, a young faculty member who was a staunch conservationist and environmentalist, and Dick knew several students involved in Earth Day preparations. We quickly decided to mount a small study that would

compare a snowball sample of eco-activists with a representative sample of Oregon undergraduates. The questionnaire we constructed gathered data not only on the political views of our samples but also on a wide range of environmental items, including a small set designed to measure commitment to environmental protection versus traditional American rights such as using one's property as one sees fit, which we later published as the "Concern for Environmental Rights Scale" (Dunlap, Gale, & Rutherford, 1973).

However, my main interests were in comparing the political views of the eco-activists with those of the representative sample (Dunlap & Gale, 1972) and then using the latter to examine the relationships among party identification, political ideology, and various indicators of proenvironmental attitudes (Dunlap, 1975). The comparison showed that eco-activists were more liberal than the average Oregon student but hardly left-wingers, and the analyses of the representative sample revealed a tendency for Democrats and liberals to be more proenvironmental than their counterparts. My subsequent dissertation found even stronger partisan differences in proenvironmental voting among members of the Oregon Legislature (Dunlap & Gale, 1974). Thus, I had applied my political sociology interests to environmental issues and found a major new domain in which partisan and, in particular, ideological cleavages were apparent. I quickly concluded that the early image of environment as a consensual motherhood issue that could unite the nation after the intense conflicts of the 1960s seemed overly optimistic.

I joined the faculty of Washington State University in 1972 with a joint appointment in the Sociology and Rural Sociology departments, and the latter encouraged me to pursue my environmental interests. Having Don Dillman, who was in the process of developing survey research techniques that would revolutionize the use of mail surveys (Dillman, 1978), as a colleague reinforced my predilection for survey research, and I quickly turned to environmental surveys. The first one was a rather superficial examination of public support for environmental protection, measured by priorities for spending public funds (Dunlap & Dillman, 1976). However, in 1974 I taught my first graduate seminar, focusing on the sociology of environmental issues, and one of the texts I used—Pirages and Ehrlich's (1974) *ARK II*—had a major impact on my thinking.

Because of my early interest in American values and prior research on partisan and ideological cleavages over environmental protection, I was intrigued by Pirages and Ehrlich's (1974) concept of the dominant social paradigm (DSP), which they described as "the prominent world view, model, or frame of reference through which individuals or collectively, a society, interpret the meaning of the external world" (Pirages & Ehrlich, p. 43). The authors went on to argue that besides a commitment to individualism and laissez-faire government, America's DSP emphasized beliefs in progress, material abundance and the goodness of growth; faith in the efficacy of science and technology; and a view of nature as something to be subdued. Suddenly, I had a way to both ground and expand my interest in political cleavages over environmental issues. It seemed clear that despite widespread acceptance of the DSP throughout American society, conservatives and Republicans were more committed to at least major portions of it than were their political counterparts. Therefore, I decided that my next survey would include an effort to measure public commitment to the DSP and its relationship to support for environmental protection.

I also noted that Pirages and Ehrlich (1974) suggested, "The persistence of any society is threatened when its DSP no longer offers valid guidance for survival. . . . Today industrial society is threatened, not by external enemies, but by the uncritical acceptance of an outmoded DSP that cannot be sustained in the environment of the future" (p. 47). They also added that "today countless citizens *are* questioning many basic beliefs inherent in the DSP, for these beliefs are no longer useful in successfully interpreting social reality" (p. 44). These and other comments convinced me that the United States might be experiencing a shift in its DSP, but to what was unclear.

Emergence of the NEP to Challenge the DSP

During this period, my own personal paradigm, or worldview, was undergoing a major transformation. Having been raised in a northern California timber and fishing town, I had developed a utilitarian perspective on natural resources; however, reading the likes of Barry Commoner, Paul Ehrlich, and Garrett Hardin, along with literature produced by environmentalists, made me question my views. Waiting four hours to get gas on the way home after a Christmas visit to California at the end of 1973 in the midst of the 1973–74 energy crisis gave the thesis of the popular *Limits to Growth* (Meadows, Meadows, Randers, & Behrens, 1972) considerable plausibility in my mind. Also, living in the rolling wheat fields of eastern Washington made me more appreciative of the exceptional majesty of the coastal redwoods that I had previously taken for granted, and thus more open to the preservationist perspective of John Muir (1911) and Aldo Leopold's (1966) call for a land ethic.

Somehow all of this congealed, and I realized that at least some environmental advocates were not simply calling for stronger environmental protection measures but were definitely issuing challenges to the DSP, as Pirages and Ehrlich (1974) suggested. By 1975, I sensed that one could discern a new environmental paradigm emerging as a direct challenge to the DSP and decided to try to conceptualize and measure it along with the DSP. The problem was trying to capture its content and conceptualize it as a paradigm or worldview. Whereas the idea of scientific paradigms, as developed by Thomas Kuhn (1970), was highly popular in the 1970s, the notion of a societal-level paradigm or worldview was a novel concept. Although Pirages and Ehrlich provided a good sense of the DSP, they neither elaborated an alternative nor gave any hints as to how one might measure social paradigms.

Van Liere and I had already decided that we would conceptualize the DSP as multidimensional and were creating sets of items designed to measure support for laissez-faire government, the status quo, individual rights, and property rights, as well as faith in science and technology, economic growth, and material abundance and future prosperity. We drew several items from existing measures of political ideology for the first four (Dunlap & Van Liere, 1984) and created new items for the last four. But the content of the NEP was much less clear, so we settled on items tapping three major themes found in environmental literature (both from scientists and activists): existence of ecological limits to growth, importance of maintaining the balance of nature, and rejection of the anthropocentric notion that nature exists primarily for human use. Although this conceptualization of the NEP was far narrower than that for the DSP, we simply could not justify a more comprehensive approach in 1975, as the emerging paradigm seemed narrowly focused on environmental matters. This approach to measuring the DSP and NEP also meant that it was impossible to try to create items that would force respondents to choose between the NEP and DSP, so we played it safe and used standard Likert-type (agree–disagree) responses to each individual item.

We consulted with a number of environmental science faculty at Washington State to develop items designed to tap these three aspects of the nascent environmental paradigm or worldview, and then we included both the DSP and NEP items along with a large number of other environmental items in a questionnaire pretested in 1975. In 1976, we gave the final version to a representative sample of Washington State residents and members of a statewide environmental organization.

One of the mistakes Van Liere and I made was to intersperse the 12 NEP items (4 for each facet) among a large set of other Likert-type items used to measure support for pollution control, resource conservation, and population control (for these and other measures developed from the survey, see Van Liere & Dunlap, 1981). In the process of trying to create balance in terms of pro- and anti-environmental wording of the entire set of items, we lost sight of the need for balance among the NEP items per se and ended up with eight pro-NEP items and only four anti-NEP items. Worse,

all of the latter were designed to tap the anti-anthropocentrism facet. This proved a key weakness of the original scale. Another weakness was our failure to ground the measure in terms of attitude theory, as we were content to draw on the conception of social paradigms provided by Pirages and Ehrlich (Dunlap & Van Liere, 1978). The problem was that this new literature ignored mainstream social-psychological work on attitudes, beliefs, and values (e.g., Rokeach, 1968). But we were young, naive, and eager to study—even in a preliminary fashion—public support for social paradigms, and we had no precedents to draw on.

Creating the NEP Scale

The original NEP Scale emerged from this survey, as we found the 12 items to possess sufficient internal consistency (for the public sample, $\alpha = .81$) and reasonable evidence of unidimensionality to warrant them being treated as a singular summated rating scale. Although we had included items designed to tap three aspects—or what we would later term facets—of the NEP, we felt that if they constituted a coherent worldview, all 12 items should hang together. The evidence suggested that they did (Dunlap & Van Liere, 1978). This claim would be challenged in a few years by other researchers, creating an ongoing debate concerning the unidimensionality of the NEP Scale.

Van Liere and I were excited that our effort to develop a measure of commitment to the NEP had yielded a psychometrically defensible scale, but our enthusiasm was not widely shared for quite some time. For example, Heberlein (1981) expressed a skeptical attitude toward our NEP Scale in his review of early measures of environmental concern, noting, "Merely developing a 12-item scale is hardly evidence for a broad overarching new environmental paradigm" (p. 12). Standard (and well-designed) measures of environmental concern, such as Maloney, Ward, and Braucht's (1975) multidimensional Ecology Scale and Weigel and Weigel's (1978) Environmental Concern Scale, received more use than did the NEP Scale well into the 1980s. In fact, only a handful of studies used the NEP Scale until the late 1980s (Hawcroft & Milfont, 2008), and two key articles raised questions about the appropriateness of treating the scale as unidimensional (Albrecht, Bultena, Hoiberg, & Nowak, 1982; Geller & Lasley, 1985). My assumption is that items addressing limits to growth (e.g., "There are limits to growth beyond which our industrialized society cannot expand"), balance of nature (e.g., "Humans must live in harmony with nature in order to survive"), and anti-anthropocentrism (e.g., "Plants and animals exist primarily to be used by humans") were seen as too *far out* in the late 1970s and through much of the 1980s.

However, by the end of the 1980s, things began to change, as environmental issues were no longer confined to relatively localized air and water pollution, resource exploitation, land degradation, wildlife preservation, and so forth. Scales that included such items as "I'm not willing to give up driving on a weekend due to a smog alert" (Maloney et al., 1975), "Pollution is not personally affecting my life" (Weigel & Weigel, 1978), or "We should think of jobs first, and pollution second" (Van Liere & Dunlap, 1981) seemed somewhat dated in an era of growing awareness of regional acid rain, ozone thinning, tropical deforestation, loss of biodiversity, and the possibility of global warming. By 1990, the scientific community had begun to recognize the reality of global environmental change (GEC), as signified by Frank Press, President of the U.S. National Academy of Sciences (NAS), in his preface to a landmark NAS publication on GEC: "Human activities are transforming the global environment . . . [and] it is abundantly clear that human activities now match or even surpass natural processes as agents of change in the planetary environment" (Silver, 1990, p. iii). I believe growing awareness that humans were potentially disrupting the global ecosystem, with unknown but potentially huge repercussions, gave NEP items such as those previously noted far greater credence, and use of the NEP Scale increased rapidly in the 1990s (Dunlap et al., 2000).

Modifying and Revising the NEP Scale

During the early 1980s, well before the original NEP Scale became popular, I undertook a couple of efforts to revise it: one minor and one major. In 1981, I was invited to work with a marketing firm commissioned to do a large environmental survey for the Continental Group and was told that we could include some NEP items but probably not the entire scale. I reluctantly put together a set of six items—including two with original wording and four that represented minor to fairly significant revisions of the original wording—with the goal of having one pro-NEP and one anti-NEP item for each of the three facets: balance of nature, limits to growth, and anti-anthropocentrism. Unfortunately, during this period, my ability to work began to suffer greatly from what would be diagnosed years later as severe depression. One consequence was my failure to publish an article presenting the Short NEP Scale as I had intended. Thus, it simply appeared in a report that I helped prepare (Continental Group, 1982).

Around this time, John Pierce, a political science colleague at Washington State, became interested in our paradigm argument and wanted to use the NEP Scale in a survey, but he felt he would not have space for all 12 items. Thinking I would soon be publishing the short form, I shared it with him and he immediately put it to use, using the six items in a series of studies with various colleagues involving cross-national comparisons of the USA with Japan and Canada. The numerous articles published by Pierce and his colleagues from these projects, along with the books that provided their definitive statements (Pierce, Lovrich, Tsurutani, & Abe, 1989; Pierce, Steger, Steel, & Lovrich, 1992), gave considerable visibility to the 6-item NEP Scale, and several other researchers have used it. Although I was highly frustrated at having never presented the scale in a publication of my own, Pierce and most others have been very good about crediting me for it: It is often referred to as a short (or 6-item) version of Dunlap and Van Liere's NEP Scale.

During this difficult personal period, I also became engaged with a far more ambitious effort to revise the NEP Scale. Shortly after we had created the original scale, a variety of analysts—stimulated by the growing visibility of books such as Schumacher's *Small is Beautiful* (1973), Lovins's *Soft Energy Paths* (1977), and Henderson's *Creating Alternative Futures* (1978)—began to flesh out the traditional and emerging social paradigms as comprehensive and opposing worldviews that encompassed not only ecological concerns but also sociopolitical dimensions such as inequality, hierarchy, citizen participation, and decentralization (e.g., Brown, 1981; Elgin & Mitchell, 1977). Stephen Cotgrove, a creative British sociologist who had found our paradigm argument convincing, built on this literature to create a set of bipolar items covering a wide gamut of ecological, social, political, and economic domains. His items forced people to choose between responses reflecting support for the DSP and what he termed the *alternative environmental paradigm* (Cotgrove, 1982). American political scientist Lester Milbrath (1984) soon used his approach in a new study.

I believe that learning of Cotgrove's (1982) innovative work initially deepened my depression, as I felt that Van Liere and I had jumped the gun, trying to measure the NEP before its comprehensive challenge to the DSP had become more apparent. However, I was definitely intrigued by the use of bipolar items that forced respondents to make choices between the two paradigms, rather than measuring the NEP and DSP separately, with summated rating scales, as Van Liere and I had done (Dunlap & Van Liere, 1984). The use of bipolar items seemed an ideal way of measuring relative commitment to the competing paradigms and assessing the degree to which these now-comprehensive paradigms did represent reasonably coherent worldviews. Although rightly impressed by Cotgrove's innovativeness, I felt that he and Milbrath could have done a better job of conceptualizing the competing perspectives, in particular by distinguishing between beliefs and values, and establishing their coherence psychometrically.

Thus, when an opportunity came to work on a project on energy issues in Washington State in 1981, I eagerly jumped in with the goal of creating an improved measure of the DSP–NEP paradigm distinction. I spent months developing sets of items addressing beliefs about the nature of the world (e.g., finite vs. infinite), as well as those addressing values about how society should be organized (e.g., employ expert decision making vs. citizen participation). I pretested them numerous times before giving a questionnaire to a statewide sample of Washington residents and members of several energy interest groups that represented Lovins's (1977) hard-path–soft-path continuum (Dunlap & Olsen, 1984).

Unfortunately, my still-undiagnosed depression worsened, and after years of doing little with this rich data set that I had worked so hard to create, I ceded leadership to a colleague. Eventually, a book was published (Olsen, Lodwick, & Dunlap, 1992), but I was not pleased with it and even considered not having my name on it. Although our approach to measuring commitment to the competing paradigms sparked some use (e.g., Musser & Malkus, 1994), I believe the reason that neither our book nor those by Cotgrove (1982) and Milbrath (1984) stimulated widespread use of the bipolar measurement technique was the emergence of sustainable development in the late 1980s. By offering a synthesis of the traditional growth-oriented and new environment-oriented paradigms (e.g., Stockdale, 1989), sustainable development muddied the waters, so to speak. Growing numbers of people were no longer willing to accept the opposing DSP and NEP as a realistic depiction of the choices facing us because of the enormous appeal of sustainable development.

This helps account for why my third, and latest, revision of the NEP Scale has proven to be quite popular. In 1990, I developed a major revision of the original scale, a 15-item version termed the *New Ecological Paradigm Scale*, that simply measures degrees of endorsement (from low to high) of an ecological worldview. I managed to present it in a hastily written paper for a 1992 conference (Dunlap, Van Liere, Mertig, Catton & Howell, 1992) that ended up being widely circulated, leading to a fair number of studies using the revised scale. But a major revision, with my former students Angela Mertig and Robert Jones joining me and Van Liere as coauthors to reflect their contributions to creating the revised scale (Dunlap et al., 2000), was not published until 2000 because of the lingering depression and its consequences (digging out of a pile of long-overdue commitments and health problems generated by the resulting stress).

New Ecological Paradigm Scale

We specifically designed the New Ecological Paradigm Scale to deal with the weaknesses of the original NEP Scale. First, in continuing to focus on the ecological (and not sociopolitical) domain, we added two new facets of an ecological worldview. Drawing on my work with William Catton to explicate a human exemptionalism paradigm in the discipline of sociology (Catton & Dunlap, 1980), we added items aimed at measuring the degree to which respondents feel modern industrial society is exempt from ecological constraints. Second, because the notion of ecological crisis has become more credible with growing awareness of global problems such as climate change, we also added items dealing with the likelihood of eco-crises. Third, we developed three items for each of the resulting five facets. We worded the 15 items so as to produce 8 pro-NEP and 7 anti-NEP items and to ensure that no single facet was measured with items worded in only one direction. Fourth, we deleted outmoded terminology such as *mankind*. Last, stimulated in part by helpful colleagues (Stern, Dietz, & Guagnano, 1995), we made an effort to ground the NEP in relevant social-psychological theory—especially the work of Rokeach (1968)—by arguing that the NEP items were measuring primitive beliefs about the relationship between human beings and their environments.

The revised NEP Scale was used in a statewide survey of Washington residents in 1990, with a sample similar to that used in the 1976 survey, and it performed well. All 15 items hung together,

producing an alpha of .83, and all items loaded heavily on the first unrotated factor in a principal components analysis. As is almost always the case with a scale consisting of many items, more than one factor emerged, but the eigenvalue for the first was much larger than those for the three remaining factors. Thus, we concluded that the revised scale had sufficient internal consistency to be treated as a single scale, and many researchers have used it that way. We also found evidence that endorsement of the NEP had increased a modest amount among Washington residents from 1976 to 1990 (Dunlap et al., 2000).

The result was a much improved NEP Scale that has gained rapid use not only in the United States but internationally as well, in part because it was published in a highly visible symposium entitled "Promoting Environmentalism" that was coedited by Zelezny and Schultz (2000) and included contributions from several distinguished scholars. The revised scale, like the original one, continues to be viewed in various ways by different researchers who treat it as a measure of environmental concern, environmental values, and environmental attitudes, among other things. However, it is increasingly treated as a measure of environmental beliefs, which I believe is the most accurate interpretation, although *ecological worldview* is my personal preference for a descriptor because I believe the NEP Scale measures the degree to which respondents view the world ecologically.

Theoretical and Methodological Developments

The tendency to treat the NEP as a measure of ecological beliefs or worldview is common in studies that use theoretical models predicting environmental attitudes and behaviors. For example, Paul Stern, Tom Dietz, and other colleagues have incorporated the NEP as a measure of beliefs in their widely used value–belief–norm (VBN) model of environmental concern and behavior (e.g., Stern et al., 1995; Stern, Dietz, Abel, Guagnano, & Kalof, 1998), and Schultz and Zelezny (1998) follow suit in using the NEP in their update of Schwartz's norm-activation model (a predecessor to the VBN model). In contrast, although Fielding, McDonald, and Louis (in press) find the revised NEP Scale to perform as expected in an update of Ajzen's (1988) theory of planned behavior, they label it a measure of general environmental attitudes. Schultz and Zelezny (1999) and de Groot and Steg (2008) also treat the NEP Scale as a measure of environmental attitudes and find it useful in clarifying the value bases of environmental concern, which is the subject of a rapidly growing body of research since Stern and Dietz (1994) drew on the NEP in launching a search for biospheric values. Overall, it is encouraging to see the NEP Scale used successfully in sophisticated social-psychological models of environmental concern and behavior.

Other recent developments I find important include the use of the NEP Scale in studies of risk perception (e.g., Slimak & Dietz, 2006; Hall & Moran, 2006) and the growing tendency for economists to use it as a predictor of willingness to pay in contingent valuation studies (e.g., Cooper, Poe, & Bateman, 2004; Kotchen & Reiling, 2000). Similarly, an effort to develop a methodology using narratives to measure views akin to those tapped by the NEP Scale is quite interesting (Shanahan, Pelstring, & McComas, 1999). In addition, two efforts to develop versions of the NEP Scale for children—one using a standard Likert-type format with wording changes to make it suitable for use with upper elementary school-aged children (Manoli, Johnson, & Dunlap, 2007) and the other using a highly innovative adaptation of key themes of the NEP into games appropriate for first- and second-grade children (Evans et al., 2007)—should stimulate investigations of ecological worldviews among children.

Last, a team of New Zealand psychologists has completed a comprehensive meta-analysis of NEP studies that yields some important findings that overall reflect well on the NEP Scale (Hawcroft & Milfont, 2008; Milfont, Hawcroft, & Fischer, 2008). After locating over 300 articles citing a version

of the NEP Scale, they focused on 68 studies from 36 nations covering over 58,000 respondents and 140 separate samples conducted between 1987 and 2007, with a large majority conducted in the past decade. To be included in their meta-analysis, studies had to (a) use at least 5 NEP items from either the original or revised versions of the NEP Scale; (b) use adult samples; (c) be published in English, Spanish, or Portuguese; and (d) have the mean score for the sample(s) published or available from the authors.

A number of findings concerning the utility of the NEP Scales (and subsets of NEP items) were reported in Hawcroft and Milfont's (2008) first paper, which also provided a list of all 68 studies. First, despite the fact that differing versions of the NEP Scales (including some with as few as 5 items) were used in 36 different nations, the internal consistency was reasonably strong, as the alpha averaged .71 for all 140 samples used in the 68 studies. Internal consistency was stronger among studies conducted in more developed nations.

After creating standardized NEP scores for each sample, Hawcroft and Milfont (2008) examined the correlations between these scores and several factors that may influence them. At the bivariate level, the only significant correlate was year of study, and scores were lower for more recent studies because of the heavy use of unrepresentative samples of white-collar and environmentalist populations in early studies. Scores were not correlated significantly with the gender or age composition of the sample nor with the length of the scale, number of response categories for items, or internal consistency of the scale. However, in a multivariate (weighted least squares regression) analysis, use of white-collar or environmentalist samples and degree of internal consistency were positively correlated with scale scores, whereas the use of 10 or fewer items was correlated negatively. Hawcroft and Milfont concluded by noting that until an ideal measure comes along, researchers should use the 15-item Revised NEP Scale and do a better job of reporting information needed for making comparisons across studies to enhance the possibility of developing a cumulative body of evidence on environmental attitudes around the world.

In a companion paper, Milfont et al. (2008) used the same studies to create standardized, national-level NEP scores for 36 countries and then correlated those scores with a wide range of national characteristics and national-level scores on several social-psychological characteristics obtained from prior cross-national studies by other researchers. They found that national-level NEP scores were higher in countries that value harmony, collectivism, and intellectual and affective autonomy and lower in countries that endorse conservative and materialist values. These results are relatively consistent with a growing body of data on the relationship between proenvironmental views and personal values (e.g., Schultz & Zelezny, 1999). It is interesting that they find no relationship between gross domestic product (GDP) per capita and endorsement of the NEP, which is consistent with studies questioning the widely assumed correlation between national affluence and citizen concern for the environment (e.g., Dunlap & York, 2008). Last, Milfont et al. found that national-level NEP scores were positively related to nations' endorsement of international environmental treaties.

The creative uses of the NEP Scale reflected in the aforementioned literature are evidence that various versions can be used successfully in cross-national research and suggest that Lalonde and Jackson (2002) may have been premature when suggesting the NEP Scale has outlived it usefulness.

Criticisms of the NEP Scales

Like most widely used measuring instruments, all three versions of the NEP Scale—the original 12-item version, the 6-item version, and the 15-item revision—have been subjected to criticism. The potentially most serious critique came from Lalonde and Jackson (2002), who suggested that many items in the original NEP Scale were overly simplistic and outdated. They arrived at this conclusion

on the basis of (a) an Internet survey of 328 individuals from 23 nations participating on 20 listservs addressing environmental and religious issues who completed a questionnaire with the original 12-item NEP Scale and (b) follow-up responses from 222 of the same individuals asked to comment in detail on the NEP items.

Although Lalonde and Jackson's (2002) qualitative results are quite interesting and provide food for thought, there are problems with the study. First, despite expressing awareness of our unpublished 1992 paper presenting the Revised (15-item) NEP Scale (Dunlap et al. 1992), they chose to focus their 1996 study on the more dated 1978 version. Second, their samples consisted of highly educated individuals—many in academia, with strong interests and often expertise in areas concerning environmental issues—who were self-selected by their participation in listservs catering to people with strong environmental interests. Therefore, it is not surprising that, for example, a philosopher had problems with an item "that assumes humans and nature are distinct entities" (Lalonde & Jackson, p. 32), nor that a biologist had problems with another item and asked, "[A]re we talking about the physiological 'balance' of an individual organism, the ecological 'balance' of an ecosystem, or the 'balance' of fundamental laws of 'nature'?" (p. 34).

Although these are understandable and intelligent responses from highly educated experts, I find it difficult to imagine how one can phrase revised items to account for, for example, dynamic equilibria of ecosystems that could be used with representative samples of the general public whose technical knowledge of ecosystems is virtually nil. Thus, although I am not denying that individual items can be improved and updated, I find Lalonde and Jackson's (2002) critique to be unhelpful except to researchers who plan to conduct studies of highly educated and trained specialists in environmental issues.

A second criticism of the NEP Scale is that it is a poor predictor of environmental behaviors (e.g., Scott & Willits, 1994). Given that it has long been established that one reason for the common finding of weak attitude–behavior relations stems from use of broad attitudinal measures to predict specific behaviors (Weigel & Newman, 1976), there was never any reason to expect that the NEP Scale would be a strong predictor of behaviors. Yet, several more recent studies conducted in a variety of nations have found the NEP Scale to be a useful predictor of both reported and observed behavior (e.g., Casey & Scott, 2006; Olli, Grendstad, & Wollebaek, 2001). Furthermore, as previously noted, well-developed theoretical models, such as the VBN, now exist for predicting environmental behaviors, and the NEP Scale has become a key variable in these models (e.g., Steg, Dreijerink, & Abrahamse, 2005). If one's primary goal is to predict environmental behaviors, I recommend using the NEP Scale along with other variables in these models.

A third criticism sometimes leveled not only at the NEP Scale but also at the conceptualization of ecological worldviews on which it was built is that the NEP may not be applicable outside of developed Western nations (e.g., Chatterjee, 2008). This critique strikes me as potentially valid, but definitive evidence is not yet available. A number of studies in Eastern European nations (e.g., Gooch, 1995) and Latin American nations (e.g., Schultz & Zelezny, 1998) have found lower levels of internal consistency and more difficulty with respondents' understanding of some items than have studies in the United States and western European nations. However, marginally acceptable levels of internal consistency (αs = .65–.69) have been found for the original 12-item and the 6-item versions of the NEP Scale in studies of Japanese (Pierce, Lovrich, Tsurutani, & Abe, 1986), Korean (Shin, 2001) and Chinese (Lo, Fryxell, & Wong, 2006) samples. In addition, a growing number of researchers are using the NEP Scale in China (see Chung & Poon, 2001; Lo et al., 2006; and the references in both). The growing number of studies employing the NEP Scale in Asian nations, in addition to the fact that Hawcroft and Milfont (2008) found that the two main versions of the NEP Scale have been used in 36 nations, suggests that the NEP may be used productively outside

of developed Western countries. In particular, evidence suggests that it can be used for making cross-national comparisons (e.g., Vikan, Camino, Biaggio & Nordvik, 2007).

The final and most persistent criticism of the NEP Scale is that the various versions are not unidimensional, a finding reported early on by Albrecht et al. (1982) and repeated by numerous others. Albrecht et al. found that the original NEP Scale produced three distinct dimensions consisting of the balance of nature, limits to growth, and anti-anthropocentrism items, as have several subsequent studies. But other researchers have found anywhere from one to four factors (see Dunlap et al., 2000). Although a few analysts have tried to paint the lack of unidimensionality as a fatal flaw (Nooney, Woodrum, Hoban, & Clifford, 2003), I have argued that sets of 12 to 15 items will nearly always yield more than one factor—factors that are often sample specific—and a more realistic measure of a scale's utility is its degree of internal consistency (Dunlap et al., 2000).

At present, many analysts treat the NEP Scale as a singular measure (e.g., Shin, 2001; Slimak & Dietz, 2006; Steg et al., 2005), whereas others create subscales (typically tapping the three original dimensions reported by Albrecht et al. [1982] that correspond to the three conceptual facets in the original 12-item version) at the outset (Ebreo, Hershey, & Vining, 1999) or specify these three dimensions beforehand and conduct a confirmatory factor analysis to validate the tri-partite model (e.g., Corral-Verduggo, Bechtel, & Fraijo-Sing, 2003).

I have suggested that researchers should use the Revised NEP Scale and then decide on the basis of their data analyses whether to treat it as a single or multidimensional scale (Dunlap et al., 2000). Fortunately, the application of the belief-systems perspective (derived from political science) on environmental concern by Pierce and colleagues has turned questions about the dimensionality of the NEP Scale from a weakness into a potential strength. This perspective focuses attention on the degree to which beliefs are organized in a coherent fashion, with high levels of *constraint* (defined as strongly correlated sets of beliefs) reflecting a more coherent belief system and low levels of constraint reflecting a less coherent one (see Pierce & Lovrich, 1980). Historically, studies of political belief systems have found political elites and activists to possess more coherent belief systems than the general public (e.g., Jennings, 1992).

Pierce and colleagues used the 6-item NEP Scale in studies comparing the organization of belief systems of citizens, activists, and political officials in the United States with those in Japan, using both internal consistency and factor analyses to compare the structure of NEP beliefs across the two nations as well as among the differing strata in each one (Pierce et al., 1989; Pierce et al., 1986). Independently, psychologist Robert Bechtel and his colleagues have adopted a similar approach, examining the dimensionality of the original NEP Scale in cross-national studies to demonstrate variation in the structure of an ecological worldview across cultures (Bechtel, Corral-Verdugo, & Pinheiro, 1999; Bechtel, Corral-Verdugo, Asai, & Riesle, 2006). These researchers have demonstrated the utility of analyzing the dimensionality of the NEP cross-culturally, and I am hopeful that future studies will do the same with the 15-item Revised NEP Scale. The belief-systems approach regards the potential multidimensionality of the NEP not as a problem but as a means of documenting variation in the structure and coherence of an ecological worldview across cultures and among social strata in individual nations. This perspective opens up new vistas for the use of the NEP Scale in comparative research.

Opposition to a Societal Paradigm Shift

Although use of the NEP Scale has clearly spread around the world, it is apparent that an ecological worldview has diffused more slowly in our own society than I would have expected in the 1970s. In retrospect, I believe I was naively assuming that societal paradigms would change in response to perceived changes in reality much as scientific paradigms change (albeit slowly and begrudgingly at

times) in response to new evidence. It is clear that in science, defenders of established paradigms do not readily abandon their views in the face of disconfirming evidence (e.g., Oreskes, 1999), but over the past few decades we have learned that defenders of the DSP can bring enormous resources to bear in mounting effective counterattacks to challenges to their hegemony, discrediting both the challenging ideas and evidence, as well as those who promote them.

In response to the turmoil of the 1960s and what was seen as a dangerous shift to the left promoted by various progressive social movements, conservative economic and political elites began to develop a powerful conservative countermovement spearheaded by conservative foundations and think tanks that helped bring about the Reagan Revolution and a major shift in the policy agenda of the United States (e.g., Stefanic & Delgado, 1996). Whereas in the late 1970s, Jimmy Carter had acknowledged the reality of limits and instituted effective energy conservation programs, Ronald Reagan came into office vowing to make America great again. Reagan dismissed the idea of limits by adopting the views of Julian Simon (1981), who proclaimed that human ingenuity was the ultimate resource and that environmental and resource problems could easily be dealt with via science and technology (see Dunlap & Catton, 1994, and references therein), and thus effectively rejected the nascent NEP.

Nonetheless, the *environmental decade*, as the 1970s was sometimes termed, had created a sufficient level of environmental awareness and concern among Americans that the Reagan administration's assault on environmental regulations provoked a significant backlash (Dunlap, 1991). Conservatives learned from this experience and realized that it was more effective to challenge the seriousness of environmental problems and thereby the need for environmental regulations. In the 1990s, conservative think tanks, political commentators, and political elites launched a full-scale effort to undermine environmental science and claims that environmental quality was in jeopardy (Jacques, Dunlap, & Freeman, 2008). The conservative attacks extended to environmental education programs (e.g., Sanera & Shaw, 1996).

The overall result of this largely successful assault was the delegitimization of environmental science (Ehrlich & Ehrlich, 1996), and growing skepticism about the seriousness of environmental problems and the need for environmental regulations among a large sector of society. This staunch antienvironmental orientation—promoted effectively by conservative think tanks and conservative media figures such as Rush Limbaugh (Jacques et al., 2008)—was institutionalized through the George W. Bush administration, which has been charged not only with weakening environmental regulations (Pope & Rauber, 2004) but also with undermining the federal government's ability to produce and use environmental science (Shulman, 2006). Evidence of this reinstitutionalization of the DSP abounds, as topics such as energy conservation, sustainable development, population growth, loss of biodiversity, and even climate change are virtually absent from the policy agenda of the United States.

At the same time, a shift toward an ecological worldview has made considerable progress in scientific disciplines and academia, as evidenced by the proliferation (since 1970) of environmental science and studies programs; the revitalization of ecology as a discipline; and the emergence of Earth science, conservation science, climate science, sustainability science, and other fields investigating aspects of global environmental change. The evidence for anthropogenic GEC is so compelling that analysts have begun to argue that the Earth has passed from the Holocene into the Anthropocene epoch:

> The term *Anthropocene* suggests that the Earth has now left its natural geological epoch, the present interglacial state called the Holocene. Human activities have become so pervasive and profound that they rival the great forces of Nature and are pushing the Earth into planetary *terra incognita.* The Earth is rapidly moving into a less biologically diverse, less forested, much warmer,

> and probably wetter and stormier state. . . . The phenomenon of global change represents a profound shift in the relationship between humans and the rest of nature. (Steffen, Crutzen, & McNeill, 2007)

In short, scientists increasingly recognize the reality of changed ecological conditions that necessitate viewing the world through a new paradigm, and I believe it is fair to say that something akin to the NEP has come to replace the older mechanistic, reductionistic, and technologically optimistic worldview that guided science a few decades ago.

Conclusion

At this point, the question becomes how to spread this rapidly growing ecological worldview from scientific and academic communities to society at large. The necessity of doing so stems from Pirages and Ehrlich's (1974) earlier noted and highly prescient warning that a "society is threatened when its DSP no longer offers valid guidance for survival" (p. 47). Despite the current institutionalization of an antienvironmental perspective that would have been unimaginable in the early 1970s, I believe that environmental education—both formal and informal from the elementary to university levels—has continued to help infuse an ecological worldview among younger generations. In fact, evidence suggests that even short educational programs may stimulate an increase in NEP scores among children (Manoli et al., 2007) and college students (Rideout, 2005). Also, many adults who came of age in the 1960s and 1970s retain an environmental sensibility. Still, it is clear that environmental skepticism has become widespread, as significant sectors of the public have absorbed the antienvironmental message of conservative elites and, for example, question the reality and significance of global warming (Dunlap & McCright, 2008).

In the short term, reestablishing momentum toward societal adoption of an NEP will depend on political change, in particular the institutionalization of leadership that relies on and promotes scientific understanding of ecological conditions, rather than environmental skepticism. In the long term, it will rest on the ability of scientists, citizens, and policy makers to recognize and acknowledge the reality of ecological deterioration. In a sense, we are in the midst of a paradigm war, with two sides attempting to give highly divergent interpretations of ecological realities. Investigating and tracking changes in worldviews seems particularly important, and if the NEP Scale can be useful in this regard, I will feel even better about the modest research project Van Liere and I initiated three decades ago.

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