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Personal and social factors that influence pro-environmental concern and behaviour: A review

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We review the personal and social influences on pro-environmental concern and behaviour, with an emphasis on recent research. The number of these influences suggests that understanding pro-environmental concern and behaviour is far more complex than previously thought. The influences are grouped into 18 personal and social factors. The personal factors include childhood experience, knowledge and education, personality and self-construal, sense of control, values, political and world views, goals, felt responsibility, cognitive biases, place attachment, age, gender and chosen activities. The social factors include religion, urban–rural differences, norms, social class, proximity to problematic environmental sites and cultural and ethnic variations We also recognize that pro-environmental behaviour often is undertaken based on none of the above influences, but because individuals have non-environmental goals such as to save money or to improve their health. Finally, environmental outcomes that *are* a result of these influences undoubtedly are determined by combinations of the 18 categories. Therefore, a primary goal of researchers now should be to learn more about how these many influences moderate and mediate one another to determine pro-environmental behaviour.

Keywords: Personal factors; Social factors; Pro-environmental behaviour; Pro-environmental concern; Review.

Many voices have called for changes in human behaviour, changes that would harm the environment less. Collectively, humans have had an enormous impact on the land, water and air of the planet, far out of proportion to our role as merely one species out of millions. We have massively shaped the planet to suit our comfort and perceived needs, using our outstanding technical abilities and dexterity. In doing so, we have very heavily exploited many of the world's natural resources, pushed aside other species and left the by-products of our efforts to improve our lifestyles in pools, pits, oceans, lakes, rivers and landfills around the world, on the highest mountains, and in the air. And, this trend is increasing.

Many possible solutions for changing this behavioural direction have been proposed, including a variety of theories, policies and interventions (e.g., Abrahamse, Steg, Vlek, & Rothengatter, 2005; Swim et al., 2011). Several attempts have been made to describe the categories of factors that result in pro-environmental behaviour or the lack of it. These attempts include visualizing the problem at the macro scale and therefore include such non-psychological factors as geophysical conditions and political influences (Gifford, 2006, 2008).

At the meso-scale, which focuses on psychological influences, the theory of planned behaviour (Ajzen, 1991), the value-belief-norm model (Stern, 2000), norm activation theory (Schwartz, 1977) and the focus theory of normative conduct (Cialdini, Reno, & Kallgren, 1990) have been proposed as succinct models of pro-environmental concern and behaviour. Yet many studies have shown that these models could be expanded to include other personal and social factors (e.g., Chen & Tung, 2010; Heath & Gifford, 2002; Hinds & Sparks, 2008; Raymond, Brown, & Robinson, 2011).

At the same time, self-reported environmental concern often does not translate to objective pro-environmental behaviour. This occurs partly because as many as 30 psychological barriers to behaviour change have been described (Gifford, 2011). Humans are an extremely protean species. Succinct theories and models may help to capture important portions of the variability in environmental concern and pro-environmental behaviour,

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but a full account inevitably must include a broad range of personal and social influences. To that end, this article summarizes many of the individual and social factors that influence whether a given person will tend to have concern about the environment or act in pro-environmental ways.

However, no single article can summarize all the relevant efforts; 25 years ago, over 300 relevant studies were gathered in a meta-analysis by Hines, Hungerford, and Tomera (1986–87) and 20 years later another meta-analysis was conducted by Bamberg and Möser (2007). We briefly describe some of the major models in the field, and their elements, but readers interested in the accuracy or predictability of the major models *qua* models may refer to other sources.[1] Our goal is to provide a guide to the many personal and social influences on environmental concern and behaviour, with special attention to the many non-Western studies that have been conducted, based on extensive searching of databases and recent books and handbooks.

These influences comprise both personal factors and social factors, and some influences contain both personal and social aspects. For example, religion can be considered a personal factor, because many people grow up in a religious environment and acquire religious values from early childhood. However, it can also be considered a social factor, because social interaction is an important aspect of most religious activities. We discuss childhood experience, knowledge and education, personality and self-construal, sense of control, values, political and world views, goals, felt responsibility, cognitive biases, place attachment, age, gender and chosen activities as personal factors, and religion, urban–rural differences, norms, social class, proximity to problematic environmental sites and cultural and ethnic variations as social factors. We consider each of these next.

PERSONAL FACTORS

People are complex beings that vary in many ways. Some of these differences have an impact on concern for the environment and how people respond to environmental problems.

Childhood experience

Childhood experiences may account in part for environmental concern. When over 200 environmental educators from around the world were surveyed, the strongest predictor of environmental concern was the amount of outdoor experience they had as children (Palmer, 1993). A study among Canadian children found, not surprisingly, that children who talk about the environment at home, watch nature films and read about the environment are more concerned (Eagles & Demare, 1999).

Knowledge and education

One is unlikely to knowingly be concerned about the environment or deliberately act in pro-environmental ways if one knows nothing about the problem or potential positive actions. These two factors were among the strongest predictors of responsible environmental behaviour in Hines et al.'s (1986–87) classic meta-analysis of 315 studies. A British study found that the best discriminator between environmentally concerned and indifferent teens was the amount of environmental knowledge about specific issues they claimed to have, although concerned teens also had more scientific knowledge than unconcerned teens (Lyons & Breakwell, 1994).

A recent summary of 15 knowledge surveys in the U.S. (Robelia & Murphy, 2012) found a very high level of knowledge about some environmental problems (e.g., what renewable resources are, where garbage goes, what causes habitat destruction), but "discouraging" levels of knowledge about others (e.g., climate change, energy production and water quality). As the authors say, making informed pro-environmental choices is difficult if one has incorrect or no knowledge. Fortunately, correct knowledge has been shown to predict behaviour (e.g., Levine & Strube, 2012), although knowledge must be regarded as a necessary but not sufficient condition for salutary decision-making. Even self-reported knowledge, fallible as it may be, seems to predict more pro-environmental behaviour (e.g., Fielding & Head, 2012).

Education is also important. In several countries, individuals with more education in general are more concerned about the environment (Arcury & Christianson, 1993; Chanda, 1999; Hsu & Rothe, 1996; Klineberg, McKeever, & Rothenbach, 1998; Ostman & Parker, 1987), although a study in Norway found the opposite (Grendstad & Wollebaek, 1998). More specifically, however, business (Synodinos, 1990) and technology (McKnight, 1991) majors are less concerned than students in other disciplines (Tikka, Kuitnen, & Tynys, 2000). Students enrolled in a Canadian university environmental education (EE) program had significantly greater environmental knowledge, verbal commitment and actual commitment than similar students who were not enrolled in the EE program (Gifford, Hay, & Boros, 1982–83). However, given that students in EE programs

[1]For a meta-analytic study of factors in the theory of planned behavior, norm activation theory, and some additional psychosocial constructs, see Bamberg and Möser (2007). For a comparison between value-belief-norm theory and the theory of planned behavior on energy consumption behaviors, see Abrahamse and Steg (2011). For a review of the contribution of environmental psychology for promoting pro-environmental behavior, including models, see Steg and Vlek (2009).

may have had more environmental concern before they entered them (Reid & Sa'di, 1997), these programs may not necessarily increase environmental attitudes. Finally, among U.S. residents, reading environmental literature is associated with more pro-environmental behaviour, after controlling for background variables and environmental attitudes (Mobley, Vagias, & DeWard, 2010).

Personality and self-construal

The Big Five personality factors (Costa & McCrae, 1992) currently are considered to represent much of the normal personality domain. They include openness to experience, conscientiousness, extraversion, agreeableness and emotional stability. In a Spanish study, openness (the degree of intellectual curiosity, creativity and a preference for novelty and variety) was related to more pro-environmental activities (Fraj & Martinez, 2006). Similar findings were reported in an American sample; openness was associated with more-frequent pro-environmental behaviour in both community and undergraduate student samples; this relation was fully mediated by environmental attitudes and connection to nature (Markowitz, Goldberg, Ashton, & Lee, 2012).

In a study of Germans, greater environmental concern was related not only to greater openness, but also to greater agreeableness (the tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others; Hirsh, 2010). To a lesser extent, increased environmental concern was also related to less emotional stability (the tendency to experience unpleasant emotions such as anger, anxiety, depression or vulnerability less) and more conscientiousness (the tendency to show self-discipline, act dutifully and aim for achievement; to engage in planned rather than spontaneous behaviour, and to be organized and dependable). The perhaps-surprising relation between emotional instability and environmental concern may be explained by the tendency of people with lower levels of emotional stability to be worried about many aspects of life, among which are environmental issues.

In a wide-ranging set of studies, openness, agreeableness and conscientiousness were strongly linked to environmental engagement across both persons and nations (Milfont & Sibley, 2012). A British study also found that agreeableness and conscientiousness were positively related to recycling behaviours (Swami, Chamorro-Premuzic, Snelgar, & Furnham, 2011).

A less-studied trait is future orientation (or consideration of future consequences), the tendency to establish and achieve goals and to plan strategies for meeting long-term obligations (Corral-Verdugo & Pinheiro, 2006). It is consistently and positively related to sustainable behaviours, including water conservation in Mexico (Corral-Verdugo & Pinheiro, 2006), choice of public transport in the U.S. (Joireman, Van Lange, & Van Vugt, 2004), and consumption behaviours and pro-environmental intentions in France and the U.S. (Urien & Kilbourne, 2011).

Another individual difference is the degree to which one feels a personal relationship with the environment. In an American study that used a modified scale adapted from research on close relationships, greater perceived inclusion of nature in the self predicted more engagement in pro-environmental behaviour (Davis, Green, & Reed, 2009). This is consistent with previous research showing that biospheric concerns are related to the degree to which people implicitly associate themselves with nature, as measured by a modified version of the Implicit Association Test (IAT; Schultz, Shriver, Tabanico, & Khazian, 2004).

Self-construal, how people relate to other people (Markus & Kitayama, 1991), has also been examined in relation to environmental concern and behaviour. A Canadian study found that independent self-construal (differentiating oneself from others) predicted egoistic environmental concern and competitiveness in sharing resources, interdependent self-construal (focusing on relationships with others) predicted resource cooperation and meta-personal self-construal (feeling fundamentally interconnected with all living things) predicted biospheric environmental concern, ecological cooperation and self-reports of pro-environmental conservation behaviour (Arnocky, Stroink, & DeCicco, 2007).

Sense of control

Locus of control is a trait-like tendency that refers to the extent to which people attribute control over events in life more to themselves or more to external sources (Levenson, 1973; Rotter, 1966). Presumably, individuals with an internal locus of control actively seek out information, including about environmental problems. If so, they will more often acquire, and make better use of, knowledge that is conducive to behaving in an environment-friendly manner than those who attribute control to external sources.

Indeed, internal locus of control has been associated with greater willingness to purchase ecological products in the U.S. (Schwepker & Cornwell, 1991) and to stronger pro-environmental intentions and behaviour in both Germany and Japan (Ando, Ohnuma, Blöbaum, Matthies, & Sugiura, 2010) as well as in Australia (Fielding & Head, 2012), including the use of cars for commuting in Canada (Abrahamse, Steg, Gifford, & Vlek, 2009). Locus of control also seems to moderate the link between values and pro-environmental behaviour (Engqvist Jonsson & Nilsson, in press). For values to be expressed in pro-environmental behaviour, people apparently must perceive events to be controlled by their own behaviour or personal characteristics. Moreover, this

is more important for people with lower levels of self-transcendence values (defined in the following section).

A similar trait-like control concept is self-efficacy, the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations (Bandura, 1977). A sense of self-efficacy facilitates recycling behaviour in mainland China (Tang, Chen, & Luo, 2011) and in Spain (Tabernero & Hernández, 2011), Pro-environmental consumer behaviour in Thailand (Rice, Wongtada, & Leelakulthanit, 1996), electricity conservation among Danish consumers (Thøgersen & Grønhøj, 2010), political activism for environmental causes in the U.S. (Lubell, 2002), as well as various other pro-environmental behaviours (Meinhold & Malkus, 2005; Walton & Austin, 2011).

Values, political views and worldviews

Many studies that investigate environmental concern and behaviour as a function of values employ a theory proposed by Schwartz (1992). In it, human values are said to be structured in two motivational dimensions: Openness to Change versus Conservation and Self-Enhancement versus Self-Transcendence. The latter dimension in particular has been associated with environmental concern, because it taps the tendency to enhance one's own interest versus the extent to which one transcends selfish concerns to promote the welfare of others and nature.

Building on this theory, later studies have modified the original value system to fit environmental issues (Stern, Dietz, Kalof, & Guagnano, 1995; Stern, Dietz, & Kalof, 1993) and support for the categorization of values into biospheric, egocentric and altruistic dimensions has been found (De Groot & Steg, 2007, 2008). In contrast to Schwartz' theory, values that concern the environment (biospheric) in this approach are distinguished from other self-transcendent values, such as altruistic values. Not surprisingly, persons who hold more self-transcendent and biospheric values report being more environmentally concerned, and the opposite is true for those who hold self-enhancement and egocentric values (e.g., Milfont & Gouveia, 2006; Nilsson, von Borgstede, & Biel, 2004; Nordlund & Garvill, 2002; Schultz & Zelezny, 1999; Stern, 2000; Stern et al., 1995). The same relations apply for environmental behaviour (e.g., Karp, 1996; Thøgersen & Ölander, 2002), although the relations are typically weak and moderating and mediating variables such as personal norms and beliefs are needed to satisfactorily predict behaviour from values (Nordlund & Garvill, 2003).

Values have also been considered in terms of orientations towards self and others (Messick & McClintock, 1968). Individuals with cooperative (pro-social) orientations emphasize joint gains between self and other, whereas those with competitive and individualistic orientations (pro-self) emphasize gains to themselves. Some studies report the expected behaviour in resource management contexts, that pro-selfs take more for themselves and pro-socials make more cooperative choices (e.g., Kramer, McClintock, & Messick, 1986). However, a Canadian study (Hine, Gifford, Heath, Cooksey, & Quain, 2009) found that people with pro-social and pro-self orientations can make similar choices in resource management simulations, although their motives may differ. Pro-selfs may view harvesting restraint by others as a chance to maximize their own profit while pro-socials may be trying to maximize the overall group's outcome by compensating for what they think might be too much restraint by others. That the two groups do differ is shown by the pro-selfs' choice to respond to a lack of restraint by others by increasing their own harvests, whereas pro-socials' harvests did not vary in response to others' lack of restraint (Hine et al., 2009).

Individuals who are more people-oriented and less authoritarian (Schultz & Stone, 1994), have higher levels of moral development (Swearingen, 1990), and believe their actions will make a difference (Axelrod & Lehman, 1993) tend to be more environmentally concerned. Somewhat surprisingly, younger people seem to be less ecocentric than older people, at least in one Norwegian (Grendstad & Wollebaek, 1998) and one Australian study (Casey & Scott, 2006).

Among other values, post-materialist values typically are held by more affluent citizens who have fewer worries about the basic materials of life; they tend to be concerned with "higher-level" goals and actions such as self-improvement, personal freedom and providing direct input to government (Inglehart, 1997). Committed Australian environmentalists apparently hold more post-materialist and secular values (McAllister & Studlar, 1999). In a cross-national study, espousing post-materialistic values was positively related to environmental concern; in turn, environmental concern, perceived threat and perceived behavioural control predicted the willingness to sacrifice, which then seems to lead to a variety of pro-environmental behaviours (Oreg & Katz-Gerro, 2006).

Among Canadian students, holding moral principles is a better predictor of environmental actions, whereas among community residents, a better predictor is having tangible possessions (such as material economic rewards; Axelrod & Lehman, 1993). In a Finnish sample, holding post-materialist values and political competence was related to increased interest in environmental political action (Paloniemi & Vainio, 2011).

Materialists and post-materialists may be concerned about different environmental issues. In Turkey, materialists tend to be more concerned about local environmental issues, whereas post-materialists tend to be more interested in global environmental issues (Göksen, Adaman,

& Zenginobuz, 2002). However, in an Israeli sample, post-material values were less important than other factors, such as whether an actual environmental hazard was nearby (Drori & Yuchtman-Yaar, 2002).

Valuing free-market principles, believing that technology will solve environmental problems, and that economics is the best measure of progress are associated with less environmental concern among various samples (Heath & Gifford, 2006; Kilbourne, Beckmann, & Thelen, 2002). Similarly, less environmental concern has been reported for individuals with conservative political views (Eiser et al., 1990; Schultz & Stone, 1994). Conservative White American males are less worried about environmental problems than are other adults (McCright & Dunlap, 2012).

As might be expected, liberal political views result in greater verbal commitment to environmental measures when a person is exposed to a degraded environment, at least in a Canadian sample (Hine & Gifford, 1991). In a more nuanced study of political values in the U.S., differences between liberals and conservatives in environmental attitudes was partially explained by the tendency for liberals (but not conservatives) to see the environment in moral terms (related to harm and care). However, when pro-environmental appeals were reframed in terms of purity, a value that resonates more for conservatives, the difference in environmental attitudes was reduced (Feinberg & Willer, 2012).

Unfortunately, relations between values and environmental views may not be simple because people have multiple values and they can conflict. When two values are in conflict, for example, the difference between the pre-existing level of endorsement of the two values may predict one's environmental views better than the endorsement level of either single value (Howes & Gifford, 2009).

One's views on the "nature of nature" are also related to one's environmental concern. Four "myths of nature" can be distinguished (Adams, 1995). First, those who think of nature as capricious believe that she is capable of anything; nature is unpredictable. Second, those who think of nature as benign believe that she is very capable of adapting; nature can manage to find its equilibrium again even when she is disturbed. Third, those who think of nature as ephemeral believe that she is delicate and fragile; even small disturbances will have drastic consequences. Fourth, those who think of nature as tolerant/perverse believe she is able to absorb some disturbance, but beyond a certain limit, she will suddenly collapse. Those who believe the nature-ephemeral myth are most environmentally concerned; those who believe the nature-benign myth are least concerned (Poortinga, Steg, & Vlek, 2003).

In a study of more than 3200 people in 18 nations across the world, participants in 15 of the nations believe that threats to the environment are weaker in their local area than in distant places (Gifford et al., 2009). In a Portuguese sample, egalitarians believed this more strongly than individualists (Lima & Castro, 2005).

Goals

Certainly one determinant of pro-environmental behaviour is holding a goal to engage in it. For example, setting a goal has been shown to play a role (with other factors) in household energy conservation (Abrahamse, Steg, Vlek, & Rothengatter, 2007). However, the role of goals can be complicated. For example, goals seem to be fulfilled more when people focus (1) on an abstract goal in combination with a specific mindset *or* (2) on a specific goal in combination with an abstract mindset (Rabinovich, Morton, Postmes, & Verplanken, 2009). Moreover, an American study (Osbaldiston & Sheldon, 2003) show that when individuals perceive an authority figure as encouraging their autonomy, they are more motivated to perform pro-environmental behaviour goals, and indeed do so in the short term and intend to do so in the longer term.

Although many personal factors play a role in pro-environmental behaviour, goals have been placed at the centre of one theory (Lindenberg & Steg, 2007). It proposes three kinds of goals: hedonic goals, which lead individuals to seek ways to improve their feelings; gain goals, which sensitize individuals to gains or losses in changes in their financial or other resources; and normative goals, which are concerned with the correctness of their behaviour.

Felt responsibility

As one might expect, feeling responsible is an important part of environmental concern (Kaiser, Ranney, Hartig, & Bowler, 1999). This feeling of responsibility apparently stems largely from a sense of guilt (Kaiser & Shimoda, 1999). In a nationwide sample of Dutch teenagers, environmental concern was strongly connected to willingness to make sacrifices, such as financial sacrifices, for the environment (Kuhlemeier, van den Bergh, & Lagerweij, 1999).

Cognitive biases

Some classic cognitive biases, such as the actor-observer effect, self-serving bias, fundamental attribution error, false consensus effect and self-centred bias play a role in making environmental choices about the environment, such as how to manage a natural resource. In a fishing microworld (Gifford & Hine, 1997), participants in a Canadian sample who intended to maximize their own gain tended to believe that other participants shared their intention (false consensus effect) much more than those

who intended to cooperate in harvesting. Participants in general strongly attributed resource outcomes more to others' personal characteristics than the situational factors (fundamental attribution error). Participants also attributed outcomes to their own behaviour more than to that of others, a significant reversal of the actor-observer effect. The self-serving bias (taking credit for successful management but denying responsibility for unsuccessful management) held only in that participants claimed less responsibility when they harvested lightly and others harvested heavily. In those circumstances, such a belief may not be a "bias." The participants tended to take more responsibility for outcomes than was objectively the case, thus manifesting a self-centred bias, although they assigned even more responsibility to other harvesters. In short, resource management is fraught with cognitive distortions.

Place attachment

One might expect that if individuals have a strong attachment to a place, they would want to protect it. Evidence from Canadian (Scannell & Gifford, 2013) and Indian (Budruk, Thomas & Tyrell, 2009) samples supports this proposition. For example, adding place attachment to the standard value-belief-norm model doubled the predictability of Australian landowner's conservation of native plants (Raymond et al., 2011). However, place attachment comes in multiple varieties, and not all seem to be related to pro-environmental behaviour: natural but not civic place attachment has that connection (Scannell & Gifford, 2010).

Age

Across childhood and youth (age 4–18), the ability to sustainably manage a resource increases, presumably as a result of growing cognitive ability (Gifford, 1982). Less obviously, girls seem to manage better at early ages, and boys do better at later ages.

Early studies (Hines et al., 1986–87; Roberts, 1993) on adults as well as more recent ones (Gilg, Barr, & Ford, 2005; Swami, Chamorro-Premuzic, Snelgar, & Furnham, 2011; Pinto, Nique, Añaña, & Herter, 2011) find that older people report engaging in more pro-environmental behaviour than younger people. These findings may support the hypothesis that something important happened to an older generation that did not happen to the younger generation. If so, such a cohort effect would not be caused by ageing itself, but by events that had a greater impact on one age group than another. This effect seems plausible if it stems from a background of limited resources and the need to conserve in the depression 1930s and wartime 1940s. However, the behaviours measured often are not only conservation behaviours, but also include such choices as fairly traded goods and recycled products (e.g., Gilg et al., 2005). This may hint at another hypothesis that is as yet poorly understood.

The picture for environmental *concern*, however, is not the same as that for environmental *behaviour*. Most (but not all) research shows that younger people report being more environmentally concerned than older people, at least about the general environment (Arcury & Christianson, 1993; Honnold, 1984–85; Klineberg et al., 1998; Zhang, 1993), although why this is so when younger people may be less ecocentric (Casey & Scott, 2006; Grendstad & Wollebaek, 1998) remains to be discovered. This trend even seems to hold *within* the younger age range; a German study found that 12-year-olds were more concerned than 15- and 18-year-olds (Szagun & Mesenholl, 1993). However, given that environmental concern is quite variable among older adults, concluding that all older people are unconcerned would be an obvious mistake (Wright, Caserta, & Lund, 2003).

Apart from the cohort effect, two other possible interpretations of this age-related trend are possible. First, as people age, they may become less concerned about the environment; this would be a true age effect. Second, perhaps the times are changing; that is, if the overall political-social climate is growing more conservative, everyone may be less concerned about the environment than they were earlier. This is an era effect. In a clever study that compared concern across different ages, generations and eras in an American sample to answer this question, support appeared for an era effect, although true age effects also appear strong within the young-adult age group (Honnold, 1984–85). However, because this study is now almost thirty years old, a current examination of this issue is needed.

Gender

Early research reviews of gender differences in environmental attitudes and behaviours (Hines et al., 1986–87; Van Liere & Dunlap, 1980) concluded that the literature was inconsistent; that no clear differences could be discerned. However, a clearer—but not entirely uniform—picture seems to have emerged more recently, in which women tend to report stronger environmental attitudes, concern and behaviours than men (Blocker & Eckberg, 1997; Gutteling & Wiegman, 1993; Luchs & Mooradian, 2012; Scannell & Gifford, 2013; Tikka et al., 2000; Zhang, 1993).

Indeed, this gender difference in environmental attitudes and behaviours was also supported across age and across 14 countries in Europe, Latin America and the U.S., and was consistently stronger for behaviours than for environmental attitudes (Zelezny, Chua, & Aldrich, 2000). The exceptions to this trend seem to be in China,

where the above pattern was observed in domestic environmental behaviours (e.g., recycling), whereas outside the home (e.g., environmental organization donations) no gender differences were exhibited, and women expressed lower levels of concern than men (Xiao & Hong, 2010).

What might explain these differences? Perhaps personality mediates the effect of gender on sustainable consumer behaviour. For example, more agreeable consumers are more likely to place importance on social and environmental concerns, a personality trait that is more prominent among women (Luchs & Mooradian, 2012). Similar explanations propose that, compared to males, females have higher levels of socialization to be other-oriented and socially responsible, which may then influence pro-environmental behaviour (Zelezny et al., 2000).

Women are more likely to say they are more upset by anti-environmental events and that they intend to do more about environmental problems, but they seem to have less factual knowledge about such problems than men (Arcury & Christianson, 1993; Gambro & Switzky, 1999; Gifford et al., 1982–83; Levine & Strube, 2012). This pattern—that women express more concern, but men are more knowledgeable—has been confirmed in other studies (Arcury, Scollay, & Johnson, 1987; Grieve & Van Staden, 1985; Schahn & Holzer, 1990; Stern et al., 1993). Perhaps this is one result of social and school systems that discourage girls from early interests in science and the environment. This pattern of results would strongly suggest that educators should pay more attention to the EE of girls and women. Another explanation is that altruistic concerns such as health and safety (which can be threatened by a degraded environment) are more important to women, especially to women with children at home (Davidson & Freudenburg, 1996; Dietz, Kalof, & Stern, 2002).

Chosen activities

Environmental concern is associated with one's choice of activities. People who engage in outdoor recreation tend to be concerned about the environment, but this varies with the activity (Teisl & O'Brien, 2003). In general, those who prefer consumptive outdoor activities (e.g., hunting or fishing) tend to be less concerned than people who engage in non-consumptive activities (e.g., hiking, photography; di Nenna, Paolillo, & Giuliani, 1987). Similarly, members of American bicycling organizations tend to be more concerned than members of off-road vehicle organizations (Schuett & Ostergren, 2003). Performing ecological restoration work is associated with more positive environmental attitudes and behaviour (Bowler, Kaiser, & Hartig, 1999), as is engaging in more nature-related activities in general (Tikka et al., 2000).

People who spend more time reading newspapers are more concerned, and those who watch more TV are less concerned and less willing to make sacrifices for the environment (Ostman & Parker, 1987; Shanahan, Morgan, & Stenbjerre, 1997). However, not surprisingly, Canadian (Eagles & Demare, 1999) and American (Holbert, Kwak, & Shah, 2003) adolescents who watch more science shows and more news and nature documentaries are more concerned. American women who engage in more personal health care activities are also more concerned (Greenwald, 1993).

SOCIAL FACTORS

People are heavily influenced by the context in which they live their daily lives. This context may be long-term, such as religion or social class, or more volatile in nature, such as the passing influence of fads or changing significant others. The manner in which these factors influence environmental concern and behaviours are reviewed next.

Religion

The hypothesis that environmental concern is rooted in religious beliefs and values has been raised by many writers. The traditional view is that the Judeo-Christian religious tradition is a main cause of Western environmental problems (White, 1967). The thesis is that by establishing a dualism between humans and nature, Christianity made it possible to exploit nature while being indifferent to the welfare of nature. The emergence of modern technology is at least partly explained by the Christian dogma of human transcendence of, and rightful mastery over, nature. However, others have made the opposite claim; that the Judeo-Christian tradition contributes to greater pro-environmental behaviour because it promotes a stewardship ethic that embodies responsible planning and management of resources (e.g., Naess, 1989; Whitney, 1993).

Empirical research on this issue remains divided and inconclusive. To a large extent, this is a result of differences in ways to measure religiosity and type of environmental concern or behaviour. American Judeo-Christians have been found to be more committed to mastery over nature orientation and to have less environmental concern than non-Christians (Hand & Van Liere, 1984). Other comparisons report no significant differences in environmental concern between Christians and Jews compared to other religions (Greeley, 1993; Hayes & Marangudakis, 2001; Kanagy & Nelsen, 1995; Wolkomir, Futreal, Woodrum, & Hoban, 1997; Woodrum & Hoban, 1994). Several studies report a negative relation between biblical literalism and environmental concern, for instance in American samples (Eckberg & Blocker, 1996) of clergy, religious activists,

political-party contributors and the public (Guth, Green, Kellstedt, & Smidt, 1995). In a multi-national study (Schultz, Zelezny & Dalrymple, 2000) respondents who expressed more literal beliefs in the Bible again expressed significantly weaker environmental attitudes and ecocentric environmental concerns and stronger anthropocentric environmental concerns. However, the authors found no significant relation between biblical literalism and self-reported pro-environmental behaviour.

Among Americans, liberal religious denominations are less likely to emphasize domination of nature; among these, church attendance is positively related to environmental concern, probably because these denominations are more oriented towards a stewardship ethic (Hand & Van Liere, 1984). Others have reported a positive relation between religious participation and pro-environmental behaviour (e.g., Kanagy & Willits, 1993).

One interpretation of much of the research (e.g., Biel & Nilsson, 2005; Hand & Van Liere, 1984; Kanagy & Nelsen, 1995; Shaiko, 1987) is that concern based on Christian religious beliefs might sometimes differ from other types of concern. Christian beliefs seem to be associated to a stewardship form of concern (the responsibility to maintain and wisely use the gifts that God has given) and the structure of environmental attitudes might therefore differ from non-religious groups. For instance, a Swedish study found that while there were no differences between Christians and non-Christians on the perception of general environmental threats, the threat of genetically modified crops were judged to be more serious by Christians (Biel & Nilsson, 2005). The use of genetically modified crops seems to resonate badly with the stewardship ethic of maintaining, rather than altering, the gifts that God has given.

The stewardship ethic should also apply for Muslims because humans, according to Islam, are part of the holistic system of life created by God, and although humans have the right to survive, they have been given the role of responsible leadership on earth (Izzi Dien, 2003). Although empirical studies are few, one in Egypt found that Islamic religious teachings and religiosity were associated with pro-environmental behaviour, thus lending support to the presence of an Islamic environmental ethic (Rice, 2006).

Empirical studies of Eastern religions such as Hinduism and Buddhism are scarce. Many scholars do point to the ecocentric, sacred and animistic relationships with nature in these religions (e.g., Dwivedi, 2005; Narayanan, 2001). However, while acknowledging the strong connections with nature, some also point out the poor environmental record in India (Dwivedi & Tiwari, 1987) and some (e.g., Narayanan, 2001) have cautioned against idealizing the significance of religious values in pro-environmental attitudes and behaviours.

Urban versus rural residence

Residents of rural areas experience the environment in very different ways from their urban counterparts; doubtless they are in touch more with nature. Does that result in greater or lesser environmental concern or behaviour? Research from numerous countries has yielded conflicting results. In China, people living in larger cities were more likely to engage in pro-environmental behaviours than people living in smaller cities (Chen et al., 2011). Urban Germans reported greater verbal commitment to environmental issues, but were not different from rural Germans in other forms of concern (Bogner & Wiseman, 1997).

However, students in the UK who had grown up in rural areas report more positive orientations towards the natural environment than urban-raised students (Hinds & Sparks, 2008). Norwegian farmers are less ecocentric (putting nature's interest ahead of humanity's interest) and more anthropocentric (wanting to protect the environment mainly so that it can fulfil human needs) than other groups (research biologists and wildlife managers; Bjerke & Kaltenborn, 1999). Rural Trinidadians also are more anthropocentric than their urban counterparts (Rauwald & Moore, 2002), and the same is true based on a large national sample in Canada (Huddart-Kennedy, Beckley, McFarlane, & Nadeau, 2009), although rural residents reported higher participation in recycling and stewardship behaviours. The anthropocentric tendencies of rural residents seem consistent with their use of natural resources for human ends. Finally, Canadian residents from British Columbia reported relatively high levels of environmental concern among both rural and urban dwellers (Lutz, Simpson-Housley, & de Man, 1999).

Norms

If one believes that the "usual thing to do" is to recycle, one is likely to recycle. This is the heart of norm activation theory (Schwartz, 1977), as adapted for environmental issues, and other norm-oriented approaches. Norm activation theory's main constructs are awareness of need, awareness of consequences, personal norms and subjective norms. Personal norms represent one's feelings of moral obligation towards taking action, for example, against nuclear energy (de Groot & Steg, 2010), or the intention to reduce one's use of cars (Abrahamse et al., 2009). Subjective norms represent one's sense that significant others expect a certain pattern of behaviour. In a typical study, the model showed that parents can create norms in young children to recycle and re-use paper (Matthies, Selge, & Klöckner, 2012). The theory's elements seem to be strong predictors of environmental behaviour (De Groot & Steg, 2009).

The focus theory of normative conduct (Cialdini et al., 1990) introduced injunctive and descriptive norms in

the context of a study of littering. These norms reflect, respectively, the idea that sometimes group approval is used to encourage people to engage in the "usual" behaviours and sometimes people engage in behaviour because they believe that "most people do this" (whether that is objectively true or not).

Perceptions of both strong descriptive and injunctive norms appear to produce the highest rates of actual participant conservation behaviour (e.g., Schultz, Khazian, & Zelezny, 2008). In an American study on household energy behaviour (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007), a descriptive normative message detailing average neighbourhood usage produced either desirable energy savings or the undesirable boomerang effect (an increase in energy usage), depending on whether households were already consuming at a low or high rate. Adding an injunctive message (conveying social approval or disapproval) eliminated this boomerang effect.

Another type is the local norm, one that derives from people sharing the same physical area. Local norms seem particularly relevant for behaviours that occur in a specific proximate location. In one Italian study, descriptive norms (both subjective and local) emerged as strong independent predictors of recycling intentions (Fornara, Carrus, Passafaro, & Bonnes, 2011).

However, people sometimes face conflicting norms. In investigating the effects of conflicting norms on pro-environmental behaviour in an Australian sample, researchers found that people can be both de-motivated and fortified in taking action by the conflicting norms (McDonald, Fielding, & Louis, 2013). Among those with positive attitudes towards the behaviour the perceived effectiveness increased, while among those with moderate attitudes the perceived effectiveness decreased. The perceived effectiveness mediated an indirect effect on behavioural intentions.

A similar study investigated the effects of conflicting descriptive and injunctive norms on intentions to save energy on samples in Australia, the UK and China (Smith et al., 2012). The results show that the beneficial effect of a supportive injunctive norm was undermined when an unsupportive descriptive norm was presented.

Social class

Environmentalists tend to be middle- or upper-middle-class individuals. This is supported, for example, in studies of consumer behaviour in Germany (Balderjahn, 1988), and energy conservation behaviour (Howard, Delgado, Miller, & Gubbins, 1993), and curbside recycling (Laidley, 2011) in the U.S. At the national level, citizens of richer countries seem on average to have or at least report greater environmental concern (Inglehart, 1995). One such study convincingly demonstrated that environmental concern has a clear positive relation with gross domestic product (GDP) per capita (Franzen, 2003).

According to Franzen (2003), this may occur because residents of richer than poorer countries prefer general environmental improvement measures to economic growth. At least two main explanations for this may be entertained. First, increased revenue will also increase demand and requirements for a good environment, and then increased economic assets make it easier to allocate resources for improving the environment (Franzen, 2003).

The second explanation, advanced in particular by Inglehart (1997), is that increased wealth and welfare generate a change from materialist to post-materialist values. When people no longer need to devote so much time to meeting their basic material needs, a shift occurs from material values, such as striving for increased income and property, to values that are more strongly linked to self-development and well-being. In Botswana, wealthier persons better recognized environmental issues than poorer persons, although this may be the result of educational differences that stem from wealth differences (Chanda, 1999). An important difference between these two explanations is that in the first case people can be as materialist as they were before, but nevertheless grant greater priority to a better environment. In the second case, the increasing concern is the result of a change in values.

However, in apparent contrast to this trend, when industrialized and developing nations were compared, environmental issues were mentioned more frequently than expected in developing countries, and respondents from developing countries (e.g., Nigeria and India) expressed higher levels of concern about environmental problems than did respondents from industrialized nations (e.g., the Netherlands and Denmark; Dunlap, Gallup, & Gallup, 1993). In the same vein, low-income earners were more concerned than higher-income earners in the U.S. (Uyeki & Holland, 2000).

This apparent discrepancy may be resolved by noticing that the former studies related environmental concern to national wealth, whereas the second studies related it to the individual level of analysis. This explanatory notion is supported by a cross-national study which found that economic factors predicted environmental concern at the national level, but not at the individual level (Kemmelmeier, Król, & Young, 2002).

Differences in environmental concern by wealth may also depend on global versus local environmental concern (cf. Gifford et al., 2009). Citizens of poorer countries (e.g. Hungary, Nigeria) appear to be more concerned about local environmental problems than citizens of wealthy countries (e.g. the Netherlands, U.S.), whereas income differences do not account for concern about global environmental problems (Brechin, 1999). This probably occurs because wealthy people have fewer environmental problems in their communities than do poor people.

Furthermore, even if environmental actions save money in the long run, wealthier people can more easily afford the initial costs.

Proximity to problem sites

People who live closer to a problem site such as a landfill or waste disposal site tend to be more concerned, at least about that environmental problem (Arp & Kenny, 1996; Bassett, Jenkins-Smith, & Silva, 1996; Elliott et al., 1993). In a southern California study, residents who believed that their well-being was more threatened by environmental problems were more likely to engage in recycling, water conservation, less driving and purchasing environmentally safer products (Baldassare & Katz, 1992). Not surprisingly, American residents are in favour of reducing greenhouse gas emissions if they believe this will not threaten their own jobs (O'Connor, Bord, Yarnal, & Wiefek, 2002).

Cultural and ethnic variations

Many variations in environmental concern among ethnic, racial and national groups have been reported. Cultures vary not merely in their level of concern, but also in the structure of their thinking *about* concern (Eisler, Eisler, & Yoshida, 2003; Zheng & Yoshino, 2003).

Within the U.S., early research suggested that environmental concern was lower among African Americans, but more recent studies show that Afro-Americans have similar (Parker & McDonough, 1999) or even greater (Mohai & Bryant, 1998; Uyeki & Holland, 2000) environmental concern than Euro-Americans. The earlier findings may have stemmed from measurement of environmental activities that were less relevant to African Americans (Arp & Kenny, 1996).

Immigration can be related to environmental concern. For example, more-acculturated U.S. Latin-Americans appear to be less environmentally concerned than less-acculturated U.S. Latin-Americans (Schultz, Unipan, & Gamba, 2000). However, business students in Chile (who are presumably not acculturated to the U.S.) exhibit more environmental concern and stronger intentions to engage in pro-environmental behaviour than U.S. business students (Cordano, Welcomer, Scherer, Pradenas, & Parada, 2010). Another study found that, in the U.S., immigrants in general have environmental attitudes that are similar to those of non-immigrants, but that newer immigrants express greater concern than native-born Americans (Hunter, 2000).

In general, citizens of developing countries (e.g., Philippines and Latvia) seem to have as much, or more, environmental concern as those in developed countries (e.g., Germany, the U.S.) (Mostafa, 2011). This contrasts with the social class results within societies; perhaps the difference reflects within versus between society dynamics. In Spain, survey results suggest that environmentalism has become a central element of the Spanish belief system (Herrera, 1992). Chinese teens list environmental pollution and overpopulation as their greatest concerns, even more important than the death of a parent, fear of nuclear war or getting a good job (Dodds & Lin, 1992). In India, more than three-quarters of the respondents in a large-scale survey said that local air pollution was a major problem (Dietz, Stern, & Guagnano, 1998). Brazilian children, Portuguese children and U.S. children of the same age are about equally concerned about the environment (Howe, Kahn, & Friedman, 1996; Kahn & Lourenço, 2002).

Thus, in general, environmental concern is important for many people around the world. The issue may be how the *structure* of attitudes differs from society to society rather than *differences* in level of concern. For example, U.S. residents tend to see environmental issues as humans versus nature, but in Mexico and Brazil residents are more likely to perceive no necessary conflict between development and nature (Bechtel, Verdugo, & Pinheiro, 1999; Corral-Verdugo & Armendariz, 2000).

Although some observers have portrayed less-developed societies as managing their resources well and as models for modern Western societies to emulate, one researcher concluded from a survey[2] that the low-impact practices of traditional societies may result less from their reverence for the environment than from low population density, inefficient harvest technologies and a lack of profitable markets for their resources (Low, 1996).

NONE OF THE ABOVE

Recently, researchers have discovered what should have been obvious: some people engage in pro-environmental behaviour without necessarily having any of its presumed pre-requisites, such as knowledge, childhood experiences, activity choices, personality, values, perceived behavioural control or even behavioural intention to do so. How could that be? Sometimes individuals make behavioural choices that reduce harm to the environment for other reasons than those just mentioned. They cycle for their health (Whitmarsh, 2009), insulate their homes to save money, or recycle and re-use because they are poor. These individuals have been called "honeybees," because, like that insect, in pursuing some completely different goal, they provide an important side-benefit to the environment (Gifford, 2011).

[2]On the basis of a sample comprising 186 societies of the Standard Cross-Cultural Sample (Divale, Khaltourina, & Korotayev, 2002).

SO, WHAT DO WE KNOW?

In short, we know that environmental concern and pro-environmental behaviour are influenced by many factors. The models that have been proposed, although well-intentioned, probably are too simple. Even without including important non-psychological influences such as natural forces, economic factors, technological innovation or governance instruments, as some have suggested (e.g., Gifford, 2006), attempting to fully account for variation in environmental concern and pro-environmental behaviour is a seriously complex enterprise. This article summarizes, but not in a fully exhaustive way, how 18 categories of personal and social factors influence these very important outcomes.

The reader who has followed this trail thus far could be forgiven for concluding that the answer to "what influences . . . " is so multi-faceted as to defy reasonable integration and comprehension. The likely reason for this is that many of the factors influence each other through moderation or mediation. Some overwhelm others in their impact, but those others may appear to have effects if they are considered in isolation.

One approach to untangling these complexities is to undertake a meta-analysis. Two important attempts have been made, and in some ways they come to the same conclusions. The first broad meta-analysis, by Hines et al. (1986–87) considered 315 relevant studies and found that pro-environmental behaviour was most strongly predicted by knowledge of issues, knowledge of action strategies, locus of control, attitudes, verbal commitment and an individual's sense of responsibility. Twenty years later, a meta-analysis by Bamberg and Möser (2007) agreed for the most part with the earlier one, but also concluded that the intention to engage in pro-environmental behaviour mediates the impact of the other personal and social influences, that personal norms influence this intention, and that problem awareness is a significant indirect influence on pro-environmental intention. The impact of the latter, they find, is mediated by moral and social norms, guilt and attribution processes.

Sadly, one very important caveat must be added. The vast majority of studies that have examined "behaviour" actually assessed reported behaviour. The implied assumption is that reported behaviour reflects the actual behaviour that truly turns the wheels of environmental degradation or enhancement. This assumption may well be quite inaccurate. Because being in favour of the environment is widely accepted, reported behaviour may reflect social desirability as a bias, or reports that are sincere but flawed by memory errors. A recent meta-analysis found that the correlation between behaviour intentions (one kind of self report) and actual behaviour was .45, meaning that the overlap between intentions and actual action is about 20% (Kormos & Gifford, submitted). Perhaps the correlation between reported behaviour and actual behaviour is stronger, but perhaps it is not.

All that being said, we will conclude with a leap of faith and suggest that in broad strokes a person with a particular personal and social profile will be more likely to be concerned about the environment and to act on its behalf. Let us therefore posit that such persons are likely to have spent time in nature as a child, to have accurate knowledge of the environment, its problems and potential solutions, to have an open, agreeable and conscientious personality, to consider the future consequences of their actions, to feel in control of their behaviours, to harbour biospheric, post-material, liberal values and responsibility for environmental problems, to be among the upper half of the economic classes, to hold personal and descriptive norms about pro-environmental action, to adhere to a religion that teaches a stewardship orientation to the earth, and to spend time in non-consumptive nature activities. Or, they could just be honeybees.

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