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The importance of connection to nature in assessing environmental education programs

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ABSTRACT

Environmental education imparts knowledge and creates experience to change beliefs, attitudes – and most importantly – behavior. What are the deep motivators of human behavior? Theory and research suggest that feeling connected to someone or something motivates protective and self-sacrificing behavior. This paper reviews the large body of research demonstrating that connectedness to nature is an important predictor of environmentally responsible behavior. We review past research on self-reported behavior, then summarize new research from our lab that demonstrates a link between connectedness to nature and actual conservation behavior (electricity use). We conclude that promoting connectedness to nature should be a goal for environmental education programs, and should therefore be an important part of any assessment.

Planet Earth is heading toward climate destabilization, and the window of opportunity to avert it is narrowing rapidly (IPPC, 2013). Technology and scientific knowledge are not the limiting factors in responding to this crisis. Rather, humans' ability to change their political and economic systems, as well as their choices and lifestyle, will determine whether we respond in time. People at all levels need to change their behavior: elected officials in the laws they promote, corporate CEOs in the practices they adopt, individual voters in the candidates they select, and consumers in the choices they make about resource use.

Environmental educators are at the forefront of the effort to change behavior by striving to teach "children and adults how to learn about and investigate their environment, and to make intelligent, informed decisions about how they can take care of it" (NAAEE, 2011) and to foster "attitudes, motivations, and commitments to make informed decisions and take responsible action" (UNESCO, Tbilisi Declaration, 1978). Intuitively, it seems reasonable to assume that imparting accurate knowledge and pro-environmental beliefs is enough to create behavior change. This assumption can be found on the North American Association of Environmental Education (NAAEE) website (NAAEE, 2011): "What do environmentally literate people do? Environmentally literate people act on their beliefs". But do they? Are beliefs enough to reliably motivate behavior change? What are the deep drivers of human behavior that will most effectively predict environmentally responsible behavior?

Connectedness to nature as an important driver of behavior

The concept of connectedness to nature has a long history in ecology and ecopsychology, and has recently generated a great deal of interest and empirical research. As Leopold (1949, p. viii) wrote years ago: "We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect". In Leopold's view, environmentally responsible behavior (ERB) will result from seeing ourselves as a "plain and simple member" of the natural world.

Modern empirical work by social psychologists on interpersonal relationships supports Leopold's assertion that a sense of "we-ness" makes protective behavior more likely, even if that behavior is inconvenient. For example, the extent to which one includes another person as part of the self is a core operationalization of relationship closeness (Aron, Aron, Tudor, & Nelson, 1991). As relationship closeness increases, so does empathy and willingness to help (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997). Similarly, acts that lead to a greater self–other overlap, such as perspective taking, (Davis, Conklin, Smith, & Luce, 1996; Galinsky & Moskowitz, 2000) also increase willingness to help (Coke, Batson, & McDavis, 1978). Among human-to-human relationships, expanding one's sense of self to include another does lead to more empathic and protective behavior.

We argue that the deep motivation that comes from a sense of "we-ness" is one of the few psychological forces strong enough to

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compete with the prevailing counterforces required to engage in environmentally responsible behavior (ERB). Doing the environmentally responsible thing is often, to quote Al Gore, inconvenient. Whether it is an elected official deciding to vote in a way that angers big donors or an individual deciding whether to drive or bike to work, environmentally responsible choices often come at a short-term cost. Humans *will* engage in effortful and inconvenient behavior for people and causes they care about (Frantz, in press). To the extent that connectedness to nature represents the same sense of caring, it should also reliably lead to ERB.

Measuring connectedness to nature

Currently there are at least nine published assessment tools that measure connectedness to nature or something highly conceptually related. Tam (2013) provides an excellent review and comparison of most of these measures, but we briefly summarize them below for readers' convenience.

Kals, Schumacher, and Montada (1999) developed a 16-item scale that measures emotional affinity toward, or love of, nature. Schultz (2001) developed the Inclusions of Nature in the Self measure, a single item adopted from a technique used to assess emotional closeness in human relationships (Aron, Aron, & Smollan, 1992). This measure presents participants with a series of paired circles (one representing nature, the other representing the self) that increase in the extent to which they overlap. Clayton's (2003) Environmental Identity Scale (EID) is 20 items, and assesses "the extent to which the natural environment plays an important part in a person's self-definition" (p. 52). Mayer and Frantz introduced the 14-item Connectedness to Nature Scale (CNS) in 2004, and have since developed a revised 10-item version (CNS-R) suitable for children (Frantz, Mayer, & Sallee, 2013). The CNS is based on Aldo Leopold's concept of the land ethic, and is intended to measure people's sense that they are egalitarian members of the natural world.

Dutcher, Finley, Luloff, and Johnson (2007) developed a scale called Connectivity with Nature that is designed to measure "a sense of a shared or common essence between the self, nature, and others" (p. 474). Davis, Le, and Coy (2011) developed a 15-item measure of commitment to nature based on interdependence theory: to the extent that we recognize we are interdependent with someone or something, we are more committed to it. Nisbet, Zelenski, and Murphy (2009) developed the Nature Relatedness Scale, 21 items that assess "one's appreciation for and understanding of our interconnectedness with all other living things on the earth" (p. 718) and includes "affective, cognitive, and experiential aspects of individuals' connection to nature" (p. 715). The most recent additions to the plethora of measures include Brügger, Kaiser, and Roczen's (2011) Disposition to Connect with Nature scale (which conceptualizes connection to nature as an attitude) and Cheng and Monroe (2012) measure of connectedness to nature designed for use with children.

How do these scales differ? In their validation of the Disposition to Connect with Nature scale, Brügger et al., 2011 compared it to the CNS, the INS and the EID. They concluded that all these scales load on a single factor, and found similar correlations with self-reported ERB among the DCN, CNS and EID (r's = .49, .54, and .40 respectively), although the DCN explained 1.7% variability in ERB above and beyond the other measures when included in a single regression equation.

Tam (2013) conducted the most complete empirical comparison of seven of these scales (Brügger et al., 2011 Disposition to Connect with Nature scale and Cheng & Monroe, 2012 connection to nature index were not included). Like Brugger et al., Tam concluded that all the scales he examined have good psychometric properties and converge on the same central factor. All the scales correlate with theoretically relevant criterion variables (e.g., self transcendence, self-reported ERB) at similar levels – with the exception of the Inclusion of Nature in the Self item, which tended to have lower correlations. The extent to which any one measure explained unique variability in the criterion variables above and beyond the common factor was limited (1–3% of the variance). In short, all of these assessment tools seem to effectively assess connectedness to nature.

Connectedness to nature and environmentally responsible behavior

Self-reported behavior

However connectedness to nature is measured, research consistently shows a reliable relationship between connectedness to nature and self-reported environmentally responsible behavior. All of the authors cited above included a measure of self-reported ERB in their validation studies. For example, Clayton (2003) asked participants to rate on a 5-point scale how often they engaged in 21 different ERBs (e.g., turning off lights, donating to environmental organizations). The EID correlated strongly with self-reported behavior, $r = .67$. Brügger et al. (2011), Dutcher et al. (2007) and Davis et al. (2011) used similar measures to validate their respective scales, and found similar results ($r = .49$, $b = .12$, and $r = .50$ respectively). Nisbet et al. (2009) predicted individual ERBs (e.g., buying organic, buying fair trade) from the NR scale, and found it strongly significantly predicted these self-reported behaviors (β's $> .80$).

One of the most widely used measures is Mayer and Frantz's (2004) Connectedness to Nature scale. This scale has been used around the world and translated into many languages. The CNS-R (Frantz, Mayer, & Sallee, 2013) is a shorter version suitable for use with children and low-income adult samples. The CNS consistently predicts self-reported ERB and often explains the relationship that other variables have to ERB. For example, Markowitz, Goldberg, Ashton, and Lee (2012) found that the CNS, together with the New Ecological Paradigm (NEP, discussed further below), mediated the relationship between openness to experience and ERB. Tam, Lee, and Chao (2013) found that the CNS mediated the relationship between anthropomorphism of nature and several self-reported indicators of ERB: the intention to use and promote green products, support for the use of environmental impact as a factor in policy decisions, and support for the environmental movement. Using an adult sample of Australian farmers and a modified version of the CNS, Gosling and Williams (2010) found that connectedness to nature predicted self-reported native vegetation protection behavior.

Research from our own laboratory is consistent with these findings. For example, in the 2004 paper introducing the CNS, Mayer and Frantz showed that the CNS related to self-reported environmentally responsible behavior (ERB), $r = .44$, $p < .01$; this relationship held when statistically controlling for ecological worldview (as measured by the NEP).

The CNS-R has also been shown to predict self-reported ERB across multiple populations, including college students, children, and a general adult population (Frantz, Mayer, Gordon, & Handley, 2010, Frantz, Mayer, & Sallee, 2013; Gordon, Frantz, & Mayer, 2012). In all, seven data sets involving 2030 participants including children, college students, and adults have produced correlations between the CNS and self-reported ERB ranging from .35 to .58.

Actual behavior

All of the research reviewed above used self-reported ERB. Do people report their behavior in an accurate and unbiased way?