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The Oxford Handbook of Environmental and Conservation Psychology

Edited by

Susan D. Clayton

OXFORD
UNIVERSITY PRESS 2012

CHAPTER

4

Environmental Attitudes

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Abstract

Environmental attitudes are important because they often, but not always, determine behavior that either increases or decreases environmental quality. Traditionally, attitudes have cognitive, affective, and conative elements, but environmental attitudes might be better described as having preservation and utilization dimensions. Pro-environmental attitudes rise and fall with current events and vary with age, gender, socioeconomic status, nation, urban-rural residence, religion, politics, values, personality, experience, education, and environmental knowledge. Environmental education aims to improve environmental attitudes but has mixed results. The mass media have been both helpful and harmful. Two prominent theories for explaining environmental attitude-behavior relations are the theory of planned behavior and value-beliefs-norm theory, which offer the benefit of parsimony and the shortcoming of incompleteness. Researchers have, for example, suggested additions to the theory of planned behavior, noting that pro-environmental behaviors vary in their effort to complete, which influences the attitude-behavior relation, and that many barriers to behavior change exist.

Key Words: attitudes, attitude structure, environmental concern, attitude-behavior relations, variations in environmental concern

Introduction

An attitude is a latent construct mentally attached to a concrete or abstract object (otherwise known as an "attitude object"—a person, place, entity, or idea). Traditionally, attitudes have three components: cognitive (thoughts about the object, usually including an evaluation), affective (feelings about the object), and conative (behavioral intentions and actions regarding the object) (Breckler, 1984).

Attitudes can be confused with other constructs, such as values, beliefs (sometimes considered the cognitive component of attitudes), opinions, personality dispositions, and personal norms. Although all these concepts relate to the three attitude components to some extent, they also differ in subtle but important ways. For example, "beliefs list toward the cognitive; values are broader than attitudes and more culturally bound. Opinions, historically in competition with attitudes, are more cognitive" (Shrigley, Koballa, & Simpson, 1988, p. 659). Personality traits differ from attitudes in that, like values, they are not focused on a particular object, are not necessarily evaluative, and are not easily changeable (Ajzen, 2005). Another construct that has recently gained favor in environmental psychology research is "personal norm," originally proposed by Schwartz (1977). Unlike attitudes, pro-environmental personal norms are internalized social norms that directly influence behavior through feelings of guilt (Bamberg, Hunecke, & Blöbaum, 2007; Bamberg & Möser, 2007).

This chapter focuses on environmental attitudes, which are defined as *concern* for the environment or caring about environmental issues (sometimes

referred to as *pro-environmental attitudes*). Five topics will be examined: the importance of studying environmental attitudes, the structure and measurement of environmental attitudes, variables that affect concern for the environment, methods for encouraging environmental attitudes, and factors that inhibit or promote attitudes influencing behavior.

The Importance of Studying Environmental Attitudes

The most intuitive reason for studying environmental attitudes is that they may determine behavior. However, this relation is tenuous; many people evince higher levels of concern than is expressed in their behavior (Jurin & Fortner, 2002). Some studies have demonstrated a strong link between attitudes and pro-environmental behavior (Heberlein & Black, 1981; Iversen & Rundmo, 2001; Kuhlemeier, van den Bergh & Lagerweij, 1999; Poortinga, Steg, & Vlek, 2004; Tarrant & Cordell, 1997; Vogel, 1996), but others have not (e.g., O'Riordan, 1976; Scott & Willits, 1994).

One explanation for this discrepancy in the research findings may rest with the methods used to collect behavioral information. Typically, a strong association exists between attitudes and *self-reported* behavior (Borden & Schettino, 1979; Dispoto, 1977), but self-reported behavior is frequently overreported (e.g., Chao & Lam, 2011) and may be the result of different influences than actual (observed) behavior (Manzo & Weinstein, 1987; Syme & Nancarrow, 1992). Weaker associations are found between environmental attitudes and observed behavior.

A second reason environmental attitudes are not strongly predictive of pro-environmental behavior is *specificity*. General attitudes may not predict specific behaviors well because each behavior has a unique set of predictors associated with it (Balderjahn, 1988; Homburg & Stolberg, 2006; Nemiroff & McKenzie-Mohr, 1992; Sivek & Hungerford, 1989; Tanner & Kast, 2003). However, general attitudes *can* predict general trends in large numbers of behaviors (Kaiser, 1998; Weigel & Newman, 1976), and specific attitudes *can* predict specific behaviors (Bamberg, 2003; Mobley, Vagias, & DeWard, 2010).

Attitudes may predict specific behaviors, but they may have some general predictiveness as well. That is, environmental attitudes that predict individual behaviors may also predict other similar behaviors. For example, recycling may be the first step toward adopting other pro-environmental behaviors or supporting political action (Berger, 1997; Daneshvary, Daneshvary, & Schwer, 1998), and a generalized energy conservation ethic (predicting multiple energy-reducing behaviors) may exist for a small number of households (Painter, Semenik, & Belk, 1983).

The study of environmental attitudes is also useful for gauging the level of public support for environmental action. Policy makers, park superintendents, fish and game officers, forestry officials, building managers, and recycling coordinators have all made use of environmental attitude research (Heberlein, 1989).

One problem with environmental attitude research is that measured attitudes can be subject to a social desirability bias. Given that individuals tend to see environmental concern as socially desirable (Bord, Fisher, & O'Connor, 1998) and that most environmental attitude measures are based on self-reports, participants may provide responses that are biased toward appearing more concerned than they actually are. However, social desirability in one recent study was only weakly related to self-reported attitudes, and was not related to pro-environmental behavior, thus lending credibility to the self-reported measurement of environmental attitudes (Milfont, 2008).

The Measurement and Structure of Environmental Attitudes

As described above, attitudes have been traditionally defined as being composed of cognitive, affective, and conative components. However, some theorists have postulated alternative structures for environmental attitudes. Several measurement tools for environmental attitudes, based on alternative ways of defining attitudes, have been proposed.

Measuring Environmental Attitudes

At least 15 measures of environmental attitudes and concern have been developed since the 1970s (Gifford, 2007). Experimenters often prefer to develop and use a new measure rather than use a measure that has been previously constructed, validated, and tested. When measures differ in their definition (and the specificity) of environmental attitudes, cross-study comparisons can be difficult. However, it can be useful having a variety of questionnaires and scales because attitudes can be context- or behavior-specific, requiring more specific and up-to-date measures. Thus, several environmental attitudes measurement instruments that may be useful for researchers are described next, in the order in which they were developed.

The 1970s saw the earliest development of environmental attitudes scales. The Maloney-Ward Ecology Inventory (Maloney & Ward, 1973; Maloney, Ward, & Braucht, 1975) was based on the traditional definition of attitudes and contained subscales measuring knowledge (cognitive component), affect, and verbal/actual commitment (conative component). Later, the Weigel Environmental Concern Scale was developed (Weigel & Weigel, 1978), which was shorter but contained no subscales. The most frequently used environmental questionnaire was created in the same year by Dunlap and Van Liere (1978). The New Environmental Paradigm measured the degree to which respondents believe that Earth is sacred and deserves protection for its own sake. The revised version, the New Ecological Paradigm Scale (Dunlap, Van Liere, Mertig, & Emmet Jones, 2000), contains 16 items and has been factor analyzed, revealing several possible dimensions (Bechtel, Corral Verdugo, & de Queiroz Pinheiro, 1999; Noe & Snow, 1990).

In the early 1990s, two German scales were developed to measure environmental concern and environmental pessimism, respectively (Schahn & Holzer, 1990; Sohr, 1994). A third scale, also developed around that time, was created to measure environmental worry about exposure to organic solvents (Bowler & Schwarzer, 1991). Worry was conceptualized as different from pessimism in that pessimism is fatalistic, whereas worry may motivate appropriate action. Yet another instrument, the Environmentalism Scale, was based on the work of previously developed values questionnaires (Banerjee & McKeage, 1994). It comprises subscales that measure substantive environmentalism (attitudes about the severity of environmental problems), external environmentalism (attitudes about environmental issues outside the self, such as those about legislation), and internal environmentalism (attitudes about one's own connection to nature and personally relevant issues).

In the late 1990s, three scales were created to examine pro-environmental behavior, and one was developed to measure specific environmental attitudes. The Motivation Toward the Environment Scale was designed to measure motivation to engage in environmentally responsible behavior (Pelletier, Tuson, Green-Demers, Noels, & Beaton, 1998) and was supported by at least one study (Villacorta, Koestner, & Lekes, 2003). The same research group later developed a scale measuring *amotivation* to engage in pro-environmental behavior (Pelletier, Dion, Tuson, & Green-Demers, 1999). Another measure, the Survey of Environmental Issue Attitudes, was designed to measure attitudes toward particular environmental issues and to measure attitudes regarding various specific environmental issues (Schindler, 1999; Kinnear & Taylor, 1973; Larsen, 1994). Self-report measures have also been developed to assess environmental attitudes in children (Larson, Green, & Castlebury, 2010; Musser & Diamond, 1999).

A Different Structure?

In proposing their environmental attitude structure, Milfont and Duckitt (2004) conducted a thorough analysis of existing attitude measures. They combined eight measures of environmental attitudes into a 99-item questionnaire that was administered to 455 participants. After several rounds of factor analysis, they identified 10 attitude components that could be further divided into two overarching factors: preservation (including pro-environmental behavior) and utilization (including economic liberalism and the idea that the environment needs to be preserved for human consumption).

This structure was also found in a four-nation study (Bogner & Wiseman, 2002). Recently, model was further expanded and called the Environmental Attitudes Inventory was created (Milfont & Duckitt, 2010). This newer inventory draws questions from additional environmental attitudes measures and parses preservation and utilization into 12 subfactors. After testing and refining the scale with samples from multiple countries, the 200-item scale was reduced to 120 items. Although lengthy, the Environmental Attitudes Inventory is comprehensive and appears to have strong theoretical and empirical support.

Variables That Affect Concern for the Environment

Levels of Environmental Concern

Public environmental concern changes over time. For example, two surveys of American college students reported that beginning in the 1970s, environmental concern and willingness to give up goods to alleviate environmental problems was declining (Gigliotti, 1992; Thompson & Gasteiger, 1985). In contrast, a study comparing American adults in 1984 and 1988 found that concern was higher in 1988 (Arcury & Christianson, 1990), and in 1993, a survey found that college students had "strong concern" for the environment (but an unwillingness to change their lifestyles to address their concern; Krause, 1993). Between 1976 and 2005 (with the exception of the early 1990s), American high school students' concern

for the environment, especially their sense of personal responsibility, appeared to decline while their value of materialism slightly increased (Wray-Lake, Flanagan, & Osgood, 2010). However, a 47-nation survey showed that adult environmental concern was higher in 2007 than in 2002 (Pew Research Center, 2007). Fluctuations in levels of pro-environmental attitudes (cognitive, affective, and behavioral intentions) probably are related to individual determinants (such as knowledge, values, experience, or lifestyle) and social determinants (such as business or government action; Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007)

In recent years, human-caused (anthropogenic) climate change has been flagged by environmental scientists as possibly the single most important global environmental issue. This message has been met by a general increase in public awareness of the problem since the late 1980s (e.g., Leiserowitz, 2005), but a small chorus of global warming deniers remains vocal. One survey reported that 84% of US scientists agreed that anthropogenic global warming is occurring, but only 49% of the public held this belief (Pew Research Center, 2009). Concern exists that although awareness of anthropogenic global warming is increasing, denial of the problem may also be increasing—resulting in a strong polarization of opinions.

Age

Most research supports the conclusion that younger people have higher levels of environmental concern than older people (Arcury & Christianson, 1993; Honnold, 1984–1985; Klineberg, McKeever, & Rothenbach, 1998; Zhang, 1994). This holds among teenagers as well—younger teens appear to be more concerned about environmental issues than older teens (Szagun & Mesenholl, 1993). However, older individuals may also have greater variability in their levels of concern than younger individuals (Wright, Caserta, & Lund, 2003). The difference in level of concern between young and old is explained by an "age effect" only for young adults (Honnold, 1984–1985). That is, the effect of getting older reduced the level of environmental concern over time for young adults, but an "era effect" explained the reduction in environmental concern for the rest of the study population. Older adults experienced a reduction in pro-environmental attitudes because previous eras were more liberal minded in general than the current one.

Gender

With the exception of a few studies (e.g., Mukherjee, 1993), women tend to show higher levels of environmental concern than men (Blocker & Eckberg, 1997; Gutteling & Wiegman, 1993; Tikka, Kuitunen, & Tynys, 2000; Zhang, 1994). However, women also seem to exhibit lower levels of pro-environmental behavior and environmental knowledge than men (Arcury & Christianson, 1993; Gambro & Switzky, 1999; Gifford, Hay, & Boros, 1982–1983). That women have less environmental knowledge but more environmental concern is supported by several studies (Arcury, Scollay, & Johnson, 1987; Gifford et al., 1982–1983; Grieve & Van Staden, 1985; Schahn & Holzer, 1990; Stern, Dietz, & Kalof, 1993), and is consistent with the notion that environmental knowledge is not necessarily associated with concern. Lower levels of knowledge among women may be related to a lack of encouragement to study science, and higher levels of concern may be related a higher level of altruism and concern for health and safety (Davidson & Freudenburg, 1996; Dietz, Kalof, & Stern, 2002). However, research on gender and environmental attitudes is now somewhat dated and should be revisited.

Socioeconomic Status

Individuals engage in political action if they possess the time, resources, and passion to do so. Thus, environmentalists are generally reported to be middle- or upper-middle-class citizens (Balderjahn, 1988; Howard, Delgado, Miller, & Gubbins, 1993; Ray, 1981, March). In Africa, a higher income also correlates with a greater knowledge of environmental issues (Chanda, 1999). However, sometimes a passion to engage in environmental action is enough on its own. One large study reported that low-income earners may display greater levels of environmental concern than high-income earners (Uyeki & Holland, 2000).

International Differences

Countries often differ in their average level of environmental concern. For example, in a four-nation study evaluating environmental knowledge and self-reported belief in the protectiveness of environmental actions, people from Japan had the highest environmental knowledge score, but believed their actions were least protective (Eisler, Eisler, & Yoshida, 2003). The same study found that Americans had the least environmental knowledge, and that Germans had the lowest felt connection to

the sea. Germans and Swedes believed their behaviors were more highly protective of the environment (relative to the other two countries).

Wealthier countries are frequently reported to be more concerned about the environment (Franzen, 2003; Inglehart, 1995), but occasionally individuals from less developed countries display equal or greater concern (Furman, 1998; Sarigöllü, 2009), and environmental issues may be mentioned more often in developing than in industrialized countries (Dunlap, Gallup, & Gallup, 1993). These seemingly conflicting findings may be partly explained by differences in societal-level concern and individual concern. Higher GDP (gross domestic product), for instance, is associated with greater concern at the national level, but not at the individual level (Kemmelmeier, Król, & Young, 2002).

Within the United States, racial groups may hold, on average, different environmental attitudes. Early studies suggested that African Americans held lower levels of environmental concern than Euro-Americans, but these measures were culturally biased and less relevant to African Americans than others (Arp, 1996). More recent studies suggest that African Americans have similar (Parker & McDonough, 1999) or greater environmental concern than Euro-Americans (Mohai & Bryant, 1998; Uyeki & Holland, 2000). New immigrants may also be more concerned about the environment than their more acculturated counterparts (Hunter, 2000; Schultz, 2000a).

Environmental concern appears to be high around the world. In the 1990s, surveys found that Chinese teens rated pollution as their biggest concern (Dodds & Lin, 1992), Spanish citizens rated environmentalism as a "central element" of their belief system (Herrera, 1992), and urban Indians rated local air pollution as a major problem (Dietz, Stern, & Guagnano, 1998). Children surveyed in Portugal, Brazil, and the United States to have approximately equal levels of environmental concern (Howe, Kahn, & Friedman, 1996; Kahn & Lourenço, 2002), and a recent report from the European Commission (2009) states that members of European countries rank climate change as the second-worst problem facing the world.

The structure and level of environmental attitudes differ internationally. For example, US citizens are more likely than Mexicans or Brazilians to perceive environmental issues as humans competing against nature (Bechtel et al., 1999; Corral-Verdugo & Armendáriz, 2000). The similarities in structure of attitudes toward nature and the environment have also been compared across nations. The structure of American and European environmental attitudes is rather similar, but distinct from that of the Japanese (Zheng & Yoshino, 2003).

Environmental concern priorities may also differ between rich and poor countries. Residents of wealthy countries may be more concerned about global environmental issues, and residents of less wealthy nations may be more concerned about local environmental issues (Brechin, 1999). Perhaps this is because pressing environmental problems are less apparent in richer countries.

Urban-Rural Residence

Some differences exist in the level of environmental concern for urban and rural dwellers, but again the evidence is mixed. Farmers and other rural residents, with their need to use environmental resources directly, tend to be more anthropocentric (believe that nature should be preserved as a resource for consumption) than city residents who tend to be more ecocentric (believe that nature should be preserved for its own sake) (Bjerke & Kaltenborn, 1999; Rauwald & Moore, 2002). A German study revealed that urbanites showed greater verbal commitment to act on environmental issues than rural inhabitants, but the groups did not differ in any other measure of environmental concern (Bogner & Wiseman, 1997). A Canadian study showed that both urban and rural residents had high levels of environmental concern (Lutz, Simpson-Housley, & de Man, 1999).

Religion and Politics

A debate exists about the role of Judeo-Christian religion in reducing environmental concern. Fundamentalist Christians, for example, appear to have generally lower levels of environmental concern than other groups (Eckberg & Blocker, 1989; Greeley, 1993; Newhouse, 1986; Schultz, 2000b), and this may be related to a message of mastery over the environment espoused in some passages of the Bible (Eckberg & Blocker, 1996; Hand & Van Liere, 1984). That is, some groups interpret the Bible as saying that the earth and its resources were given to humans to use as desired. However, other groups interpret this message differently—that humans are charged with taking care of the earth and preserving it, that is, acting as stewards. This may be why one study found no significant association between biblical literalism or Bible salience and environmental concern (Wolkomir, Futreal, Woodrum, & Hoban, 1997). Religiosity is also associated with

engagement in social and political issues. Thus, in some cases religion can empower people (especially minorities) to take action on social issues such as the environment (Arp, 1997).

Conservative politics, traditionally associated with religious values, also predicts lower levels of environmental concern (Eiser, Hannover, Mann, & Morin, 1990; Schultz, 1994). Belief in anthropogenic global warming in the United States may be increasingly becoming a partisan issue (rather than an issue of scientific integrity); Democrats more often accept that humans influence climate change than do Republicans (Akerlof & Maibach, 2011; Dunlap & McCright, 2008).

Personality and Values

As noted earlier, environmental values and personality are distinct from attitudes.

For example, one personality trait, (greater) self-efficacy, is related to higher levels of concern (Axelrod & Lehman, 1993). Greater agreeableness and openness to experience are also associated with more environmental concern (Hirsh, 2010).

The effect of environmental values on behavior appears to be mediated by environmental attitudes; that is, values trigger attitudes that, in turn, lead to behavior (Milfont, Duckitt, & Wagner, 2010). Several values in particular affect environmental attitudes. Biospheric, altruistic, and post-materialist values, as well as increased levels of tolerance and understanding, all predict high levels of environmental concern (McAllister & Studlar, 1999; Milfont & Gouveia, 2006). These values indicate a general disposition for caring about others and caring about self-improvement or freedom rather than material goods. Post-materialists also differ from materialists in that they tend to be concerned about global rather than local issues (Gökşen, Adaman, & Zenginobuz, 2002), but the value of post-materialism may not be as important as other factors (such as direct experience) in determining pro-environmental attitudes (Drori & Yuchtman-Yaar, 2002).

Other values can also influence environmental attitudes. For example, individuals who put their faith in technology or the free-market have lower levels of concern (Heath & Gifford, 2006; Kilbourne, Beckmann, & Thelen, 2002). People with both egalitarian and individualist values tend to see local environmental threats as less problematic than distant threats, but egalitarians hold this belief significantly stronger (Lima & Castro, 2005).

Direct Experience with Nature

Engaging in nature-related outdoor activities often is associated with increased concern for the environment (Hausbeck, Milbrath, & Enright, 1992; Palmer, 1993). However, the type of outdoor recreation matters (Teisl & O'Brien, 2003). For example, cyclists show more concern for the environment than off-road-vehicle drivers (Schuett & Ostergren, 2003). One theory suggests that individuals who participate in consumptive outdoor activities, such as hunting, have less pro-environmental concern than those who participate in non-consumptive activities, such as photography (di Nenna, Paolillo, & Giuliani, 1987).

Direct experience can also affect environmental attitudes. For example, warmer local outdoor temperatures seems to increase acceptance of global warming (Joireman, Truelove, & Duell, 2010), and living close to a landfill or waste disposal area increases concerns related to that area (Arp, 1996; Bassett, Jenkins-Smith, & Silva, 1996; Elliott, Taylor, Walter, & Stieb, 1993). In Chernobyl and Three Mile Island, local residents' attitudes toward nuclear power became less favorable after the reactors harmed the local environment (MacGregor, 1991) but with time, opinions became more varied (Midden & Verplanken, 1990) and, overall, concern largely returned to pre-meltdown levels (Verplanken, 1989). In the wake of a major earthquake and tsunami in 2011, Japan also experienced a Chernobyl-sized nuclear accident, and it will be interesting to learn whether residents of that country are also follow this pattern of reaction.

Education and Environmental Knowledge

Environmental knowledge is often assumed to be closely linked to environmental concern. Some evidence supports this: children who learn about nature informally (by reading, watching movies, or talking about it) and teens with knowledge of specific environmental issues (or science in general) show higher levels of concern (Eagles & Demare, 1999; Lyons & Breakwell, 1994). However, the knowledge-attitude association is not always found (e.g., Bang, Ellinger, Hadjimarcou, & Traichal, 2000).

The manner in which knowledge is acquired appears to matter. Individuals who read newspapers report higher levels of environmental concern than those who watch TV (Ostman & Parker, 1987), unless those people spend most of their time watching science shows, news, or nature documentaries (Eagles & Demare, 1999; Holbert, Kwak, & Shah, 2003). In general, however, TV watchers are less

willing to sacrifice aspects of their lifestyle for the environment (Shanahan, Morgan, & Stenbjerre, 1997).

The type of education people receive can affect their environmental attitudes. Private-school students usually have more concern about the environment than public-school students (Arcury & Christianson, 1993; Chanda, 1999; Hsu & Roth, 1996; Klineberg et al., 1998), but sometimes the opposite is observed (Grendstad & Wollebaek, 1998). In university, business and technology majors report lower concern and commitment to pro-environmental behavior than environmental education students or students engaging in ecological restoration projects (Gifford et al., 1982–1983; Tikka et al., 2000). However, in all these cases, the students may have had different environmental attitudes before beginning their degrees (Bogner, 1998; Bowler, Kaiser, & Hartig, 1999; Reid & Sa'di, 1997).

Methods for Improving Environmental Attitudes

Media and Messages

The media can have a positive or negative effect on public environmental attitudes. For example, American mass media has been cited as a major driver of climate change skepticism and a possible cause of reduced support for the Kyoto protocol in the United States (Antilla, 2005; Boykoff & Boykoff, 2007). However, mass media was also successfully employed to educate the public about how to recycle (Gillilan, Werner, Olson, & Adams, 1996).

Campaigns to raise public environmental concern in general or about specific issues inevitably involve mass media participation. Therefore, understanding how to effectively communicate a persuasive environmental message can lead to substantially increased environmental concern. Many principles for message crafting have been suggested. For example, less dire messages may lead to an increased public understanding of climate change (Feinberg & Willer, 2011). Empowering messages are more effective than sacrifice messages (Gifford & Comeau, 2011). Most of these principles have been summarized in a recent review (Moser, 2010). In general, four guidelines lead to an effective message: it must be internally consistent, tap the audience's mental model, keep the audience's attention, and have an emotional component. Strong images can increase pro-environmental behavior (Hine & Gifford, 1991), but negative emotions, such as worry or fear, should be evoked only if an option for alleviating that emotion is presented. Moser warns that the design of every message must take into account not only the goal of the message, but also the audience, the message itself, the communicator, the channel of communication, and the context in which the message will be received. No single environmental message will be useful in every context, and environmental messages require particular attention because mitigation lacks immediacy (e.g., the positive outcomes appear distant and the immediate benefits of action are not apparent).

Environmental Education

Increased levels of environmental concern can be facilitated through formal teaching situations. However, teaching programs that include environmental education components are not always effective (Eagles & Demare, 1999) and sometimes even have reverse effects (Bull, 1993). A meta-analysis that reviewed 34 such programs found that only 14 had positive effects (Leeming, Dwyer, Porter, & Cobern, 1993). Given a bias for publishing significant (as opposed to null) results, many more studies showing programs to be unsuccessful may be sitting in researchers' file drawers.

Sometimes environmental education programs (in a university or elementary school) succeed in increasing knowledge, but not concern (Keen, 1991; Yount & Horton, 1992). This may occur because direct nature experiences are more likely than indirect experiences to result in increased concern (Duerden & Witt, 2010). For example, high school students who participated in a six-day wilderness experience subsequently displayed increased environmental concern (Gillett, Thomas, Skok, & McLaughlin, 1991), and children (ages 9 to 14) in a summer-camp environmental education program had higher levels of environmental concern than they started with, particularly if they were first-time campers or stayed at camp for a longer duration (Shepard & Speelman, 1985).

Some environmental education methods appear to be more effective than others. For instance, using a simulation of local energy use and conservation, presenting the problem as a story (pre-teens), or incorporating games (children) may improve attitudes toward the problem and increase corresponding action (Dresner, 1989; Hewitt, 1997; Monroe, 1992). A technique known as Issue Investigation and Action Training (IIAT) also appears to hold some promise. By focusing on specific environmental issues *and* guiding students to develop creative solutions for them, IIAT students gain enhanced knowledge about the issues, skills to solve environmental problems, and a belief that they can solve them. Engagement in active problem solving

leads to subsequent engagement in pro-environmental behavior. This program has been successfully employed with middle- and high-school-age children (Jordan, Hungerford, & Tomera, 1986; Ramsey & Hungerford, 1989; Ramsey, 1993).

Several suggestions for successful environmental education programs have been offered (Boerschig & de Young, 1993; Newhouse, 1990; Pooley & O'Connor, 2000). These can be summarized as follows: (1) gear the program to the student's current level of knowledge, attitudes, and moral development; (2) explain both sides of every issue; (3) encourage contact with nature or the outdoors; (4) promote a sense of personal responsibility; (5) engender feelings of control over the issue; (6) know potential action strategies and employ action skills; (7) learn about the issue before teaching it; (8) develop social norms that favor environmental conservation and protection; (9) enhance environmental sensitivity; and (10) involve emotional components in the program.

Factors That Inhibit or Promote Environmental Attitudes Leading to Behavior

Theories to Explain How Attitudes Influence Behavior

To understand how to increase the likelihood that attitudes lead to behavior, one must first understand how attitudes influence behavior in general. Several theories have been proposed to explain this link. The most commonly used model, and the one with greatest support (e.g., Heath & Gifford, 2002; Laudenslager, Holt, & Lofgren, 2004) is the theory of planned behavior (TPB; Ajzen, 1991). In this model, pro-environmental behavior is predicted by specific behavioral intentions, which are, in turn, predicted by attitudes, perceived social norms, and perceived behavioral control. A recent meta-analysis provided support for TPB but suggested that personal moral norms also predict behavioral intentions (Bamberg & Möser, 2007).

The value-belief-norm model (VBN) is often used to explain the attitude-behavior association (Stern, 2000). In it pro-environmental values are postulated to lead to pro-environmental beliefs (or attitudes), which lead to pro-environmental behaviors (Milfont et al., 2010). Strong altruistic or biospheric values, accompanied by weak egoistic values, are said to encourage individuals to adopt pro-environmental beliefs. Pro-environmental beliefs, defined as high scores on the New Ecological Paradigm Scale (Dunlap et al., 2000), lead individuals to believe that their actions can have adverse environmental consequences, which precedes the belief that individuals have perceived behavioral control over environmental problems.

If these beliefs are adopted, individuals may then activate a personal norm that they are obliged to behave pro-environmentally. This personal norm then is postulated to directly influence pro-environmental behaviors such as organizational action (e.g., promotion of composting at work), private action (e.g., choosing to bike), public non-activist action (e.g., attending meetings), or activist actions (e.g., protesting). The VBN model has successfully accounted for pro-environmental behaviors, in particular non-activist behaviors (García-Mira, Deus, Rodríguez, & Martínez, 2003; Steg, Dreijerink, & Abrahamse, 2005; Stern, 2000). A Swedish study validated the VBN as an appropriate model for explaining action, but also elaborated it by demonstrating that self-transcendence (versus self-enhancement) values may precede more specific pro-environmental values, which only then activate beliefs (Nordlund & Garvill, 2002).

Cognitive dissonance theory may also explain how environmental attitudes predict corresponding behavior (Thøgersen, 2004). It proposes that people are motivated to maintain attitude-behavior consistency. Therefore, in situations in which individuals hold a specific pro-environmental attitude, but behave in a manner inconsistent with that attitude, they will change either their attitude or their behavior.

Bringing attention to a person's attitude-behavior inconsistency (i.e., hypocrisy) is an effective means of reducing shower times (Dickerson, Thibodeau, Aronson, & Miller, 1992) and increasing energy conservation (Kantola, Syme, & Campbell, 1984); however, the effect of hypocrisy was seen only in the first week of the two-week energy conservation study. In the second week, evoking hypocrisy did not have an effect beyond that of providing energy-saving tips and/or feedback on consumption. Of course, dissonance may work in a negative way, too: if one holds anti-environmental attitudes, one may achieve consistency by refusing to engage in pro-environmental actions.

Environmental Attitudes and Other Constructs Lead to Pro-Environmental Behavior

MORE THAN ATTITUDES

Many factors can encourage pro-environmental behavior. For example, people who partake in pro-

environmental behaviors often do so for reasons unrelated to the environment (Whitmarsh, 2009). Some recycling behaviors are predicted by concern for the environment (i.e., reusing and reducing), but others (i.e., using a recycling bin) may not be (Barr, 2007). Indeed, on their own, attitudes do not predict behavior very well, and therefore any behavioral intervention should also address the costs and benefits of the behavior, individuals' morals and values, social norms, emotions, habits, and contextual factors (Steg & Vlek, 2009). Other factors that may influence behavior (with or without pro-environmental attitudes) are seeing others behave in pro-environmental ways (Sussman & Gifford, 2011), feelings of personal responsibility or guilt (Kaiser & Shimoda, 1999; Kaiser, Ranney, Hartig, & Bowler, 1999), and individual motivation (Pelletier et al., 1999), especially self-determined or internalized motivation (Green-Demers, Pelletier, & Ménard, 1997; Osbaldiston & Sheldon, 2003; Séguin, Pelletier, & Hunsley, 1998).

MEDIATORS AND MODERATORS

A variety of factors promote the conversion of environmental attitudes to behavior (e.g., Gill, Crosby, & Taylor, 1986). Several of these serve to increase environmental concern (and were discussed earlier) but are cited again here because they also facilitate the connection between attitudes and behavior.

The ease of enacting a behavior influences whether pro-environmental attitudes will be turned into behavior. The low-cost hypothesis states that environmental attitudes predict easily enacted behaviors but not difficult ones (O'Connor, Bord, Yarnal, & Wiefek, 2002; Schultz, 1996). For high-cost (difficult) behaviors, people find more reasons to justify the gap between their attitudes and behaviors and are less likely to change (Diekmann & Preisendörfer, 1992). For example, the low-cost hypothesis is fulfilled when employees support greenhouse-gas-reducing actions as long as they do not affect their jobs (O'Connor et al., 2002), or when farmers engage in soil conservation practices only when they can afford to (Lynne & Rola, 1988).

Several demographic and individual difference factors influence the strength of the attitude-behavior association. For example, being a student or public-sector employee seems to facilitate the translation of morals and attitudes into action (Axelrod & Lehman, 1993; Nilsson, von Borgstede, & Biel, 2004). Community members are more motivated by tangible rewards than by morals or attitudes (Axelrod & Lehman, 1993), and private-sector employees are less likely to behave in accordance with pro-environmental values than public-sector employees (Nilsson et al., 2004). Individuals with pro-environmental attitudes also exhibit less pro-environmental behavior if they have conservative values, higher income, and less education (Tarrant & Cordell, 1997). Furthermore, even for people with environmental knowledge, accurate assessment of the environmental problem and concurrent arousal to act often are required before pro-environmental activity can take place (Syme, Beven, & Sumner, 1993).

Meta-analyses (studies that empirically combine the results of multiple studies) have identified a number of important factors for the mediation or moderation of an environmental attitude-behavior correspondence. People are more likely to engage in pro-environmental behavior if they (1) know about the issues, (2) know about action strategies, (3) have an internal locus of control, (4) state a verbal commitment to act, (5) are concerned about the issues, and (6) feel responsible to act on them (Bamberg & Möser, 2007; Cottrell, 2003; Hines, Hungerford, & Tomera (1986)).

Several aspects of the environmental issue itself may also make acting on it more likely. If, for example, the problem appears to be personally threatening (as in the case of global warming in Southern California), individuals are more likely to behave pro-environmentally (Baldassare & Katz, 1992). Behavior is also more likely if the action that is required is publicly observable rather than private (Liu & Sibley, 2004).

Factors That Inhibit Attitudes from Leading to Behavior

Factors that *promote* a strong attitude-behavior link are insufficient on their own to explain the relation. Frequently, pro-environmental knowledge or attitudes exist without being converted into action because seven categories of important *psychological barriers* exist (Gifford, 2011). Five of the seven barriers are particularly pertinent here. These are: limited cognition (including problems of uncertainty about the problem or the results of action, and a lack of perceived behavioral control), comparisons with others (including negative social norms about action, social comparison, and perceived inequality), sunk costs (including previous financial investments, conflicting goals and aspirations, and behavioral momentum), perceived risks (including

physical, financial, social, functional, psychological, and temporal risks), and limited behavior (including engaging in small token behaviors, and justifying environmentally harmful behavior by engaging in positive but simple, relatively unimportant pro-environmental behaviors).

Conclusion

Environmental attitudes have been extensively studied. Their structure and definition have been carefully specified and many instruments exist to measure and quantify them in a variety of populations and contexts. Internationally, environmental knowledge is growing and concern is strong. Numerous demographic, dispositional, political, religious, and experiential factors increase or decrease environmental concern. Unfortunately, strong concern does not always result in pro-environmental behavior. Although a clear link exists between attitudes and behavior (mediated by intentions and other variables), additional factors also importantly influence behavior and must be considered. Several of these may help make the attitude-behavior link stronger and others may act as psychological barriers. Some can either increase or decrease environmental concern (e.g., social norms). Increasing attention to appropriate media campaigns and well-designed pro-environmental messages can strengthen environmental attitudes and thus make appropriate behavior more likely. Given the current level of interest in environmental attitudes research, the future looks bright for discoveries of factors that will further increase the frequency of pro-environmental behaviors arising from environmental attitudes.

Future Directions

Implicit attitude measurement is one fruitful potential avenue for future environmental attitude research. Implicit attitudes are activated automatically without conscious awareness and apparently have some ability to direct behavior (Dijksterhuis & Aarts, 2010). In other research areas, such as on stereotypes, implicit attitudes often differ in content from explicit (self-reported) attitudes and can independently influence behavior (Greenwald, Smith, Sriram, Bar-Anan, & Nosek, 2009). Implicit attitudes toward genetically modified foods in Great Britain have also been found to differ from self-reported explicit attitudes (Spence & Townsend, 2006), and an implicit association task has been used to demonstrate that connectedness to nature may be positively associated with biospheric concern and negatively associated with egoistic concern (Schultz, Shriver, Tabanico, & Khazian, 2004). This area of environmental attitudes research deserves further investigation.

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