

The Psychology of Environmental Attitudes: Conceptual and Empirical Insights from New Zealand

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Introduction

Human behavior has been producing unprecedented environmental transformations, and the cumulative impact of humanity on the planet is far greater than that of any other species (Gardner & Stern, 2002; Millennium Ecosystem Assessment, 2005). In order to address environmental problems, it is necessary to have a better understanding of the extent to which individuals hold particular attitudes that might lead them to form behavioral intentions to engage in proenvironmental behaviors. The study of attitudes toward the environment is indeed a key topic in the field of environmental psychology, with more than half of all publications in the field addressing this topic (Kaiser et al., 1999; Milfont, 2007).

Despite the importance of the topic and broad academic interest, until recently studies in the area have primarily been atheoretical and fragmented (Dunlap & Jones, 2002; Stern, 1992). Following other scholars—including the work by Norman Blaikie (1992) in the Australian context (see also Stern & Dietz, 1994; Wiseman & Bogner, 2003)—my colleagues and I have developed a program of research to provide a more systematic approach to the study of environmental attitudes (Milfont, 2009b, 2010; Milfont & Duckitt, 2004, 2006, 2010; Milfont & Gouveia, 2006). This work has focused on advancements in conceptual, theoretical, and measurement aspects of environmental attitudes.

Although our work on environmental attitudes is broad in scope and does not focus on the ecological or cultural contexts of New Zealand, I decided to review this research program for this special issue because the research comes out of the Australasian region and

the findings are internationally relevant. It is worth noting that our research group has also focused on other environmentally-focused work with relevance to New Zealand not reviewed here. Recent work includes a 1-year longitudinal study on aspects of climate change beliefs in a representative sample of New Zealanders (Milfont, 2012b), a study investigating spatial optimism (“things are better in New Zealand than elsewhere”) and temporal pessimism (“things are better now than they will be in the future”) (Milfont et al., 2011), a study on urban edible gardening (growing fruit, vegetables, and herbs on one’s residential property) as a means to foster community resilience (Lake et al., 2012), and a study investigating support for climate change action and political party support in New Zealand (Milfont et al., 2012).

In the first part of the present article I will provide a brief overview of our research program on environmental attitudes. I will then report unpublished meta-analytical findings of the social-structural and social-psychological bases of environmental attitudes based on New Zealand and overseas data.

Conceptual, Theoretical, and Measurement Advancements

One initial goal of our research program was to provide a clear conceptual and theoretical grounding for studying environmental attitudes. Technically speaking, “any object outside of self exists in the individual’s environment, so all attitudes except those beliefs about self could be correctly called environmental attitudes” (Heberlein, 1981, p. 243). The word *environment* may also refer to both built and nonhuman environments. Thus, environmental attitudes may refer to attitudes toward all external objects of one’s reality. To avoid overgeneralization and confusion, we use the term *environmental attitudes* only when considering attitudes toward the natural (biophysical or nonhuman) environment.

Environmental attitudes have been defined in many ways, such as “the collection of beliefs, affect, and behavioural intentions a person holds regarding environmentally related activities or issues” (Schultz et al., 2004, p. 31). We based ours on the most conventional definition of attitudes proposed by Eagly and Chaiken (1993), who define attitudes as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (p. 1, emphasis in original). This definition is coherent to contemporary approaches that conceptualize attitudes as evaluative tendencies that can be inferred from (and have an influence on) beliefs, affect, and behavior (Albarracín et al., 2005). Therefore, environmental attitudes are a psychological tendency to evaluate the natural environment, and factors affecting its quality, with some degree of favor or disfavor.

Regardless of the preferred definition, researchers have traditionally seen environmental attitudes as a unidimensional construct ranging from *unconcerned* about the environment at the low end to *concerned* at the high end (e.g., Dunlap et al., 2000; Pierce & Lovrich, 1980). There is a growing recognition that environmental attitudes form a multidimensional construct, however. Examples of studies taking this multidimensional approach include those classifying environmental attitudes as rooted in either a concern for all living things (*ecocentric* concern) or a concern for humans (*anthropocentric* concern) (Thompson & Barton, 1994), and those using a tripartite classification of environmental attitudes rooted in a concern for the self (*egoistic* concern), for other people (*altruistic* concern), or for the biosphere (*biospheric* concern) (Schultz, 2001; Stern & Dietz, 1994). Using this tripartite model, we investigated differences between European New Zealanders and Asian New Zealanders in environmental motive concerns (Milfont et al., 2006). We found that Asian New Zealanders showed significantly higher egoistic concern than European New Zealanders, whereas European New Zealanders showed significantly higher biospheric concern. Although recognizing these alternative approaches, we focus on a model of environmental attitudes comprising two broad dimensions, namely Preservation and Utilization attitudes.

On the distinction between Preservation and Utilization attitudes

Many scholars have identified two broad dimensions of attitudes toward the environment that are expressed by the conflict between preservation of natural resources on one hand and utilization of natural resources on the other. For example, Pierce and Lovrich (1980) comment that the fundamental basis of the actual environmental conflicts “seems to concern whether natural resources should be developed or whether they should be preserved” (p. 266). These broad dimensions are also related to the spiritual and the instru-

mental views of people-environment relations (Stokols, 1990), in which the environment is either viewed as an end in itself or as a means for human objectives. Similarly, Blaikie (1992) argues that the distinction between these two broad dimensions

reflects some of the dilemmas which people experience in trying to balance the need both to be aware of the delicate balance between humans and the rest of the natural world, and to conserve the natural environment, while at the same time recognizing that some forms of exploitation of the environment are needed if standards of living are to be maintained. (p. 161)

More recently, Kaiser and Scheuthle (2003) have argued that the evaluative component of people’s attitudes toward nature should consist of at least two distinguishable lines of values which they call moral/altruistic values and utilitarian values.

We have provided a list of other theoretical models describing these two broad dimensions (Milfont & Duckitt, 2004, p. 300). What all these models have in common is the notion of two broad sets of beliefs: one prioritizing preserving nature and the diversity of natural species in its original natural state and protecting it from human use and alteration; and the other expressing that it is right, appropriate, and necessary for nature and all natural phenomena and species to be used and altered for human objectives. Following others (e.g., Wiseman & Bogner, 2003), we respectively termed these dimensions Preservation and Utilization attitudes and showed that these environmental attitude dimensions distinctively predict ecological and economic behavior (Milfont & Duckitt, 2004, 2006). We have also argued that these two broad dimensions are linked to sustainability because environmental sustainability implies that humans need to use natural resources for human survival and well-being, but at the same time we also need to protect the environment for the same reasons (Milfont & Duckitt, 2004, p. 300).

In one of our recent publications, we describe the development and validation of a measurement tool, the Environmental Attitudes Inventory (EAI), that aims to integrate past research in the area, takes into account the multidimensionality of environmental attitudes, and explicitly considers Preservation and Utilization as the main broad dimensions (Milfont & Duckitt, 2010). According to the theoretical model used to develop the EAI, Preservation attitudes comprise seven specific domains of environmental attitudes (enjoyment of nature, support for interventionist conservation policies, environmental movement activism, environmental fragility, personal conservation behavior, ecocentric concern, and support for population growth policies), while Utilization attitudes comprise five other specific domains (conservation motivated by anthropocentric concern,

confidence in science and technology, altering nature, human dominance over nature, and human utilization of nature). We report results showing that the EAI has satisfactory psychometric parameters in samples from Brazil, New Zealand, and South Africa, and other researchers have been employing the measure in other cultural contexts.

Besides these theoretical, conceptual, and measurement advances that support the distinction between Preservation and Utilization attitudes, some of our research has also focused on other relevant methodologies. To the extent that Preservation and Utilization attitudes are indeed distinct, this distinction should also be supported by qualitative studies.

Qualitative analysis of Preservation and Utilization attitudes

In an attempt to provide evidence that individuals see these broad environmental attitude dimensions as qualitatively distinct, I conducted a study with 80 participants from 16 countries across all six inhabited continents (Milfont, 2010). To gather information on the psychological meaning of both “environmental preservation” and “environmental utilization,” participants were asked to list the first five words that came to their minds when presented with the two stimuli phrase words. In this approach, listed words are treated as a semantic network generated through a process of memory reconstruction, and the order of the listed words indicates a hierarchical order of importance in relation to the stimulus word/phrase. Weights are applied based on the order of the listed words that enable the researcher to rank order the importance or salience of each concept.

Briefly, the results showed that the psychological meaning for “environmental preservation” was richer (more words were elicited), more coherent (strength of association between words elicited), and more positive (mainly associated to positive definers) than “environmental utilization.” These findings suggest that participants are more familiar with the idea of conservation of the natural environment than the idea of its exploitation, and that they relate environmental conservation to more positive attributes. Although other research has not found substantial influence of social desirability on environmental attitudes and self-reports of proenvironmental behaviors (Milfont, 2009a), it is very likely that social desirability issues may influence the recall of words related to environmental preservation rather than words for environmental utilization. But the fact that participants could easily elicit words for both phrases provides some qualitative evidence supporting the distinction between Preservation and Utilization attitudes.

In another publication, the psychological functions that environmental attitudes can serve for the individual are described (Milfont, 2009b). Preservation and Utilization attitudes seem to

respectively express symbolic and instrumental functions (cf. Ennis & Zanna, 2000; Prentice, 1987). The distinction between symbolic and instrumental attitudes differentiates those attitudes that serve the expression of deep-rooted values (*symbolic* attitudes) versus those that serve individual self-interest and utilitarian concerns (*instrumental* attitudes). Preservation attitudes seem to mainly serve a symbolic attitude function, whereas Utilization attitudes serve a utilitarian attitude function and express instrumentality.

In line with the conceptual and qualitative distinctions discussed above, I posit that Preservation and Utilization attitudes express distinct *legitimizing myths*, a concept proposed by Sidanius and Pratto (1999) in their Social Dominance Theory. This theory explores how the interaction between psychological, intergroup, and institutional processes helps in the production and maintenance of group-based hierarchical social structures. Sidanius and Pratto (1999) argue that *legitimizing myths* “consist of attitudes, values, beliefs, stereotypes, and ideologies that provide moral and intellectual justification for the social practices that distribute social value within the social system” (p. 45). Hierarchy-enhancing legitimizing myths are those supporting greater levels of group-based social inequality (e.g., fate, meritocratic policies, political conservatism), whereas hierarchy-attenuating legitimizing myths are those justifying and supporting group-based social equality (e.g., socialism, communism, universal rights).

By expanding this theory to the understanding of the hierarchical relations between humans and the natural environment, I posit that Utilization and Preservation attitudes are expressions of legitimizing myths. Utilization attitudes express hierarchy-enhancing legitimizing myths that justify and support human dominance over nature. These myths include anthropocentrism from Judeo-Christian tradition as well as cultural value orientations such as Kluckhohn’s humans over nature, Schwartz’s mastery values, and individualistic social solidarity and its related myths of nature as proposed by Douglas’ cultural theory (Milfont, 2012a; Milfont & Duckitt, 2004). Contradicting these myths are Preservation attitudes and those hierarchy-attenuating legitimizing myths that justify and support harmony with nature and serve to promote the importance of nature in itself. These include Kluckhohn’s humans in nature, Schwartz’s harmony values, and egalitarian social solidarity and its related myths of nature as proposed by Douglas’ cultural theory.

The Nomological Network of Preservation/Utilization Attitudes: A Meta-Analytic Summary

In order to provide further evidence of the usefulness of distinguishing between Preservation and Utilization attitudes, this section

of the article describes a meta-analysis examining the relationships between Preservation and Utilization attitudes and criterion variables. This meta-analytical summary is based on variables included in at least two studies in the research reported by Milfont (2007). Table 1 provides an overview of the sample characteristics included in the studies. Most of the studies relied on undergraduate psychology students, but some studies also included nonstudent participants from a variety of countries. The aim of this meta-analysis was to test the extent to which individuals with Preservation or Utilization attitudes share general patterns of demographic, psychological, and ideological characteristics. That is, what are the social-structural and social-psychological bases of environmental attitudes (cf., Dietz et al., 1998; Fransson & Gärling, 1999; Van Liere & Dunlap, 1980).

In order to conduct the analyses, the approach proposed by Hedges and Olkin (1985) was used to calculate the pooled correlations. The raw correlations were transformed using Fischer's r to Z transformation, and the sample size weighted transformed correlations were then averaged. The resulting weighted pooled values were then transformed back into correlations, thus providing sample size weighted mean r for each variable. Confidence intervals for the effect sizes are also reported. Please note that for convenience of interpretation Utilization was reverse scored to have the same direction as Preservation. Moreover, a unidimensional mean score was calculated

and labeled "Generalized Environmental Attitudes" (GEA) by averaging the Preservation mean score and the reverse-scored Utilization mean.

As can be seen in Table 2, the confidence intervals for religiosity, altruistic values, and environmental threat did not overlap for Preservation and Utilization. This indicates that out of the 18 associations considered only three provide significant discriminant properties for Preservation and Utilization. Altruistic values may thus be said to underlie Preservation orientations. Individuals oriented by values such as "a world at peace," "social justice," and "equality" judge environmental issues on the basis of costs or benefits for the community, ethnic group, or all of humanity, which is in line with past research (e.g., Coelho et al., 2006; Schultz et al., 2005; Schultz & Zelezny, 1999; Stern & Dietz, 1994). People holding Preservation attitudes are also more predisposed to perceive threats from environmental problems. This is also consistent with studies showing significant correlations between environmental attitudes and environmental threat (Pahl et al., 2005; Walsh-Daneshmandi & MacLachlan, 2000).

In contrast, people holding Utilization attitudes are religiously orientated. The weighted correlations between being Judeo-Christian and Biblical literalism were also stronger for Utilization than for Preservation. This supports White's (1967) general claim that

Table 1. Data Sources and Brief Description of Samples Included in the Meta-Analysis

STUDY	SAMPLE SIZE	MEAN AGE AND RANGE	GENDER (F/M)	COUNTRY OF ORIGIN	SAMPLE TYPE	SURVEY YEAR
1	455	$M=20$; $SD=4.31$ (17-48)	319/136	New Zealand	Undergraduate psychology students (University of Auckland)	2003
2a	314	$M=20$; $SD=4.48$ (16-51)	215/99	New Zealand	Undergraduate psychology students (University of Auckland)	2004
2b	229	$M=32.28$; $SD=9.50$ (19-64)	153/76	Brazil, representation of 50% of Brazilian states	81.4% completed undergraduate degree	2005
2c	468	$M=34.04$; $SD=12.89$ (18-69)	244/224	59 countries (Africa $n=9$, Asia $n=35$; Australia & Oceania $n=216$; Europe $n=107$; North America $n=80$; South America $n=21$)	88.7% completed undergraduate or graduate degree	2005
3	201	$M=22.17$; $SD=4.27$ (18-47)	147/52	Brazil	Undergraduate psychology students	2005
	226	$M=19.48$ $SD=2.54$ (17-39)	159/67	New Zealand	Undergraduate psychology students	2005
	257	$M=19.36$ $SD=2.69$ (17-42)	187/71	South Africa	Undergraduate psychology students	2005

These studies are fully reported in Milfont (2007).

Table 2. Meta-Analytic Summary of the Correlations Between the Higher-Order Factors of the Environmental Attitudes Inventory and External Variables Across Studies

	PRESERVATION			UTILIZATION ^a			GEA		
	WEIGHTED MEAN <i>r</i>	L95%CI	U95%CI	WEIGHTED MEAN <i>r</i>	L95%CI	U95%CI	WEIGHTED MEAN <i>r</i>	L95%CI	U95%CI
<i>Sociodemographic variables</i>									
Age	.11***	.06	.16	.04	-.01	.09	.09***	.04	.14
Being Judeo-Christian	-.12***	-.18	-.06	-.20***	-.26	-.14	-.16***	-.10	-.22
Biblical literalism	-.13***	-.18	-.08	-.23***	-.28	-.18	-.19***	-.14	-.24
Gender (being male)	-.14***	-.19	-.09	-.13***	-.18	-.08	-.15***	-.10	-.20
Political conservatism	-.18***	-.23	-.13	-.22***	-.27	-.17	-.21***	-.16	-.26
Religiosity	-.05	-.10	.00	-.20***	-.25	-.15	-.12***	-.07	-.17
<i>Psychological variables</i>									
Altruistic values	.19***	.13	.25	.03	-.03	.09	.21***	.15	.27
Biospheric values	.60***	.54	.66	.13***	.07	.19	.61***	.55	.67
Conservatism values	-.22***	-.28	-.16	-.21***	-.27	-.15	-.23***	-.17	-.29
Openness to change values	-.06*	-.12	.00	-.02	-.08	.04	-.05	-.11	.01
Self-enhancement values	-.46***	-.52	-.40	-.42***	-.48	-.36	-.48***	-.42	-.54
Self-transcendence values	.38***	.32	.44	.30***	.24	.36	.38***	.32	.44
<i>Environmentally related variables</i>									
Ecological behavior	.50***	.44	.56	.35***	.29	.41	.48***	.42	.54
Economic liberalism	-.38***	-.44	-.32	-.47***	-.53	-.41	-.46***	-.40	-.52
Environmental threat	.23***	.15	.31	.07	-.01	.15	.18***	.10	.26
Environmental organization membership	.12**	.04	.20	.13***	.05	.21	.14***	.06	.22
Inclusion with nature	.37***	.31	.43	.25***	.19	.31	.36***	.30	.42
Sustainability	.27***	.21	.33	.21***	.15	.27	.27***	.21	.33

GEA=Generalized Environmental Attitudes, which is the average of Preservation mean score and the reverse-scored Utilization mean score. To control for individual differences in response style, the value clusters are centered scores created by subtracting the mean score of all values from each of the value clusters.

^aUtilization was reverse scored to have the same score direction as Preservation and GEA.

p*<.05; *p*<.01; ****p*<.001.

Christian axioms toward people–environment relations emphasize a belief in human dominance over nature, and is related to the idea of hierarchy-enhancing myths discussed above. Empirical studies have also shown that persons from a Judeo-Christian tradition, and persons expressing high levels of religiosity and literal beliefs in the Bible, are less environmentally concerned (Gardner & Stern, 2002; Schultz et al., 2000).

Taking the GEA score into account, it can be said that individuals with proenvironmental attitudes are those who are older, female, and members of an environmental organization, who attribute greater importance to self-transcendence, biospheric and altruistic values, who conserve the environment by performing ecological behaviors, who feel connected with nature and are concerned about threats from environmental problems, and who support sustainability principles. In contrast, individuals with anti-environmental attitudes are those who are Judeo-Christian, who have higher levels of religiosity and beliefs in the Bible, who support economic liberalism and political conservatism, and who attribute greater importance to traditional and self-enhancement values.

Interestingly, the most important sociodemographic predictor is political conservatism. This supports several studies indicating that environmental attitudes are positively related to liberal political ideology (Diekmann & Preisendörfer, 1998; Fransson & Gärling, 1999; Mayton, 1986; Theodori & Luloff, 2002; Van Liere & Dunlap, 1980). Another point worth mentioning is the very high weighted correlation between environmental attitudes and biospheric values. This suggests content overlap between these variables, indicating that value items with environmental content should be excluded from Schwartz's (1994) self-transcendence value clusters prior to analysis (cf. Milfont & Gouveia, 2006; Schultz et al., 2005; Stern et al., 1998). It also indicates that these biospheric values (protecting the environment, unity with nature, respecting the earth) could be used as an economical measure for testing the convergent validity of environmental attitude measures. Content overlap may also explain the strong relationship between environmental attitudes and the other environmentally-related variables. Although the positive correlation between environmental attitudes and sustainability principles is theoretically expected (cf. Schmuck & Schultz, 2002), this is the first known study to provide an empirical test.

Another noteworthy point is the magnitude of the effect sizes. The average effect size for the sociodemographic, psychological, and environmentally-related variables were respectively $|.16|$, $|.33|$, and $|.33|$, and the average effect size across all 18 variables was $|.27|$. According to guidelines by Cohen (1988) and Hemphill (2003), these effect sizes ranged from small to medium. Moderate effect sizes can also be seen in the association between environmental attitudes and

ecological behavior. Of the two prior meta-analyses, Hines et al. (1987) reported a mean correlation of $r = .37$ (9 studies) and Bamberg and Möser (2007) $r = .42$ (17 studies) with a 95% confidence interval ranging from $.26$ to $.56$. The mean correlation in the current study was slightly higher ($r = .48$, five studies), but within Bamberg and Möser's confidence interval. Moreover, Bamberg and Möser found that only 27% of the variance of ecological behavior was explained by intention (a more proximal behavioral determinant than attitude) and that reporting bias (i.e., only significant results tend to be published) might have inflated this.

The available findings show that the effect sizes in the environmental domain seem small or at best medium. It is important to keep in mind, however, that small and medium effect sizes in psychology are not uncommon and that even small effect sizes can be practically important. Analyzing the magnitude of meta-analytic effect sizes for 474 social psychology effects, Richard, Bond, and Stokes-Zoota (2003) concluded that the effects typically yielded a value of $.21$ and that 30.44% yielded an r of $.10$ or less. The effect sizes reported in the present research are therefore within the range usually found in social psychology.

Concluding Remarks

Our research program carried out in New Zealand has provided a more systematic approach to the study and measurement of environmental attitudes. Both theoretical and empirical evidence suggest that two kinds of environmental attitudes—Preservation and Utilization attitudes—form the main dimensions underlying people–environment relations. Taken together, the meta-analytic findings showed that environmental attitudes possess a logical external structure of nomological relationships, and these findings also provide some further evidence for the discriminant validity of Preservation and Utilization attitudes. It suggests that these two environmental attitude dimensions are conceptually and (to some extent) empirically distinct constructs whose correlations with other variables may differ, depending on the variables considered.

The findings reported in the present article might suggest that only certain people (e.g., primarily those who are women, who are liberal in sociopolitical orientations, or who endorse altruistic values) tend to support proenvironmental attitudes, which might indicate that concern for environmental problems is still a “sectarian” phenomenon (Tognacci et al., 1972). It is important to note, however, that there are patterns of associations with different demographics and that there is also great variation within and between these. Moreover, and despite a possible sectarian bias, recent research has shown that it is possible to reframe proenvironmental rhetoric to foster engagement

of individuals that might not be prone to act in environmentally friendly ways, either by encouraging those individuals to regard pro-environmental behaviors as patriotic and consistent with protecting the status quo (Feygina et al., 2009, Study 3) or by framing proenvironmental messages in terms of specific moral values (Feinberg & Willer, in press, Study 3). This provides an exciting avenue for further research.

Other important areas not considered here refer to broader considerations of environmental values, the social representation of environmental problems, social and cultural shifts in environmental attitudes and understandings, environmental issues such as biotechnology and disasters, and the way in which contested political policy implications seem to drive media coverage of environmental issues, in turn influencing environmental attitudes. Despite the narrower focus of our environmental attitudes research, we have also been exploring other avenues of psychological and broader social science research that are examining people's connections to and experiences in their natural environments, and the positive and negative psychological impacts of differing kinds of experiences in (and relationships with) natural environments and with environmental changes and ongoing environmental threats and stressors, especially pertaining to New Zealand.

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REFERENCES

- Albarracín, D., Zanna, M. P., Johnson, B. T., & Kumkale, G. T. (2005). Attitudes: Introduction and scope. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 3–19). Mahwah, NJ: Lawrence Erlbaum.
- Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology, 27*, 14–25.
- Blaikie, N. W. H. (1992). The nature and origins of ecological world views: An Australian study. *Social Science Quarterly, 73*, 144–165.
- Coelho, J. A. P. M., Gouveia, V. V., & Milfont, T. L. (2006). Valores humanos como explicadores de atitudes ambientais e intenção de comportamento pró-ambiental [Human values as predictors of environmental attitudes and pro-environmental behavior]. *Psicologia em Estudo, 11*, 199–207.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Diekmann, A., & Preisendörfer, P. (1998). Environmental behavior: Discrepancies between aspirations and reality. *Rationality and Society, 10*, 79–102.
- Dietz, T., Stern, P. C., & Guagnano, G. A. (1998). Social structural and social psychological bases of environmental concern. *Environment and Behavior, 30*, 450–471.
- Dunlap, R. E., & Jones, R. E. (2002). Environmental concern: Conceptual and measurement issues. In R. E. Dunlap & W. Michelson (Eds.), *Handbook of environmental sociology* (pp. 482–524). Westport, CT: Greenwood Press.
- Dunlap, R. E., Van Liere, K. D., Mertig, A., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56*, 425–442.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Orlando, FL: Harcourt Brace Jovanovich.
- Ennis, R., & Zanna, M. P. (2000). Attitude function and the automobile. In G. R. Maio & J. M. Olson (Eds.), *Why we evaluate: Functions of attitudes* (pp. 395–416). Mahwah, NJ: Lawrence Erlbaum.
- Feinberg, M., & Willer, R. (in press). The moral roots of environmental attitudes. *Psychological Science*.
- Feygina, I., Jost, J. T., & Goldsmith, R. E. (2009). System justification, the denial of global warming, and the possibility of "system-sanctioned change." *Personality and Social Psychology Bulletin, 36*, 326–338.
- Fransson, N., & Gärling, T. (1999). Environmental concern: Conceptual definitions, measurement methods, and research findings. *Journal of Environmental Psychology, 19*, 369–382.
- Gardner, G. T., & Stern, P. C. (2002). *Environmental problems and human behavior* (2nd ed.). Boston, MA: Pearson Custom Publishing.
- Heberlein, T. A. (1981). Environmental attitudes. *Zeitschrift für Umweltpolitik, 4*, 241–270.
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Orlando, FL: Academic Press.
- Hemphill, J. F. (2003). Interpreting the magnitudes of correlation coefficients. *American Psychologist, 58*, 78–80.
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education, 18*, 1–8.
- Kaiser, F. G., Ranney, M., Hartig, T., & Bowler, P. A. (1999). Ecological behavior, environmental attitude, and feelings of responsibility for the environment. *European Psychologist, 4*, 59–74.
- Kaiser, F. G., & Scheuthle, H. (2003). Two challenges to a moral extension of the theory of planned behavior: Moral norms and just world beliefs in conservatism. *Personality and Individual Differences, 35*, 1033–1048.
- Lake, B., Milfont, T. L., & Gavin, M. C. (2012). The relative influence of psycho-social factors on urban edible gardening. *New Zealand Journal of Psychology, 41*, 49–58.
- Mayton, D. M. (1986). The structure of attitudes to doomsday issues: A replication. *Australian Psychologist, 21*, 395–403.
- Milfont, T. L. (2007). *Psychology of environmental attitudes: A cross-cultural study of their content and structure*. (Unpublished doctoral dissertation.) University of Auckland, Auckland, New Zealand.
- Milfont, T. L. (2009a). The effects of social desirability on self-reported environmental attitudes and ecological behaviour. *The Environmentalist, 29*, 263–269.

- Milfont, T. L. (2009b). A functional approach to the study of environmental attitudes. *Medio Ambiente y Comportamiento Humano*, *10*, 235–252.
- Milfont, T. L. (2010). The psychological meaning of preservation and utilization attitudes: A study using the natural semantic network technique. *Psychology*, *1*, 123–136.
- Milfont, T. L. (2012a). Cultural differences in environmental engagement. In S. Clayton (Ed.), *Handbook of environmental and conservation psychology* (pp. 181–202). Oxford: Oxford University Press.
- Milfont, T. L. (2012b). The interplay between knowledge, perceived efficacy, and concern about global warming and climate change: A one-year longitudinal study. *Risk Analysis*, *32*, 1003–1020.
- Milfont, T. L., Abrahamse, W., & McCarthy, N. (2011). Spatial and temporal biases in assessments of environmental conditions in New Zealand. *New Zealand Journal of Psychology*, *40*, 56–67.
- Milfont, T. L., & Duckitt, J. (2004). The structure of environmental attitudes: A first- and second-order confirmatory factor analysis. *Journal of Environmental Psychology*, *24*, 289–303.
- Milfont, T. L., & Duckitt, J. (2006). Preservation and utilization: Understanding the structure of environmental attitudes. *Medio Ambiente y Comportamiento Humano*, *7*, 29–50.
- Milfont, T. L., & Duckitt, J. (2010). The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, *30*, 80–94.
- Milfont, T. L., Duckitt, J., & Cameron, L. D. (2006). A cross-cultural study of environmental motive concerns and their implications for proenvironmental behavior. *Environment and Behavior*, *38*, 745–767.
- Milfont, T. L., & Gouveia, V. V. (2006). Time perspective and values: An exploratory study of their relations to environmental attitudes. *Journal of Environmental Psychology*, *26*, 72–82.
- Milfont, T. L., Harré, N., Sibley, C. G., & Duckitt, J. (2012). The climate-change dilemma: Examining the association between parental status and political party support. *Journal of Applied Social Psychology*, *42*, 2386–2410.
- Millennium Ecosystem Assessment. (2005). *Ecosystem and well-being: Synthesis report*. Washington, DC: Island Press.
- Pahl, S., Harris, P. R., Todd, H. A., & Rutter, D. R. (2005). Comparative optimism for environmental risks. *Journal of Environmental Psychology*, *25*, 1–11.
- Pierce, J. C., & Lovrich, N. P., Jr. (1980). Belief systems concerning the environment: The general public, attentive publics, and state legislators. *Political Behavior*, *2*, 259–286.
- Prentice, D. A. (1987). Psychological correspondence of possessions, attitudes, and values. *Journal of Personality and Social Psychology*, *53*, 993–1003.
- Richard, F. D., Bond, C. F., Jr., & Stokes-Zoota, J. J. (2003). One hundred years of social psychology quantitatively described. *Review of General Psychology*, *7*, 331–363.
- Schmuck, P., & Schultz, P. W. (Eds.). (2002). *Psychology of sustainable development*. Norwell, MA: Kluwer Academic Publishers.
- Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, *21*, 327–339.
- Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franek, M. (2005). Values and their relationship to environmental concern and conservation behavior. *Journal of Cross-Cultural Psychology*, *36*, 457–475.
- Schultz, P. W., Shriver, C., Tabanico, J. J., & Khazian, A. M. (2004). Implicit connections with nature. *Journal of Environmental Psychology*, *24*, 31–42.
- Schultz, P. W., & Zelezny, L. C. (1999). Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of Environmental Psychology*, *19*, 255–265.
- Schultz, P. W., Zelezny, L. C., & Dalrymple, N. J. (2000). A multinational perspective on the relation between Judeo-Christian religious beliefs and attitudes of environmental concern. *Environment and Behavior*, *32*, 576–591.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, *50*, 19–45.
- Sidanius, J., & Pratto, F. (1999). *Social dominance: An intergroup theory of social hierarchy and oppression*. New York: Cambridge University Press.
- Stern, P. C. (1992). Psychological dimensions of global environmental change. *Annual Review of Psychology*, *43*, 269–302.
- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, *50*, 65–84.
- Stern, P. C., Guagnano, G. A., & Dietz, T. (1998). A brief inventory of values. *Educational and Psychological Measurement*, *58*, 984–1001.
- Stokols, D. (1990). Instrumental and spiritual views of people-environment relations. *American Psychologist*, *45*, 641–646.
- Theodori, G. L., & Luloff, A. E. (2002). Position on environmental issues and engagement in proenvironmental behaviors. *Society and Natural Resources*, *15*, 471–482.
- Thompson, S. C. G., & Barton, M. A. (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of Environmental Psychology*, *14*, 149–157.
- Tognacci, L. N., Weigel, R. H., Wideen, M. F., & Vernon, D. T. (1972). Environmental quality: How universal is public concern? *Environment and Behavior*, *4*, 73–86.
- Van Liere, K. D., & Dunlap, R. E. (1980). The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. *Public Opinion Quarterly*, *44*, 181–197.
- Walsh-Daneshmandi, A., & MacLachlan, M. (2000). Environmental risk to the self: Factor analysis and development of subscales for the environmental appraisal inventory (EAI) with an Irish sample. *Journal of Environmental Psychology*, *20*, 141–149.
- White, L., Jr. (1967). The historical roots of our ecologic crisis. *Science*, *155*, 1203–1207.
- Wiseman, M., & Bogner, F. X. (2003). A higher-order model of ecological values and its relationship to personality. *Personality and Individual Differences*, *34*, 783–794.

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