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Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale

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Dunlap and Van Liere's New Environmental Paradigm (NEP) Scale, published in 1978, has become a widely used measure of proenvironmental orientation. This article develops a revised NEP Scale designed to improve upon the original one in several respects: (1) It taps a wider range of facets of an ecological worldview, (2) It offers a balanced set of pro- and anti-NEP items, and (3) It avoids outmoded terminology. The new scale, termed the New Ecological Paradigm Scale, consists of 15 items. Results of a 1990 Washington State survey suggest that the items can be treated as an internally consistent summated rating scale and also indicate a modest growth in pro-NEP responses among Washington residents over the 14 years since the original study.

When environmental issues achieved a prominent position on our nation's policy agenda in the 1970s, the major problems receiving attention tended to be air

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and water pollution, loss of aesthetic values, and resource (especially energy) conservation. Consequently, attempts to measure public concern for environmental quality, or "environmental concern," focused primarily on such conditions (e.g., Weigel & Weigel, 1978). In recent decades, however, environmental problems have evolved in significant ways. Although localized pollution, especially hazardous waste, continues to be a major issue, environmental problems have generally tended to become more geographically dispersed, less directly observable, and more ambiguous in origin. Not only do problems such as ozone depletion, deforestation, loss of biodiversity, and climate change cover far wider geographical areas (often reaching the global level), but their causes are complex and synergistic and their solutions complicated and problematic (Stern, Young, & Druckman, 1992). Researchers interested in understanding how the public sees environmental problems are gradually paying attention to these newly emerging "attitude objects" (Stern, Dietz, Kalof, & Guagnano, 1995), and the number of studies of public perceptions of issues such as global warming is slowly mounting (Dunlap, 1998; O'Connor, Bord, & Fisher, 1999).

The emergence of global environmental problems as major policy issues symbolizes the growing awareness of the problematic relationship between modern industrialized societies and the physical environments on which they depend (Stern et al., 1992). Recognition that human activities are altering the ecosystems on which our existence—and that of all other living species—is dependent and growing acknowledgment of the necessity of achieving more sustainable forms of development give credence to suggestions that we are in the midst of a fundamental reevaluation of the underlying worldview that has guided our relationship to the physical environment (e.g., Milbrath, 1984). In particular, suggestions that a more ecologically sound worldview is emerging have gained credibility in the past decade (e.g., Olsen, Lodwick, & Dunlap, 1992).

In this context, it is not surprising to see that traditional measures of "environmental concern" are being supplanted by instruments seeking to measure "ecological consciousness" (Ellis & Thompson, 1997), "anthropocentrism" (Chandler & Dreger, 1993), and "anthropocentrism versus ecocentrism" (Thompson & Barton, 1994). The purpose of this article is to provide a revision of the earliest such measure of endorsement of an ecological worldview, the New Environmental Paradigm Scale (Dunlap & Van Liere, 1978).

The New *Environmental* Paradigm Scale

Development of the Scale

Sensing that environmentalists were calling for more far-reaching changes than the development of environmental protection policies and stimulated by Pirages and Ehrlich's (1974) explication of the antienvironmental thrust of our

society's dominant social paradigm (DSP), in the mid-1970s Dunlap and Van Liere argued that implicit within environmentalism was a challenge to our fundamental views about nature and humans' relationship to it. Their conceptualization of what they called the New Environmental Paradigm (NEP) focused on beliefs about humanity's ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity's right to rule over the rest of nature. In a 1976 Washington State study Dunlap and Van Liere (1978) found that a set of 12 Likert items measuring these three facets of the new social paradigm or worldview exhibited a good deal of internal consistency (coefficient alpha of .81), and strongly discriminated between known environmentalists and the general public. Consequently, they argued that the items could legitimately be treated as a New Environmental Paradigm Scale, and found that endorsement of the NEP was, as expected, negatively related to endorsement of the DSP (Dunlap & Van Liere, 1984). [Dunlap and Van Liere later developed a six-item NEP Scale for use in a national survey for the Continental Group (1982) that has subsequently been used by several researchers, particularly political scientists (Pierce, Steger, Steel, & Lovrich, 1992).]

Drawing upon a spate of literature in the late 1970s and early 1980s that explicated more fully the contrast between the emerging environmental paradigm and the dominant social paradigm (e.g., Brown, 1981), subsequent researchers provided far more comprehensive conceptualizations of the NEP and DSP (Cotgrove, 1982; Milbrath, 1984; Olsen et al., 1992). However, their elaborate measuring instruments, encompassing a wide range of both beliefs and values, have proven unwieldy, and the NEP Scale has become the far more widely used measure of an environmental or, as now seems the more appropriate label, "ecological" worldview. Also, because the emergence of global environmental change has made items like "The balance of nature is very delicate and easily upset" more relevant now than in the 1970s, and because alternative measures of environmental concern widely used in the 1970s and early 1980s focusing on specific types of environmental problems have become dated (e.g., Weigel & Weigel, 1978), the NEP Scale has also become a popular measure of environmental concern, with endorsement of the NEP treated as reflecting a proenvironmental orientation.

The fact that the NEP Scale is treated as a measure of endorsement of a fundamental paradigm or worldview, as well as of environmental attitudes, beliefs, and even values, reflects the ambiguity inherent in measuring these phenomena as well as Dunlap and Van Liere's failure to ground the NEP in social-psychological theories of attitude structure (Stern, Dietz, & Guagnano, 1995). Although attitude theory cautions against categorizing individual items as clear-cut indicators of attitudes *or* beliefs (see, e.g., Eagly & Kulesa, 1997), in retrospect it nonetheless seems reasonable to argue that the NEP items primarily tap "primitive beliefs" about the nature of the earth and humanity's relationship with it. According to Rokeach (1968, p. 6), primitive beliefs form the inner core of a person's belief

system and "represent his 'basic truths' about physical reality, social reality and the nature of the self." Though not as foundational as the examples used by Rokeach, beliefs about nature and humans' role in it as measured by the NEP items appear to constitute a fundamental component of people's belief systems vis-à-vis the environment.

Social psychologists see these primitive beliefs as influencing a wide range of beliefs and attitudes concerning more specific environmental issues (see Gray, 1985, chap. 2, and Stern, Dietz, & Guagnano, 1995a, for two alternative but complementary models incorporating the NEP as a measure of primitive beliefs). Similarly, political scientists find the NEP beliefs to be a core element in comprehensive environmental belief systems (Dalton, Gontmacher, Lovrich, & Pierce, 1999; Pierce, Lovrich, Tsurutani, & Takematsu, 1987). A consensus that the NEP items measure such beliefs (Edgell & Nowell, 1989; Gooch, 1995) is emerging, and it seems reasonable to regard a coherent set of these beliefs as constituting a paradigm or worldview that influences attitudes and beliefs toward more specific environmental issues (Dalton et al., 1999). In short, a proecological orientation or "seeing the world ecologically," reflected by a high score on the NEP Scale, should lead to proenvironmental beliefs and attitudes on a wide range of issues (Pierce, Dalton, & Zaitsev, 1999; Stern, Dietz, & Guagnano, 1995). Although such beliefs may also influence behavior, the barriers and opportunities that influence proenvironmental behaviors in specific situations caution against expecting a strong NEP-behavior relationship (Gardner & Stern, 1996).

Past Research and Validity of the NEP Scale

Although treated variously as measuring environmental attitudes, beliefs, values, and worldview, the NEP Scale has been widely used during the past 2 decades. It has been used most often with samples of the general public, but it has also been used with samples of specific sectors such as farmers (Albrecht, Bultena, Hoiberg, & Nowak, 1982) and members of interest groups (e.g., Edgell & Nowell, 1989; Pierce et al., 1992). It has been used as well to examine the environmental orientations of ethnic minorities in the United States (e.g., Caron, 1989; Noe & Snow, 1989–90) as well as of residents of other nations such as Canada (Edgell & Nowell, 1989), Sweden (Widegren, 1998), the Baltic states (Gooch, 1995), Turkey (Furman, 1998), and Japan (Pierce et al., 1987). Finally, it has recently been used to compare the environmental orientations of college students in several Latin American nations and Spain with those of American students (Bechtel, Verdugo, & Pinheiro, 1999; Schultz & Zelezny, 1998). In general, these studies have found, as did Dunlap and Van Liere (1978) in their 1976 Washington State survey, a relatively strong endorsement of NEP beliefs across the various samples.

Rather than attempt to summarize the dozens of studies that have employed the NEP items, we will cite selected findings that bear on the validity of the NEP

Scale. As noted previously, studies of interest groups such as environmental organizations have consistently found that environmentalists score higher on the NEP Scale than do the general public or members of nonenvironmental interest groups (e.g., Edgell & Nowell, 1989; Pierce et al., 1992; Widegren, 1998). These findings suggest, as did Dunlap and Van Liere's (1978) original study, that the NEP Scale has known-group validity. Similarly, despite the difficulty of predicting behaviors from general attitudes and beliefs, numerous studies have found significant relationships between the NEP Scale and various types of behavioral intentions as well as both self-reported and observed behaviors (e.g., Blake, Guppy, & Urmetzer, 1997; Ebreo, Hershey, & Vining, 1999; O'Connor et al., 1999; Roberts & Bacon, 1997; Schultz & Oskamp, 1996; Schultz & Zelezny, 1998; Scott & Willits, 1994; Stern, Dietz, & Guagnano, 1995a; Tarrant & Cordell, 1997; Vining & Ebreo, 1992). Such findings clearly indicate that the NEP Scale possesses predictive validity as well. Since both predictive and known-group validity are forms of criterion validity (Zeller & Carmines, 1980, pp. 79–81), the overall evidence thus suggests that the NEP possesses criterion validity.

Judging the content validity of the NEP Scale is more difficult, especially since the construct of an environmental/ecological paradigm or worldview is inherently somewhat amorphous. A recent study by Kempton, Boster, and Hartley (1995), however, that employed in-depth, ethnographic interviews in an effort to flesh out the environmental perspectives of Americans is highly relevant in this regard. Although their methods were dramatically different than those employed in the development and construction of the NEP Scale, on the basis of responses to their unstructured interviews Kempton et al. (1995, chap. 3) concluded that three general sets of environmental beliefs play crucial roles in the "cultural models" by which Americans attempt to make sense of environmental issues: (1) Nature is a limited resource upon which humans rely; (2) Nature is balanced, highly interdependent and complex, and therefore susceptible to human interference; and (3) Materialism and lack of contact with nature have led our society to devalue nature. That Kempton et al. found three nearly identical beliefs to those forming the major facets of the NEP Scale—balance of nature, limits to growth, and human domination over nature—is strong confirmation of the scale's content validity.

Judging the construct validity of measuring instruments is difficult because it depends on how the measure relates to other measures in ways that are theoretically specified (Zeller & Carmines, 1980, pp. 80–84). Original claims of the NEP Scale's construct validity (Dunlap & Van Liere, 1978, p. 16) were limited to the fact that scores on it were related in the expected fashion with personal characteristics such as age (younger people were assumed to be less wedded to traditional worldviews and thus more supportive of the NEP), education (the better educated were assumed to be exposed to more information about environmental issues and to be more capable of comprehending the ecological perspective implicit in the NEP) and political ideology (liberals were assumed to be less committed to the

status quo in general and the DSP in particular). Although there have been some exceptions, most studies have continued to find support for the NEP to be negatively related to age and positively related to education and liberalism.

More importantly, studies that have examined the presumed intervening links between these variables and support for the NEP, such as those that have documented the assumed positive relationship between environmental knowledge and endorsement of the NEP (Arcury, 1990; Arcury, Johnson, & Scollay, 1986; Furman, 1998; Pierce et al., 1992) and two that found a negative relationship between right-wing authoritarianism and support for the NEP (Lefcourt, 1996; Schultz & Stone, 1994), are beginning to provide more convincing evidence of the NEP Scale's construct validity. But the most important evidence of the NEP Scale's construct validity comes from studies that have theorized that the NEP forms a primary component, along with fundamental values, of environmental belief systems and then have found this expectation empirically confirmed (Pierce et al., 1987; Stern, Dietz, & Guagnano, 1995). As theoretical models of the sources of environmental attitudes and behaviors that assign a key role to the NEP are developed, tested, and confirmed, evidence of the NEP Scale's construct validity should increase.

Dimensionality of the NEP Scale

While the bulk of available evidence converges to suggest the overall validity of the NEP Scale, there is far less consensus on the question of whether the scale measures a single construct or is inherently multidimensional. After a series of U.S. studies (Albrecht et al., 1982; Geller & Lasley, 1985; Noe & Snow, 1990) produced similar results via factor analysis, suggesting that the NEP is composed of three distinct dimensions—balance of nature, limits to growth, and human domination of nature—some researchers began to routinely measure each dimension separately (e.g., Arcury, 1990; Ebreo et al., 1999; Vining & Ebreo, 1992). A careful review of studies that have factor-analyzed the NEP items, however, reveals considerable inconsistency in the number of dimensions actually obtained: Three studies (Edgell & Nowell, 1989; Lefcourt, 1996; Noe & Snow, 1990, p. 24) found all items to load on a single factor with at least one of their samples, and several studies have found only two dimensions in one or more of their samples (Bechtel et al., 1999; Gooch, 1995; Noe & Snow, 1989–90, 1990; Noe & Hammitt, 1992; Scott & Willits, 1994). Although a number of studies have found three dimensions similar to those noted above in one or more samples (Edgell & Nowell, 1989; Noe & Snow, 1989–90; Shetzer, Stackman, & Moore, 1991), still others have found as many as four dimensions (Furman, 1998; Roberts & Bacon, 1997).

The above results, combined with the fact that studies finding three dimensions often report some discrepancies in the loadings of individual items, suggest that it may be premature to assume automatically that the 12 NEP items measure three distinct dimensions. We encourage researchers to at least factor-analyze the

entire set of items at the outset to determine if the three widely used dimensions do in fact emerge. Factor-analyzing 12 items typically yields two or more dimensions, but as the above results indicate, the dimensions are often sample specific. For this reason, some researchers see unidimensionality as an unrealistic goal and settle for a high level of internal consistency, as measured by strong item-total correlations, high loadings on the first *unrotated* factor, and an acceptable (0.7 or higher) value for coefficient alpha, the mean of all possible split-half reliabilities (Zeller & Carmines, 1980, chap. 3). Although internal consistency is generally a necessary but not a sufficient condition for unidimensionality, it provides a reasonable rationale for combining a set of items into a single measure rather than creating ad hoc dimensions that emerge from various factoring techniques.

The decision to break the NEP items into two or more dimensions should depend upon the results of the individual study. If two or more distinct dimensions that have face validity emerge and are not highly correlated with one another, then it is sensible to employ them as separate variables. If substantively meaningful dimensions do not emerge, however, and the entire set of items (or at least a majority of them) are found to produce an internally consistent measure, then we recommend treating the NEP Scale as a single variable. Although the notion of a worldview or paradigm implies some consistency (in terms of taking pro- or anti-NEP positions) in responses to the NEP items, it is not unreasonable to expect that discernible dimensions will emerge in some samples, as populations vary in terms of how well their belief systems are organized into coherent frameworks (e.g., Bechtel et al. 1999; Dalton et al., 1999; Gooch, 1995; Pierce et al., 1987). Thus, the decision to treat the NEP as a single variable or as multiple variables should not be made beforehand but ought to be based on the results of the particular study. Whether used as a single scale or as a multidimensional measure, the NEP can still be fruitfully employed to examine the structure and coherence of ecological worldviews and the relationships between these worldviews and a range of more specific environmental attitudes, beliefs, and behaviors.

Finally, it should also be noted that the apparent multidimensionality of the NEP items may stem in part from a serious flaw in the original 12-item NEP Scale. Only 4 of the 12 items were worded in an anti-NEP direction, *and all 4 focused on anthropocentrism or the belief that nature exists primarily for human use and has no inherent value of its own*. That these items generally form a distinct dimension (often termed "domination of nature") in factor-analytic studies reporting two or more dimensions may thus represent a methodological artifact, reflecting the direction of their wording relative to the rest of the items (see, e.g., Green & Citrin, 1994).

The Study

To address the directionality imbalance in the original NEP Scale and to update and broaden the scale's content, we have developed a revised NEP Scale. In

keeping with the growing salience of broad "ecological" (as opposed to narrower, more specific, and less systemic "environmental") problems facing the modern world, this new and hopefully improved instrument is labeled the "New *Ecological* Paradigm Scale."

Data Collection

After being pretested with college students, the new set of NEP items was used in a 1990 mail survey of a representative sample of Washington State residents (as was the original set of items). A questionnaire covering a wide range of environmental issues was mailed out in early March of that year, and the data collection ended in early May. It proved impossible to contact 145 members of the sample of 1,300 (because of their having moved and left no forwarding addresses, being deceased, etc.), and 676 completed questionnaires were received from the remaining 1,155 potential respondents, for a completion rate of 58.5%. Given that funding allowed for only two follow-ups, rather than the recommended three (Dillman, 1978), this is a reasonably good overall response rate.

Item Construction and Modification

Besides achieving a better balance between pro- and anti-NEP statements, we also wanted to broaden the content of the scale beyond the original three facets of balance of nature, limits to growth, and antianthropocentrism. The notion of "human exemptionalism," or the idea that humans—unlike other species—are exempt from the constraints of nature (Dunlap & Catton, 1994), became prominent in the 1980s through the efforts of Julian Simon and other defenders of the DSP. In addition, the emergence of ozone depletion, climate change, and human-induced global environmental change in general suggested the importance of including items focusing on the likelihood of potentially catastrophic environmental changes or "ecocrises" besetting humankind. Consequently, we added items to tap both the exemptionalism and ecocrisis facets. Finally, we wanted to modify the outmoded sexist terminology ("mankind") present in some of the original items and decided to include an "unsure" category as a midpoint to cut down on item nonresponse.

The set of 15 items shown in Table 1 (including 6 from the original NEP Scale, 4 of which are modified very slightly) was constructed to achieve these purposes. Three items were designed to tap each of the five hypothesized facets of an ecological worldview: the reality of limits to growth (1, 6, 11), antianthropocentrism (2, 7, 12), the fragility of nature's balance (3, 8, 13), rejection of exemptionalism (4, 9, 14) and the possibility of an ecocrisis (5, 10, 15). (Item 5 was in the original NEP Scale and typically showed up in the "balance" dimension.) The eight odd-numbered items were worded so that agreement indicates a proecological view, and the seven even-numbered ones so that disagreement indicates a proecological worldview.

Table 1. Frequency Distributions and Corrected Item-Total Correlations for New Ecological Paradigm Scale Items[a]

Do you agree or disagree[b] that:	SA[c]	MA	U	MD	SD	(*N*)	r_{i-t}
1. We are approaching the limit of the number of people the earth can support	27.7%	25.2%	21.0%	16.0%	10.0%	(667)	.43
2. Humans have the right to modify the natural environment to suit their needs	4.1	28.5	9.2	33.9	24.3	(663)	.35
3. When humans interfere with nature it often produces disastrous consequences	44.6	37.6	4.0	11.2	2.5	(668)	.42
4. Human ingenuity will insure that we do NOT make the earth unlivable	7.8	23.5	21.5	24.4	22.7	(664)	.38
5. Humans are severely abusing the environment	51.3	35.3	2.6	9.3	1.5	(665)	.53
6. The earth has plenty of natural resources if we just learn how to develop them	24.4	34.8	11.3	17.5	11.9	(663)	.34
7. Plants and animals have as much right as humans to exist	44.7	32.2	4.7	12.8	5.7	(665)	.46
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations	1.1	7.4	11.3	30.9	49.4	(664)	.53
9. Despite our special abilities humans are still subject to the laws of nature	59.6	31.3	5.4	2.9	0.8	(664)	.33
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated	3.9	17.9	13.8	25.9	38.5	(665)	.62
11. The earth is like a spaceship with very limited room and resources	38.0	36.3	7.5	13.4	4.8	(664)	.51
12. Humans were meant to rule over the rest of nature	13.5	20.4	8.2	23.9	34.0	(661)	.51
13. The balance of nature is very delicate and easily upset	45.9	32.8	5.9	14.1	1.4	(665)	.48
14. Humans will eventually learn enough about how nature works to be able to control it	3.2	20.1	24.2	27.9	24.6	(666)	.35
15. If things continue on their present course, we will soon experience a major ecological catastrophe	34.3	31.0	16.9	14.1	3.6	(667)	.62

[a]Question wording: "Listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you STRONGLY AGREE, MILDLY AGREE, are UNSURE, MILDLY DISAGREE or STRONGLY DISAGREE with it."
[b]Agreement with the eight odd-numbered items and disagreement with the seven even-numbered items indicate pro-NEP responses.
[c]SA = Strongly Agree, MA = Mildly Agree, U = Unsure, MD = Mildly Disagree, and SD = Strongly Disagree.

Results

The percentage distributions for responses to each of the 15 items are shown in Table 1. As in past studies, overall there is a tendency for respondents to endorse proecological beliefs, as pluralities and often majorities (sometimes large ones) do so on every item. This is especially true for seeing the balance of nature as being threatened by human activities but is much less true for accepting the idea that there are limits to growth. There is also considerable variation in the proportions being "unsure" about the various statements, as over 20% are unsure about items 1 (on limits) and 4 and 14 (both on human exemptionalism).

Constructing a New Ecological Paradigm Scale

We were particularly interested in determining if the 15 items can legitimately be treated as measuring a single construct. A high degree of internal consistency is a necessary condition for combining a set of items into a single measure as well as an appropriate (albeit not essential) expectation for item responses constituting a reasonably coherent worldview, so we began by examining the consistency of responses to the 15 items. The last column in Table 1 shows the corrected item-total correlations for each item. All of these correlations are reasonably strong, ranging from a low of .33 to a high of .62. Not surprisingly, then, coefficient alpha is a very respectable .83. Furthermore, deletion of any of the 15 items lowers the value of alpha. Thus, the evidence from this initial survey suggests that the set of 15 items can be treated as constituting an internally consistent measuring instrument (Mueller, 1986).

Another means of assessing internal consistency is via principal-components analysis. All 15 items load heavily (from .40 to.73) on the first unrotated factor, and this factor explains 31.3% of the total variance among the items (compared to only 10% for the second factor extracted). This and the pattern of eigenvalues (4.7, 1.5, 1.2, and 1.1) suggest the presence of one major factor and thus reinforce the prior evidence concerning the internal consistency of the revised NEP Scale (Zeller & Carmines, 1980, chap. 3).

Because the dimensionality of the original NEP Scale has frequently been investigated, we employed varimax rotation to create orthogonal dimensions, and the results are shown in Table 2. When the four factors with eigenvalues greater than one are subjected to a varimax rotation, six items load most heavily on the first factor: the three ecocrisis items (5, 10, 15), two balance-of-nature items (3, 13), and one exemptionalism item (9). In addition, three other items that load most heavily on other factors have substantial cross-loadings on the first factor: one antianthropocentrism item (7), one limits-to-growth item (11), and one balance-of-nature item (8). These results suggest the first and major factor taps the balance and ecocrisis facets heavily but also incorporates the remaining three facets to

Table 2. Principal Components Analysis of NEP Items With Varimax Rotation

		Factors			
		1	2	3	4
NEP 3	(Balance)	**60**	04	07	19
NEP 5	(Eco-Crisis)	**71**	12	20	09
NEP 9	(Anti-Exempt)	**62**	20	–15	00
NEP 10	(Eco-Crisis)	**54**	**36**	27	22
NEP 13	(Balance)	**60**	00	**33**	14
NEP 15	(Eco-Crisis)	**66**	13	**35**	21
NEP 4	(Anti-Exempt)	19	**74**	05	–05
NEP 6	(Limits)	–18	**54**	**52**	11
NEP 8	(Balance)	**30**	**63**	11	21
NEP 14	(Anti-Exempt)	06	**72**	–03	18
NEP 1	(Limits)	20	–05	**76**	16
NEP 11	(Limits)	**31**	15	**75**	01
NEP 2	(Anti-Anthro)	11	10	–02	**75**
NEP 7	(Anti-Anthro)	**38**	01	10	**63**
NEP 12	(Anti-Anthro)	08	28	26	**71**
Eigenvalue		4.7	1.5	1.2	1.1
Percentage of variance		31.3	10.0	7.8	7.4

Note: Loadings of .30 and above are in bold.

some degree. The four items loading most heavily on the second factor include the remaining two exemptionalism items (4, 14), the third balance item (8), and a limits item (6), and the ecocrisis item (10) from the first factor also cross-loads heavily on this factor. Only the marginally important third and fourth factors (with eigenvalues barely above 1.0) consist of items designed to tap the same facet. The remaining two limits items (1, 11) load most heavily on the third factor, whereas the third one (6) loads almost as heavily here as it does on the second factor, and the three anthropocentrism items (2, 7, 12) load most heavily on the fourth factor.

Different researchers will have varying interpretations of the results of this analysis. Because the evidence suggests the presence of one predominant factor, and because the first three factors have items from several facets loading heavily on them, we are not inclined to create four NEP subscales measuring the four factors that emerged from the principal-components analysis and varimax rotation. Furthermore, because all 15 items load heavily on the first *unrotated* factor, have strong item-total correlations and yield an alpha of .83 when combined into a single measure, we think it is appropriate to treat them as constituting a single (revised) NEP Scale. Further, the revised NEP Scale possesses a level of internal consistency that justifies treating it as a measure of a coherent belief system or worldview. Of course, future research on differing samples is needed to confirm the appropriateness of treating the new set of 15 items as a single measure of endorsement of an ecological worldview as opposed to creating two or more

dimensions of such a worldview from the NEP items. As noted earlier, differing populations will no doubt vary in the degree to which the NEP beliefs are organized into a highly consistent belief system, and in many cases it will no doubt be more appropriate to treat the NEP as multidimensional.

Predictive and Construct Validity

Because the original NEP Scale has been subjected to a good deal of testing and has been found to have considerable validity, we are not concerned about obtaining evidence on the validity of the new measure at this stage. However, the 1990 questionnaire included a number of indicators of proenvironmental (or proecological) orientation, and examining the correlations between them and the revised NEP Scale provides at least limited data on the predictive validity of the latter. Scores on the revised NEP Scale correlate significantly (r =.61) with scores on a 13-item measure of the perceived seriousness of world ecological problems (the higher the NEP score, the more likely the problems are seen as serious); significantly (.57) with a 4-item measure of support for proenvironment policies (the higher the NEP score, the more support for the policies); significantly (.45) with a 4-item measure of the perceived seriousness of state and community air and water pollution (the higher the NEP score, the more likely pollution is viewed as serious); and—most importantly—significantly (.31) with a 10-item measure of (self-reported) proenvironmental behaviors (more behaviors are reported by those with high NEP scores). These results, showing that the new NEP Scale is related to a wide range of ecological attitudes and behaviors, suggest that it possesses predictive validity.

Researchers have consistently found young, well-educated, and politically liberal adults to be more proenvironmental than their counterparts and have offered theoretical explanations for these findings (Jones & Dunlap, 1992). In addition, one would expect to find people with such characteristics more likely to endorse, in particular, an ecological worldview, for the reasons noted previously. Our results fit this pattern, although only political liberalism is substantially (r = .32) correlated with endorsement of the NEP. Age is slightly (–.11), albeit significantly, related to endorsement of the NEP, as is education (.10), both in the expected direction.

Other variables that are significantly ($p < .05$) correlated with scores on the revised NEP Scale include political party (.22), with Democrats having higher NEP scores; occupational sector (.13), with those employed in primary industries having lower NEP scores; income (–.10), which is negatively related to endorsement of the NEP; and past residence (.08), with those raised in urban areas scoring higher on the NEP. Although these correlations are quite modest, they are generally consistent with past studies of correlates of environmental concern in general and the NEP in particular. To the extent that there are sound theoretical reasons for

expecting these correlations (Jones & Dunlap, 1992), as there especially are for age, education, and ideology, such findings provide some degree of construct validity for the revised NEP Scale.

Trends in Endorsement of NEP Beliefs

To our knowledge only one previous study has obtained longitudinal data on public endorsement of the NEP. Arcury and Christianson (1990) compared responses of statewide samples of Kentucky residents to the six-item version of the NEP Scale in 1984 and 1988 (the latter following a severe summer drought) and found an increase in pro-NEP responses. The increase in support for the NEP was significant, however, only in counties that had experienced water use restrictions, leading Arcury and Christianson (1990, p. 404) to conclude that "critical environmental experience can accelerate change in environmental worldview." A secondary purpose of the present study was to examine possible changes in Washington State residents' endorsement of key elements of an ecological worldview over time. Because the sample frame and data collection techniques were the same for the 1976 and 1990 surveys, we can examine trends in Washingtonians' support for the NEP over the 14-year period.

Table 3 presents the relevant data for eight items that were used in both surveys and for which the wording was either identical or changed in only minor ways. (The last two items, reflecting the ecocrisis or ecological catastrophe facet in the revised NEP Scale, were included in the 1976 questionnaire but were not incorporated into the original scale.) It should be emphasized, however, that because "unsure" was *not* used in the 1976 survey, the 1990 results have been recomputed with that response category deleted (which accounts for the difference between these figures and the results reported in Table 1). In general, there was a modest increase in Washington residents' endorsement of elements of the NEP over the 14-year period, reaching 10% on four of the eight items. The largest increase occurred on the two items that most clearly focus on the likelihood of ecological catastrophe, suggesting that the emergence of major problems such as ozone depletion and global warming have had some effect on the public. Interestingly, however, the two items dealing with ecological limits saw a decline in support, perhaps reflecting the impact of the Reagan era (which most definitely rejected the idea of limits to growth) as well as the declining salience of energy shortages.

The overall pattern of increasing endorsement of the NEP in Washington State, especially given the "ceiling effect" imposed by the relatively strong pro-NEP views expressed in 1976, provides modest support (as does the above-noted complementary trend in Kentucky) for arguments that an ecological worldview is gaining adherents (e.g., Olsen et al., 1992). Presumably, had the original data been obtained in the 1960s, or earlier, rather than in the middle of the

Table 3. Trends in Responses to Selected NEP Items by Washington Residents, 1976 and 1990

	1976	1990[a]	Change
Ecological limits			
We are approaching the limit of the number of people the earth can support. (AGREE)	73%	67%	−6%
The earth is like a spaceship with very limited room and resources.[b] (AGREE)	83	80	−3
Balance of nature			
When humans interfere with nature it often produces disastrous consequences. (AGREE)	76	86	+10
The balance of nature is very delicate and easily upset. (AGREE)	80	84	+4
Human domination			
Humans have the right to modify the natural environment to suit their needs. (DISAGREE)	62	64	+2
Ecological catastrophe			
Humans are severely abusing the environment.[c] (AGREE)	79	89	+10
The so-called "ecological crisis" facing humankind has been greatly exaggerated.[d] (DISAGREE)	57	75	+18
If things continue on their present course, we will soon experience a major ecological catastrophe.[e] (AGREE)	60	78	+18

[a]The 1990 results were computed with "Unsure" deleted, as that category was not used in 1976.
[b]The 1976 wording was "The earth is like a spaceship with *only* limited room and resources."
[c]The 1976 wording was "*Mankind is* severely abusing the environment."
[d]The 1976 wording was "The so-called 'ecological crisis' facing *mankind* has been greatly exaggerated."
[e]The 1976 wording was "If things continue on their present course, *mankind* will soon experience a major ecological catastrophe."

so-called environmental decade, the amount of change would have been far more striking (see Dunlap, 1995, for data on long-term trends in public concern for environmental quality).

Conclusion

The results reported in this article suggest that it is appropriate to treat the new set of 15 items designed to measure endorsement of an ecological worldview as constituting a single "New Ecological Paradigm Scale." The revised NEP Scale appears to be an improved measuring instrument compared to the original scale, as it (1) provides more comprehensive coverage of key facets of an ecological worldview, (2) avoids the unfortunate lack of balance in item direction of the original scale (where only four items, all dealing with anthropocentrism, were stated in an anti-NEP direction), and (3) removes the outmoded, sexist terminology in some of the original scale's items. The revised NEP Scale has slightly more

internal consistency than did the original version (alpha of .83 versus .81), although this likely stems from its having three more items (as alpha tends to increase with scale length, all other things equal). Although items were selected to represent five discernible, but interrelated, facets of an ecological worldview, thus maximizing content validity, the results suggest the presence of one dominant factor in the Washington survey.

Of course, future research will be needed to address the issue of the revised NEP Scale's dimensionality, and on some samples a clearer pattern of multidimensionality will no doubt emerge and warrant creation of two or more subscales measuring distinct dimensions of the NEP. A goal for future research will be to compare the degree to which the NEP beliefs are organized coherently across different populations, including comparing patterns of multidimensionality when distinct dimensions emerge, as well as the degree to which resulting belief systems (or worldviews) influence a range of environmental attitudes, beliefs, and behaviors.

We also hope to see additional longitudinal research employing the revised NEP Scale. Although they tap primitive beliefs about humanity's relationship with the Earth, the NEP items should be responsive to personal experiences with environmental problems (as reflected by Arcury and Christianson's [1990] Kentucky study) and to information—diffused by government agencies, scientists, environmentalists and the media—concerning the growing seriousness of environmental problems. Despite the inherent complexities involved in cognitive change (see, e.g., Eagly & Kulesa, 1997), we suspect that the never-ending emergence of new scientific evidence concerning the deleterious impacts of human activities on environmental quality and the subsequent threats these pose to the welfare of humans (and other species) will generate continual pressure for adoption of a more ecological worldview. The revised NEP Scale should prove useful in tracking possible increases in endorsement of an ecological worldview, as well as in examining the effect of specific experiences and types of information in generating changes in this worldview.

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