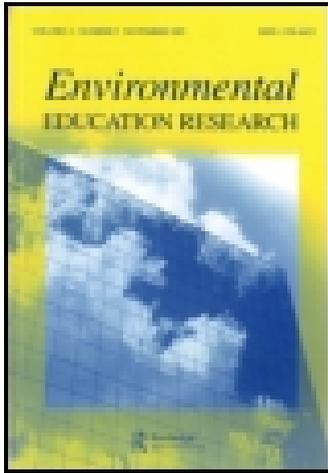


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### Understanding behavior to understand behavior change: a literature review

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## **Understanding behavior to understand behavior change: a literature review**

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One view of environmental education suggests that its goal is to ‘develop a world population that ... has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones’ (UNESCO-UNEP 1976). Embedded within this charge is the teaching of skills and motivations to implement skills, where a *skill* refers to performance of an act acquired through extended practice and training (Ericsson and Oliver 1995). However, it is often difficult to articulate clearly what skills we teach in conservation education and environmental education focusing on behavior change or influence. It can be equally challenging to describe the behaviors we are ultimately seeking, identified in the Tbilisi Declaration as ‘new patterns of behavior’ (UNESCO 1978). At a basic level, it is important to explore the grounding for teaching toward behavior – often referred to as behavior change – that supports the work of the field. This literature review attempts to provide a foundation for behavior-related discussions in environmental and conservation education. A number of the behavior theories, concepts and models discussed in this review have been explored extensively elsewhere; therefore, this review is not exhaustive, but rather is intended to be broadly representative of the literature.

**Keywords:** behavior theory; behavior change; conservation education

### **Introduction**

There are many debates about the purpose of education and these debates can be seen very clearly within the larger field of environmental education. Some argue that the ultimate purpose of education is to affect individuals’ behaviors and that conservation education, among other areas, specifically calls for behavioral change. Others contend that the primary role of education is to facilitate an individual’s intellectual capability and not to impose on individuals how they should live. To that end, environmental education represents a process for intellectual growth using environment as the context. Of course, there are extreme positions on this single polarity, numerous positions between, and other disagreements over the nature of the field that create similar tension. It is not the purpose of this article to settle this important debate and perhaps-necessary polarity in environmental education. Rather, the purpose is to better inform the dialogue and practice of environmental education through a reflection on the complex field of behavioral psychology and how it can inform and has influenced the research and practice of environmental education in different settings.

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## History of behaviorism and behavior theories

The study of behavior within the field of psychology grew out of opposition to the initial view that psychology should only deal with internal mental processes. Early psychologists studied mental processes in an attempt to correlate thoughts and feeling with definite conditions of the brain (Wilson and Keil 1999). In 1913, John B. Watson's seminal paper *Psychology as the Behaviorist Views It* proposed that psychology should be based on studying visible behaviors rather than using introspection to understand non-visible mental processes (Hineline 1992). Watson encouraged a move away from the earlier methods and tenets of mentalism – a branch of psychology focusing on mental perception and thought processes rather than overt behavior (Roeckelein 1998). The enduring mark of behaviorism is evident today in the notion that complex behaviors can be distilled into the basic elements of stimulus and response. In other words, behaviorism broadly defined, postulates that an individual develops all aspects of behavior through experiences related to the connection between environmental stimuli and responses to those stimuli (Tomprowski 2003). Those responses may include cognitive elements, unobservable mental processes and choice in mediating the behavior of the individual.

Although there were earlier efforts in behaviorism, most notably the work of Ivan Pavlov (classical conditioning) and Edward Thorndike (instrumental learning), the field was truly defined by Watson's work. After receiving the first Ph.D. in psychology in the US, Watson proposed a field of study based in the natural science traditions of logical positivism (Reber and Reber 2001; Roeckelein 1998; Squire 1992). This epistemological frame led him to pursue the search for lawful relationships between behavior and the observable social and physical environment (Jensen 2006). Such views were significant in breaking from the work of Freud, Jung and other psychologists who focused on psychotherapy. Initially, behaviorism studied only specific muscular and glandular responses. Though a classic behaviorist, Skinner expanded his area of study to focus on the effects acts have upon the environment (Epstein 1991; Reber and Reber 2001).

Looking at behavior's effects on the environment led to the subfield of neo-behaviorism, championed by Hull and Spence (Hineline 1992). Their research focused on chains of mediating events that occur between an individual's behavior and the environment. Discussions on neobehaviorism also include labels such as logical behaviorism, informal behaviorism (liberal stimulus-response theory) and radical behaviorism – all of which support the general tenet that whatever cannot be observed and measured is not worth studying or, in the case of radical behaviorism, does not exist (Roeckelein 1998; Suppes 1975).

It is important to note that there are branches of behaviorism far broader than the classical behaviorist theory and even the neo-behaviorist schools of thought, and there is a tremendous disservice to behaviorism when constrained to the narrow and simplistic philosophy of Skinner (Staddon 2004). There are branches of behaviorism that operate on the assumption that not all behaviors are visible – there are cognitive and affective behaviors that are learned, practiced and perfectable. Neo-cognitive behaviorism, for example, suggests that there are both conditioned (negative) and unconditioned (natural) levels of awareness and that there are factors that determine if an individual is acting at either of those levels of perception, affect and behavior at any given time (Kelley 1993). Another example is Relational Frame Theory, which is a cognitive and behavioral analysis of complex human behavior (McIlvane 2003). Tolman built an elaborate model of learning based on behaviorism that included internal mental processes affecting the stimulus response relationship such as purpose, expectation and cognition (Hineline 1992). The various branches of behaviorism

have led to tremendous innovations in creating observable and measurable elements from affective and cognitive processes.

Early in the twentieth century, James (1912) suggested another approach to behavior, epitomized in his pragmatist doctrine of radical empiricism, which focuses on role of experience and the connections among experiences. James argued that experience is unified rather than dichotomized, rejecting the dominant turn-of-the-century belief that the mind is separate from the world; he called the melding of these two ‘pure experience’ (Chemero 2003). In rejecting the classic ‘stimulus-response’ theory, which is built on the mind/world dichotomy, James (1912) emphasizes the importance of experience and perception as mediators between the elements of stimulus and response.

Dewey (1905) also rejected the dichotomies that separated mind from body, world and action, championing the role of lived experience in his adherence to ‘immediate empiricism’. This focus on experience, and the role prior experiences play in predicting and forming future behaviors, has influenced the field of environmental education as many of his ideas subsequently informed social behaviorism, which emphasizes the centrality of attitudes in relation to behavior (Garrison 1995).

In a seminal 1896 paper, *The Reflex Arc Concept in Psychology*, Dewey argued that the stimulus-response model of behavior was an oversimplification and based on a false dichotomy of mind/body (Dewey 1896). The dominant belief of the day was that a stimulus would occur and the body, through a series of nerve channels, would respond (Rogers 1962), but Dewey described a ‘reflex-circuit,’ spurred by an organism seeking a stimulus (initiation) and then interpreting the stimulus, producing a response (Feffer 1993; Rogers 1962). In other words, organisms do not passively wait for a stimulus; rather, there is an initiation whereby organisms seek out a stimulus, producing a response, and interpretation occurs at a stage between the stimulus and the response (Dewey, 1896). Thus, rather than forming an arc, with two discrete endpoints, behavior is more appropriately described in the form of a circuit. This concept, while quite interesting and relevant to the environmental education field, became entwined with the tenets of functional psychology, which buckled to the emerging behaviorist movement and thus has been obscured in psychology in general, and environmental psychology in particular (Ballantyne 1996).

Using the broader notion of behaviorism, several concepts have entered the lexicon of psychology, motivation, education and the general vernacular. Most common are the ideas of stimulus and response, including conditional (controlled) and unconditional (random or not controlled) stimuli. This language is central to all behaviorist theories: stimulus to organism to response (S-O-R) is the basic structure upon which all behaviorism is built. Even cognitive behaviorism, which studies how the mind processes information leading to behaviors, looks at how memory leads to motor responses that are based on environmental inputs (Tomprowski 2003). In other words, many behaviors can be performed without thought because those behaviors are learned within specific, relatively stable environments.

Avoidance learning emerged from the application of operant training procedures. In avoidance learning, somewhat predictable aversive elements fail to occur depending on whether a specified response occurs (Squire 1992). Studies of active and passive contingency later led to the clinical tools of behavioral modification.

Latent inhibition, which is part of classical conditioning, is a concept familiar to environmental educators even if the phrase is not: when the individual is pre-exposed or repeatedly exposed to the conditional stimulant (in this case, an environmental message), there is a retardation of the conditioning or a slowing of receiving the message (Pearce and Hall

1992). Therefore, with each subsequent harping on environmental messages, we run the risk of desensitizing the audience to future environmental messages.

Another familiar concept in environmental education is second-order conditioning. Second-order conditioning occurs when one stimulus is paired with an unconditioned stimulus until the desired conditioned response is elicited. At that point, the second stimulus becomes paired with the first stimulus. The unconditioned response weakens or disappears over time if there is no continual reinforcement of the conditioned response. The lesson for environmental education is that desired behaviors need to be specifically targeted and paired with learning events. The more distant or removed the desired behavior is from the learning event, the more likely the message being conveyed will be lost over time (Pearce and Hall 1992).

When teaching people about recycling, for example, some environmental educators might encourage them to recycle and teach them to use a recycling bin to separate plastic, paper and glass. The eventual desired outcome for that approach to teaching behavior is that the individual will recycle used items; however, this desired behavior risks breaking down if the person becomes reliant on the bin rather than committed to the recycling behavior. If that person is in a situation without the recycling bin, he or she may decide to throw recyclable items in the trash because the first-order behavior (sorting items into bins) is absent.

Other concepts that have become common in education include overt behaviors – those that can be observed, and covert behaviors – those that are private (including thoughts and emotions). In addition, the study of behavioral antecedents and consequences (Spiegler and Guevremont 2003) has led to a better understanding of how to sustain behaviors. One example is extinction, or the decaying of a response, which occurs when the stimulus is removed and reinforcement withheld. Another is the inhibitory situation that emerges when there is a negative correlation between conditioned and unconditioned stimuli, which confounds the conditioned or desired stimuli. Consequently, the behavioral response to the conditioned stimulus wanes. All of these concepts are often applied in education even though the psychological terms are not as common and educators may not be familiar with the basic research (Reber and Reber 2001).

In classical behaviorism, behaviors are what can be seen. In environmental and conservation education, we use messaging, communication and educational strategies to instigate and encourage particular behaviors, many of which may be cognitive behaviors, emotions, attitudes and intentions. From this point forward, this paper will use the term ‘behavior’ in the broadest sense in order to incorporate important learnings from the wide array of behaviorist theories.

Regardless of the type of behavior or the framework used, many environmental educators often make the mistake of focusing specifically on the behavioral outcomes rather than the steps required to reach those outcomes. In doing so, it is possible to disregard a legitimate means of achieving the desired conservation state: Frick asserts that ‘[d]ifferent conservation behaviors have different conservation potentials’ (Frick, Kaiser, and Wilson 2004, 1599), although those different behaviors may achieve the same goal. McKenzie-Mohr and Smith (1999) explain that a behavior is a specific action, while ‘most environmental activities are made up of several discernible behaviors’ (cited in Monroe 2003, 115). Therefore, it is necessary to be able to parse the discernible behaviors in order to compare direct actions. To change behaviors, we must consider each of the individual behaviors and actions that add up to the larger environmental behavior we encourage people to undertake. In dissecting behaviors into habits, tasks and skills, opportunities exist for changing the larger behaviors (Monroe 2003).

### *Hierarchy of behaviors*

Organizing behaviors based on how conscious the individual is of each behavior provides a useful hierarchical structure. Certain behaviors – such as the muscle behaviors of breathing and digestion – are subcortical or done continually without conscious thought. These behaviors are also referred to as *reflexive* behaviors, which are mechanical responses that are usually species-specific and show little variability (Reber and Reber 2001). Other behaviors are *intuitive*, or based on natural reactions and instinctive response to stimuli, and are often neuro-physiologically based (Santrock 2000).

By contrast, conscious behaviors require explicit thought to complete. New skills require conscious effort, as do changes in settings or environment. Basically, at some point, all of our behaviors require a conscious decision and many can, in different situations, require conscious reflection. The classic example of this occurs when one awakens during the night in a strange hotel room and runs into furniture or walls. Even so, few of the behaviors people apply each day are conscious – most are post-conscious, which means that they were once learned behaviors. Through repetition, those behaviors become embedded in daily routines and are performed without thinking.

People make countless decisions each day, making it impossible to be conscious of every behavior. However, few behaviors are isolated; most are embedded in patterns and routines that become automatic and fixed (Wittig and Belkin 1990). These patterns and routines are organized serially and vary depending on an individual's level of proficiency with performing each of the skills that comprise the behaviors (Annett 1995). One common illustration is driving a car. This activity requires a driver to make hundreds of decisions every minute, but most of those decisions are *routine*, which means that the behaviors are serially organized and controlled while also taking into account unpredictable features such as an erratic driver or a deer on the road. If every behavioral choice required an individual's undivided attention, we would become immobilized by the overwhelming number of decisions. Therefore, developing routines serves an important role, particularly as life becomes increasingly complex.

Routines are sequences of a series of habits; habits are learned acts. Originally, habits were defined only by motor patterns and physical responses, but the concept has now expanded to also include perceptual, cognitive and affective habits (Reber and Reber 2001). Sutherland (1996) describes habits as a persistent pattern of learned behaviors and the sequence of responses in a routine. Over time, habits and routines lead to a long-term tendency to respond in a certain way (Wittig and Belkin 1990), which is also called a default action. These types of well-practiced behaviors recur because the processing that initiates and controls performance becomes automatic. When behaviors are not well-learned or when they occur in unstable or unpredictable contexts, people must make conscious decisions to perform the desired behavior (Ouellette and Wood 1998).

In essence, few behaviors are conscious and most are learned habits. Those habits – or isolated acts – are sequenced into routines that allow the individual to consciously apply thought when necessary. The challenge, then, for educators seeking behavior change is not to change the behavior, but rather to change the routine that exists around that behavior. In other words, changing behaviors is not about changing one act; it is about altering the routines in which the acts are embedded.

Many environmental activists strive to make conservation actions routine, default actions supported by social norms. In behavior theory, these types of behaviors are called *causuistic*. If most people looked askance at driving a car to work, for example, then walking, riding a bike, or using public transportation would be the causuistic behavior. Causuistic

behaviors are often considered to be subconscious as they relate to societal – not individual – norms and values. Although some conservation education behaviors may appear to fit into the causuistic mode, it is important to consider the role of agency regarding an individual's behavioral choices or decisions and the rich dialogue in the environmental education community around the challenges of identifying behavioral outcomes that are inviolate in all situations and for all individuals.<sup>1</sup>

Similar to causuistic behaviors, but meaningful to conservation action based on historic approaches, are rule-governed behaviors. Rule-governed behaviors can be described by clearly articulated rules that arise from an authority figure or from a social construct. Ultimately long-term in nature, rule-governed behaviors start as short-term, proximately reinforced behaviors: they are socially acceptable, the individual receives approval for applying the behavior, there is general acceptance of the behavior and they are rewarded with reinforcers (including money) (Baum 2005). Rule-governed behaviors can become causuistic when the reinforcers become societal and expected.

Although it may appear that environmental educators want conservation actions to become causuistic – or automatic and socially reinforced – environmental education also encourages critical thinking, which runs contrary to the subconscious aspect of causuistic behaviors. With critical thinking, we desire behaviors to be post-conscious rather than subconscious.<sup>2</sup> This means that one's actions should be conscious enough that individuals are able to identify a behavior that can or should change when situations or circumstances change. New technologies, for example, may render obsolete old ways of being environmentally appropriate; new materials sometimes supplant older, environmentally unfriendly materials; or a change in geographic location can affect what is considered environmentally appropriate. Fulcher's taxonomy of behaviors (*cf.* Wittig and Belkin 1990) starts with impulse as being the base, default behavior and then moves to routine and casuistic behaviors. Moving beyond causuistic, thoughtful behavior includes the ability to change behaviors based on skills of transfer, knowledge and attitude.

Behaviors are rooted in skills, which cluster to become tasks (Norton 1997). It is difficult to teach behavior, *per se*, as behaviors are complex combinations of skills, as discussed previously. The teaching of individual skills, while possible, involves teaching about the affect and cognition that support the behavior as well as the skill.

### ***The affective and cognitive interplay in behavior***

Behavior does not refer only to a physical activity, but rather represents a complex intermingling of affective and cognitive processes that guide decisions in the short- and long-term. To fully understand the mechanisms behind behaviors and, by extension, to more effectively move people toward environmentally friendly behavior, it is critical to explore the interplay among the cognitive and affective components, which are nearly inseparable. Within this structure, attitudes both toward the environment and toward environmental behavior may be instrumental in predicting and influencing environmental behaviors, which makes environmental attitudes a frequently studied concept (Kaiser et al. 1999). Knowledge about environmental behaviors is also complex: Frick et al. (2004) note that behavioral cognition as it relates to environmental knowledge relies not only on system knowledge – or understanding the ecological issue – but also action-related knowledge (what can be done) and effectiveness knowledge (comparative benefits of different actions).

The definition and formation of attitudes represent contested territories as differing opinions exist on what attitudes are and how attitudes are formed. Rosenberg and Hovland (1960) define attitudes as 'predispositions to respond to some class of stimuli with certain

classes of responses' (p. 3) and recognize attitudes as having behavioral, affective and cognitive facets. Petty and Cacioppo (1981) suggest that 'the term *attitude* should be used to refer to a general and enduring positive or negative feeling about some person, object or issue' (p. 7). They distinguish attitudes from beliefs by saying that beliefs are 'reserved for the information that a person has about other people, objects, and issues') (p. 7).

Although attitudes are inarguably an important consideration when addressing behavior, many findings are inconclusive, while others are contradictory. Little consensus exists on how, and to what extent, attitudes affect and can predict environmental behavior. In a meta-analysis of more than 100 environmental-behavior studies, Hines, Hungerford and Tomera (1986) found moderate to substantial correlations ( $r = .49$ ) between pro-environmental attitudes and pro-environmental behaviors.<sup>3</sup> However, more important than – but also strongly interactive with – attitudes were the cognitive aspects of knowledge of issues and knowledge of action strategies. The psychological constructs of locus of control and individual sense of responsibility are also important, as well as whether an individual communicates a willingness or intention to undertake a behavior (Kollmuss and Agyeman 2002).

Delving more deeply into the apparent inconsistency among environmental attitudes and behaviors reveals several factors that alter the attitude-behavior relationship: attitude specificity, normative influences and attitude accessibility (Bell et al. 1996). With regard to attitude specificity, while generally positive attitudes toward the environment do not predict whether an individual will take specific environmental behaviors, specific attitudes toward particular problems do have predictive value (Bell et al. 1996). A general pro-environmental outlook, for example, does not ensure that a person will purchase a fuel-efficient vehicle, but a specific concern with climate change may link with behaviors to mitigate that effect, including driving a vehicle that minimizes carbon dioxide emissions. Normative influences – or the social pressures around certain attitudes and behaviors – are important in several models that explore the attitude-behavior interface, including Fishbein and Ajzen's Theories of Reasoned Action and Planned Behavior (1975). Finally, attitude accessibility, or the frequency with which an individual is given the opportunity to express and act upon an attitude, helps strengthen (or weaken) attitudes toward certain attitude objects. Consequently, individuals are more likely to take behaviors to protect or improve the object (in this case, the environment or a particular environmental concern) if the attitude is frequently reinforced and the association between the attitude and attitude object is strengthened (Bell et al. 1996). Building on these constructs from Bell et al., environmental education approaches including service learning, action research and action learning may help reinforce attitudes and the subsequent relationship between those attitudes and the desired behaviors.

Despite the continuing debates about precisely how attitude links with environmental behavior, most studies suggest that attitudes do have some impact; therefore, it is important to explore and understand the mechanisms by which attitudes may be changed, particularly when pursuing behavior change. A number of theories exist about how attitude change occurs, and those theories are relevant to environmental education because of the potential connection to changed behaviors. Manstead (1990) suggests that many theories agree on one to three basic pathways for changing attitudes, which are: (1) directly experiencing the attitude object, which in the case of environmental education may be a woodlot behind one's home or an endangered species in a nearby creek; (2) persuasive communications, such as environmental education programs or social marketing designed to change attitudes on specific issues or behaviors; and (3) induced behavior change, which includes offering financial or other incentives.

Regarding the use of incentives, some researchers believe that attitudes follow behaviors and, therefore, if we use incentives to induce behavior, attitudes will follow. This

occurs through the mechanism of cognitive dissonance, which develops when ‘a person has two contradictory cognitions, or beliefs, at the same time’ (Morris and Maisto 2006, 462). To resolve the dissonance – or to bring the thoughts, actions and feelings into alignment – an individual must either change his or her attitude or the behavior. As changing the attitude is easier than changing the behavior, the process of cognitive dissonance is one that is believed to change attitudes (Bell et al. 1996; Morris and Maisto 2006). To retain harmony between attitudes and behaviors, individuals are thought to sustain the behavior that expresses the underlying attitude. In the environmental education arena, this translates into pro-environmental behaviors, such as recycling, linking with and reinforcing positive attitudes toward resource conservation and reuse.

Overall, research has consistently demonstrated that general pro-environmental attitudes alone rarely lead to specific behavioral changes (Bell et al. 1996; Monroe 2003). The question arises, then, as to why so many environmental education programs continue to focus solely on general environmental literacy, which Disinger and Roth (1992) define as the capacity to perceive and interpret the relative health of environmental systems and take appropriate actions to maintain, restore or protect these systems. In addition, these same programs tend to measure literacy solely on the basis of either attitude or cognition (Volk and McBeth 1998). Bell et al. (1996) postulate that ‘[o]ne attraction of attitude change is its potential for generalizability. That is, behavioral change would be efficient if we could change a few global attitudes, which might then promote a variety of responsible behaviors across a number of settings. If they worked, such broad programs would be more efficient than those ... tailored to dozens of different situations’ (p. 536). However, we know that specific pro-environmental attitudes based on specific relationships with the environment or an environmental issue, building on already-developed self-esteem and locus of control and requiring mastered, or master-able, skills, are most effective in promoting behavior change. Therefore, focusing on developing skills that build on pro-environmental attitudes is a critical step toward changing or reinforcing behavior as most effective behavior change efforts contain attitude arguments, educational information (cognition), behavioral skill arguments and behavioral skills training (Albarracin et al. 2005).

By contrast, Kaiser et al. (1999) posit that environmental attitude can be a ‘powerful predictor of ecological behavior’ and that earlier study findings were inconclusive because of omissions in structural models used to explore the attitude-behavior link. They propose a fused model that includes environmental knowledge, environmental values and ecological behavior intentions as the foundation of attitudes, which they indicate can then be used to predict behavior somewhat reliably (Kaiser et al. 1999).

### ***Constellations: groups of behaviors***

People often perform a variety of individual behaviors that are conceptually held together for each person as grouped, or constellations, of behaviors.<sup>4</sup> While some behaviors support each other and often occur concurrently, they are not necessarily indicators of other behaviors or consistent with an overall pattern of behavior that may be considered to be, for example, environmentally friendly or health-conscious. Behaviors that environmental professionals see as logically fitting together, such as the suite of ‘environmentally responsible behaviors’ that are often cited,<sup>5</sup> may not necessarily mesh in someone else’s world view. Someone who is motivated by financial concerns might use compact fluorescent bulbs, turn off lights, and conserve water because these behaviors have a direct financial impact; they are money-saving behaviors. However, that same individual may also buy conventionally grown produce, non-recycled paper towels and toilet paper, mainstream

cleaning products and other low-cost items, motivated by the same financial concern. While these behaviors may initially appear inconsistent to environmental professionals who expect a constellation of environmental behaviors to occur simultaneously, looking more deeply at motivations, rather than simply the resulting behaviors, reveals that the inconsistency should not be at all surprising.

Another reason that constellations of behaviors that may be expected to occur together do not is that certain people may be motivated by *issues*, while others feel more empowered and are motivated to take action within particular *settings*. An individual who is interested in addressing climate change, for example, may choose to drive a hybrid car, minimize airplane travel, financially support groups that address climate change and install high-efficiency home heating/cooling systems, among other actions. However, that same person may not be as concerned about toxic chemicals in the environment, so may not purchase organic produce or non-toxic cleaning products. By contrast, someone who feels particularly empowered, or has a strong internal locus of control, within the realm of the household may take every action possible at that scale: they may purchase recycled paper products, use non-toxic cleaning products, use compact fluorescent bulbs, recycle and conduct all of the behaviors that are deemed environmentally responsible and appropriate within a home setting. However, they may not feel that their actions outside the home are as powerful, or they may have other obligations or situations that do not make it easy to change existing behavioral patterns in that realm.

There are also certain identities that may make someone more likely to undertake a constellation of expected or rational-seeming behaviors. Those identities may not necessarily indicate an interest in a particular issue or a commitment to a certain setting, but they may be consistent with one's self-identity as well as group or social identity. While an individual with an identity that says she or he is 'an environmentalist' may take certain behaviors consistent with that identity, if probed too deeply, inconsistencies in behaviors may become apparent as the rationale and motivation for the behavior may be related more to external appearances rather than internal motivations. Internal motivators, linked with deeply held values or comprehensive knowledge of an issue and the impacts of a particular action, can lead to dramatically different behavioral outcomes than external motivators, such as prestige or group belonging.

Various approaches have been used to incorporate elements of identities into potential clusters of behaviors. The Biodiversity Project (1999), for example, used a marketing approach to construct a taxonomy of individuals who are likely to be open to biodiversity messages and action. Jurin and Fortner (2002) included elements of identity in their study of how students did or did not see themselves as 'environmental' and correlated their perceptions to behaviors and intents. While identities can be leveraged with regard to conservation behaviors, it must be recognized that behaviors motivated by external factors can lack reliability, particularly in the light of changing circumstances, new facts or other factors.

### **Teaching of skills**

Skills are the building blocks to performing acts or tasks that seek to achieve a goal. Motor skills are those that require voluntary body or limb movement to be properly performed. As such, skills have purpose, are not reflexes and have specificity to accomplishing a particular task (Magill 2000). An action differs from a skill or act in that multiple actions may achieve the same goal; however, a skill is specific. Multiple skills or acts are required to complete an action, and a 'right' or 'better' way of performing the act exists.

Skills, by definition, are learned and usually are purposefully taught (Annett 1995). Skills are incremental, domain specific<sup>6</sup> and practicable, though practice must be meaningful and lead to success of the desired action or goal over time (Good and Brophy 1990). Skills, however, are not the result of merely repeating an act. Learning a skill is a process resulting in a relatively consistent change in behavior based on experience (Tomprowski 2003). This view of skill learning has three components: learning is based on behavior changes being *consistent* on different occasions and under different conditions; learning occurs within an individual and the behavior is the *use of a skill* or set of skills that demonstrate the learning; and learning occurs only with *experience and practice*. Skills are often categorized as motor skills, cognitive skills and emotional behavior.

Cognitive skills can be taught with varied emphasis on perceptual, cognitive and motor processes (Ericsson and Oliver 1995). Ericsson and Oliver note that skills with cognitive components include skills in sports, surgery and the arts. Other psychologists believe cognitive skills are necessary for applications of all behaviors that require conscious thought. More commonly, the word *skills* invokes the concept of motor skills, of which there are three classifications. First, skills are classified by the precision of the movement – gross to fine motor skills. Second, skills can be defined by the beginning and end points where discrete skills are placed into a series to become serial motor skills. The third way of classifying skills is by the stability of the environment and leading from closed to open skills. A stable environment requires closed skills, or those in which the individual initiates the behavior. Changing or unpredictable environments require open skills as the individual must apply the skill based on what is happening at that moment and react to temporal circumstances (Magill 2000).

Because behaviors are contextually based and represent a compilation of skills, they are not directly teachable, although skills are. Fletcher (1934) noted that if education is to deal with learning in its broadest sense, then learning must take into account more than the laws of mental and physical habit formation. Learning skills requires attention, alertness, and preparation – including affective and cognitive preparation. Magill (2000) suggests that perfecting a skill requires knowledge of the results, a transfer of learning, practice and motivation. Annett (1995) notes that the definition of a skill includes achievability of the desired goal with economy of time and effort acquired by training and practice.

The typical steps involved in teaching skills include: (1) demonstration, (2) practice, (3) feedback and (4) corrective action (Nilson 1991). Practice, which is the key to learning skills, occurs while the learner performs the skill and task as the educator observes and provides feedback. Practice and feedback steps are usually performed simultaneously as skills are developed through repeated attempts at performance under realistic conditions (Sisson 2001). Graeff, Elder and Booth (1993) have a slightly different skills-training sequence, consisting of five steps: (1) instruction; (2) demonstration; (3) practice; (4) feedback and reinforcement; and (5) homework (referring to continued practice and efforts toward economy in performance).

Tomprowski (2003) notes that there are a variety of factors that influence the learning of skills, including definition of the task; ability to practice the skill; success of prior experience with the skill; and context or subject, which are dependent upon the individual's developmental, motivational and mental characteristics. As skills develop, complexity and rapidity are incorporated (Nilson 1991). The ultimate goal is to transfer the skill by focusing on the elements of non-specificity of the skill (Annett 1995). To create sustainable behavior change through skills, ongoing feedback on skill-specific items is necessary while a skill is being learned, as is continually demonstrating how those skills relate to specific behavioral goals (Wexley and Latham 1991).

In essence, then, skills are learnable, practicable, and perfectable. Clusters of skills (or acts) become tasks that serve actions and, ultimately, enough actions achieve the goals. This leads back to the article's initial observations: what do we mean by 'behavior change' with regard to environmental and conservation education, and how do we achieve it? Skills are teachable, routines serve to embed skills and habits in individuals' life patterns and ways of doing things, and actions are goal-focused. It is not possible to change behaviors by simply stating the need; rather, behavior change requires additional messaging, either through marketing or education.

### *Models of behavior change*

Teaching skills must involve interrupting one routine of behavior and replacing old skills that occur within that routine with new skills. Those new skills must be embedded in either a modified or a new routine. Conservation behaviors are complex and embedded in a variety of routines and across situations and contexts, making them difficult to alter and transfer to other situations. For several decades, health education has studied how and whether different approaches to behavior change work. Through these studies, and some in other fields, a number of models have been developed to guide practitioners and academics.

#### *Communication/persuasion model*

The communication/persuasion model posits that communication can change attitudes and behaviors that are linked in the same causal chain (McGuire 1964). In this model, inputs include the source, the message itself, the channel, the recommended change or behavior and the destination. Outputs of the model are changes in specific cognition and observed behaviors (Graeff et al. 1993). This model is widely used in communications and media studies. The greatest challenges to the model are ensuring the causal chain is maintained and the message is continued.

In environmental education, the communications/persuasion model is frequently used. We assume that inputs lead to the desired cognitive outcomes and thus to the desired behaviors. One of the challenges is that, as in other fields, causal chains are extremely difficult to determine given the many exposures and competing sources of information to environmental messages.

#### *Diffusion of innovation*

In 1962, Everett Rogers introduced the concept of diffusion of innovation (2003). The theory purports that change spreads in a population through a normal distribution of willingness to accept new ideas. The labels for the distribution within a larger population include innovators (2.5% of the population), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). At the individual level, behavioral adoption occurs through the stages of knowledge, persuasion, decision, implementation and confirmation (Rogers 2003).

Diffusion theory has been widely applied and studied (Rogers 1968; Rogers and Shoemaker 1971; Rogers 1972) and was popularized with the general public in Malcolm Gladwell's 2000 bestselling book *The Tipping Point: How Little Things Can Make a Big Difference*. According to diffusion theory, behaviors are affected across a community through change agents. Geller et al. (1990) identified four elements that would affect a

change agent's *own* behavior while diffusing innovation: involvement, social support, response information and intrinsic control.

In environmental education, the diffusion model is useful as it stresses that each of the four types of distribution groups requires different motivations to adopt a behavior. Those motivations are influenced by social context, social processes and social support (Frank, Zhao, and Borman 2004) and are most marked between the categories of early adopters and the early majority (Woodell and Garofoli 2003).

### *Health Belief Model*

Beliefs help shape behavior. While enduring, beliefs are not fixed individual characteristics, but rather are acquired through primary socialization (Sheeran and Abraham 1996). The Health Belief Model focuses on two aspects of an individual's views of health and behavior: threat perception and behavioral evaluation (Janz and Becker 1984). Threat perception – or perceived risk appraisal – is based on one's perceived susceptibility to illness and the anticipated severity of the consequences of such an illness. The Health Belief Model suggests that, as an individual's assessed level of risk increases, the likelihood the individual will adopt recommended prevention behaviors increases (Mattson 1999). Behavioral evaluation, also called coping appraisal (Zak-Place and Stern 2004), relates to the belief that an available course of action will be beneficial and the anticipated barriers or costs of taking action do not outweigh the benefits (Rosenstock 1990).

In addition to these four core components of the model, there are demographic, socio-psychological and structural variables, as well as 'cues to action' (Mattson 1999). Winfield and Whaley (2002) describe cues to action as the stimuli necessary to initiate or trigger engagement in the desired, healthy actions. Cues include, for example, media campaigns or the illness of a family member or close friend. The Health Belief Model has been widely used in health education to predict behavior change. Various tools have been developed around the model (cf, Scandell and Wlazelek 2002; Winfield and Whaley 2002; Wallace 2002) and research continues to reveal validity in the model.

Over time, much of the work of environmental and conservation education has been framed to address the four core components of the Health Belief Model. The concepts of issue relevance and cues to action, for example, are prevalent in the *Guidelines for Excellence of the National Project for Excellence in Environmental Education* (North American Association for Environment Education 2004). Making the concepts explicit and focusing on the secondary variables may benefit environmental education efforts for conservation action.

### *Integrated Model of Behavioral Prediction*

The Integrated Model of Behavioral Prediction is based on previously described behavioral theories (Kasprzyk, Montano and Fishbein 1998). The integrated model incorporates elements of the Theory of Reasoned Action, Theory of Planned Behavior, Social Cognitive Theory, Theory of Interpersonal Relations and Subjective Culture, the Information-Motivation-Behavioral Skills Model and the Health Belief Model (Danter 2005). The Integrated Model illuminates three core concepts shared across these theories: perceptions about outcomes of performing the behavior, the social support for the behavior and the effect of the environment or the situation on behavior performance (Kasprzk et al. 1998).

While the Integrated Model has undergone a series of adaptations, it generally includes external variables as well as behavioral, normative and efficacy beliefs related to attitudes and social norms, which support intentions. Intentions are modified by skills and

environmental factors to lead to the outcome behavior (Fishbein 2000). Past behavior, intervention or media exposure, and abilities have been added to the model (Fishbein et al. 2003). Danter (2005) notes that the integrated model's strength is derived from the fact that the model's variables change according to the behavior in question in combination with the specific population being targeted. Like the Theory of Reasoned Action and the Theory of Planned Behavior, the Integrated Model is valuable for studying behavior on a theoretical level, but its complexity makes it difficult to implement.

### *Locus of control*

The psychological construct of locus of control predicts that an individual's behavior is guided by his or her perception that a certain behavior will lead to an expected reinforcement (Rotter 1954, 1966). Lever, Pinol and Urlade (2005) explain that, from the individual's perspective, locus of control is the motivating force that leads the individual to act in a particular manner. The outcomes of the selected actions will be determined either as a consequence of behavior (internal) or as a result of circumstances unrelated to actions (external).

The locus of control concept has been widely discussed and leveraged within the environmental education arena.<sup>7</sup> Locus of control is based on internal versus external control, referring to the degree to which an individual believes that a desired outcome can be achieved through one's own behavior or personal characteristics. If the desired outcome occurs, that outcome serves as a reinforcement of the belief in one's internal efficacy.

Locus of control also considers the degree to which individuals expect that reinforcement or outcome is a matter of chance, luck or fate; under the control of (powerful) others; or simply unpredictable (Rotter 1990). An important construct of this theory is that of efficacy – a person's belief that he or she possess the competency to perform the behaviors necessary to achieve the desired outcome (Meier 1991). Self-efficacy as described by Bandura (1977) posits that a person's expectations related to his or her efficacy beliefs influences whether that person undertakes a new behavior and, if so, how likely it is that the behavior will be maintained. A variety of studies have shown that income, prior levels of achievement and educational level are often predictors of locus of control, and health locus of control is one of the most widely researched constructs related to prediction of health behavior (Norman and Bennett 1996).

Some environmental education studies have recommended a focus on helping learners develop internal loci of control (e.g. Riechard and Peterson 1998; Hwan, Kimand, and Jeng 2000; Yerkes and Beiderman 2003). One of the challenges with targeting locus of control is that accurate measurement of locus of control related to a specific behavior must be created for each individual situation or behavior.<sup>8</sup>

### *Responsible environmental behavior*

Hungerford and Volk (1990) challenged the myth that knowledge or affect alone can lead to behavior change (as presented in Ramsey and Rickson 1977). As a result of the Hungerford and Volk critiques, environmental education researchers were spurred to explore alternative models leading to responsible environmental behavior. One particularly provocative and thoughtful model was created by Hines. The Hines Model, based on behavior-change and environmental education literature, focuses on additional conditions including personality factors, knowledge of issues and possession of skills for taking action. All of these elements

combine in an intention to act, but the ultimate behavior is mediated by situational factors (Hungerford and Volk 1990).

Hines's work, along with studies by Hungerford, Volk, Tomera and others, sparked a tremendous interest in researching factors leading to environmentally responsible behaviors.<sup>9</sup> Thanks to these seminal efforts, discussions of responsible environmental behavior have become part of the fabric of the environmental education field. Ultimately, research into responsible environmental behavior suggests that environmental citizenship behavior is based on three levels of variables: (1) entry level, including sensitivity, ecological knowledge, androgyny and attitudes; (2) ownership, including knowledge of issues, personal investment, knowledge of consequences and commitment; and (3) empowerment, including environmental action skills, locus of control and intention to act (Hungerford, 1996).

### *Social learning*

The concept of self-efficacy is included in many models of behavior change. Self-efficacy influences whether behaviors are initiated and the level of effort necessary to maintain the behavior (Bandura 1977). Because much of self-efficacy is learned through social contexts, the theory of social learning explores the development of that sense of efficacy. Social learning addresses real-life problems, takes place in communities and occurs within a specific context that is not necessarily institutional (Zepke 2005). The social-learning literature suggests that individuals engaged in the learning process become a learning community that is partially based on both cooperative and collaborative learning endeavors (Leach and Knight 2003). Social learning is therefore 'situated' in the community and the context.

Situated learning is grounded in everyday situations, recognizing that knowledge is context-bound and not usually generalizable. Organized learning as a social process within learning communities – or communities of practice – must lead to action (Lave and Wenger 1991). Bandura, in describing situated cognition, notes that the level and strength of self-efficacy is altered whenever psychological procedures (including education) are applied (Bandura 1977). He describes how cognitive skills and self-control are used through moral justifications and devices to rationalize behaviors (Bandura 1978).

Social learning theories hold important implications for environmental education as they suggest that behaviors are learned from others in the situated context in which the behaviors can be used. Some environmental educators believe effective change will result from increasing locus of control, which leads to greater feelings of self-efficacy; social learning suggests we do so considering more fully the community of practice in which the behavior will be used.

### *Social marketing*

Social marketing affects social change by applying commercial marketing techniques and analysis, along with elements of behavioral psychology, to social issues. Andreasen (1994) defines social marketing as the 'adaptation of commercial marketing technologies to programs designed to influence the voluntary behavior of target audiences to improve their personal welfare and that of the society of which they are a part' (p. 110). Rather than encouraging a general pro-environmental attitude or overall literacy, social marketing targets particular behaviors to change or reinforce by creating optimal conditions for action. Social marketing has been widely applied, particularly in the field of community health education. Extensive research on the impacts of social marketing both have included programs focused on topics such as: reduced drinking in college groups (Granfield 2002;

Glider et al. 2001; Thombs et al. 1996), family involvement in education (Sensiper 1999), teen driving safety (Smith 2006), use of female condoms (Artz et al. 2005) and use of bicycle helmets (Ludwig, Buchholz, and Clarke 2005), among others.

Social marketing follows a process similar to commercial marketing: target audiences are defined, barriers are identified and programs are designed to reach the target audience by using specific 'behavior-change tools' (McKenzie-Mohr and Smith 1999). Communications with the target audience include information on the issue and behavior, the consequences of the behavior and the benefits of taking the behavior (Monroe 2003). McKenzie-Mohr, who coined the term community-based social marketing, also emphasizes the importance of piloting projects and evaluating the results in order to revise initiatives as necessary to achieve the most powerful behavior-change result, again focused on one specific behavior.

Some environmental educators, such as zoo educators in the US, have embraced social marketing, seeing opportunities for combining social-marketing strategies for short-term, specific behavior changes with environmental education strategies for longer-term, more general attitudinal and behavioral outcomes. Monroe describes this dichotomy and partnership as the 'two avenues for encouraging conservation behaviors', with social marketing representing the 'specific route of changing behavior' and education following the 'general route of cultivating environmental literacy' (Monroe 2003, p. 113).

### *Theory of Reasoned Action*

The Theory of Reasoned Action is one of the dominant behavior models used in environmental education. The Theory of Reasoned Action assumes that human behavior is grounded in rational thought, and the model uses the Principle of Compatibility, which predicts that attitudes reflect behavior only to the extent that the two refer to the same valued, outcome state of being (evaluative disposition) (Ajzen and Fishbein 1980). Behaviors include the action, the target, the context and the time frame (Danter 2005). A change in any of those four elements will alter the behavior in question (Fishbein et al. 2001).

The Theory of Planned Behavior (Ajzen 1991), which grew out of the Theory of Reasoned Action, suggests that human behavior is influenced by three belief constructs: beliefs about consequences, expectations of important others and things that may support or prevent the behavior (Ajzen 2002). Following a meta-analysis of research using the Theory of Planned Behavior, Staats (2003) noted that a strong premise of the theory is that, at the conceptual level, links among influences on behavior and their effect are captured through one of the components of the model or relationships in the model.

The Theory of Reasoned Action and the Theory of Planned Behavior form the base of many environmental education studies about behavior adoption. The adaptive ability of the model to reflect any changes in context, environment and content proves both useful to the validity, while also cumbersome to the general applicability of the model (Danter 2005).

### *Transtheoretical or Stages-of-Change Model*

The Transtheoretical Model of behavior change suggests that there are stages of change and that change can be explained not through a particular theory, but through multiple theories. The most widely cited Transtheoretical Model is that of Prochaska (1979), which includes five stages: pre-contemplation, contemplation, preparation, action and maintenance of a behavior. These stages describe levels of motivational readiness to actively pursue behavior changes or new behaviors, and the stages occur along a continuum. The two key predictors

of transitions between stages are self-efficacy and the decisional balance, or the pros and cons associated with a particular behavior (Armitage et al. 2004).

The Transtheoretical Model also describes processes of change, which are ten strategies people may use to progress from one stage to another or to prevent regression to an earlier stage (Prochaska et al. 1994). Those strategies include: consciousness-raising, social liberation, emotional arousal, self-reevaluation, commitment and helping relationships, among others (Prochaska et al. 1994). Various studies using the Transtheoretical Model examine the relationships among stages of change, demographic variables, self-efficacy, decisional balance and processes of change in order to better understand how to intervene to facilitate change within a larger population (e.g. Cardinal and Kosma 2004; Cardinal, Tuominen, and Rintala 2004; Omar-Fauzee 2002).

### **Challenges to changing behavior: lessons for the field**

Understanding how and why behaviors occur is perhaps the greatest barrier to affecting behavioral outcomes in educational programs. Human behavior and motivation are enormously complex, which can make their study overwhelming. From the structure of behavioral beliefs held by an individual (Ajzen 2002) to the now well-accepted constructs of barriers (Rosenstock 1966), facilitating conditions (Triandis 1977), and self-efficacy (Bandura 1977), the multiplicity of internal and external conditions affecting an individual's choice to perform an act are tremendous. Even so, research in environmental education and other fields suggests general lessons that can be applied to encourage conservation-related actions.

First, it must be explicitly noted that people act in ways that are usually consistent with how they express their values, beliefs, understandings, culture, socialization, enculturation, upbringing and training. Behaviors are not static, and people are continually adapting behaviors for myriad reasons. Indeed, even on environmental issues, people constantly take action and behave in certain ways – although those ways may not always reflect the most appropriate or effective environmental choices (Clover 2002). In addressing environmental behaviors, it is important that environmental educators understand individual motivations and differences in behavior rather than assuming a single, 'right' or even 'best' behavior (Heimlich and Harako 1994).

The behavior-change research focuses on causality – what drives an individual to adapt, adopt or assume a behavior? Most research asks the causal question: What can an educator or communicator do to change the learner's or target audience's behavior(s), regardless of the type of behavior being taught?

Clearly, one of the greatest challenges to affecting behaviors is the consistency of educational and marketing messages. Various studies that examine increased participation in an array of actions have found that participation can sometimes be increased, at least temporarily, through the use of explicit goals or incentives.<sup>10</sup> Stern and Oskamp (1987) reported that such techniques typically motivate between 10 and 15% of the people eligible or targeted for the behavior. It is also fairly well known that enthusiasm for a new behavior or action tends to wane and participation decays in the absence of continual reinforcement. In one meta-study, 31 experiments were reviewed and the findings indicated that, while short-term outcomes were promising, very few of the behaviors demonstrated response maintenance after messages were discontinued (Porter, Leeming, and Dwyer 1995).

Continuing promise is in the research on commitment, which tends to predict greater likelihood of action. Early work in this area was done by psychologists focusing on achievement motivation and the cognitive and conative aspects of commitment (Cobern et al.

1995). Danter (2005) found that commitment of action by teachers at the end of a workshop had a tremendously high level of prediction of actual implementation of ideas from the training. Cobern et al. (1995) conducted a study comparing two types of commitment strategies. The study found that individuals with stronger commitments (i.e. commitments to more than one action) maintained the behaviors at a statistically significant level, even a year after the study period. Those individuals also successfully recruited other people to serve as agents of change.

Research reveals that education and marketing campaigns are relatively effective in changing or adopting simple behaviors that require little confidence or skill. However, behaviors that demand lifestyle and habit changes require a greater sense of self-efficacy and are more complex (Winfield and Whaley 2002). Some of the environmental education research continues to explore models for behavior change that lead to predictable changes (Kollmuss and Agyeman 2002) and are layered with assumptions of the educator being able to manipulate variables. Other research approaches behavior from the perspective of individual obstacles to achieving behaviors that are both personally and environmentally beneficial and include multiple ways of knowing<sup>11</sup> as part of the equation (Clover 2002).

If environmental education is to produce a citizenry capable of making sound decisions and acting on those decisions in a way that is environmentally and personally sustainable, it is imperative that the field avoids unilateral assumptions. It is necessary to understand that, related to behaviors, individuals are not all alike; they are not motivated by the same things nor are they equally capable of altering routines. People may act in ways we believe are not environmentally appropriate and yet believe themselves to be committed to the environment. Nearly 20 years after Hungerford and Volk (1990) challenged the 1970s belief of linear causality of affect and knowledge leading to behavior, the field continues to struggle with the perception that *telling* someone to behave in a certain way and providing sound reasoning to support that command equals *teaching behavior*. It is our hope that grounding our practice in decades of research related to behavioral theories will propel the field forward and ultimately lead to better learning through educational efforts.

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### Notes

1. For a further discussion, see Robottom and Hart (1993 and 1995).
2. Post-conscious behaviors are those that were once learned but have now become routine. They can be easily retrieved to the conscious level. Subconscious behaviors, by contrast, arise from the deepest level of consciousness and occur without active thought.
3. Care should be taken in interpreting these numbers as they are reported as descriptive correlationals and not variance.
4. The section on 'behavior constellations' was inspired and informed by a February 2007 discussion with Na'ilah Nasir from the Stanford School of Education.
5. Widely cited environmentally responsible behaviors include recycling, turning off lights, conserving water, riding the bus, walking or biking to work, using reusable shopping bags, among others.)
6. Skills are considered domain specific because, although the muscle movement may be transferable, the specific skill is unique to the task. For example, a move *en pointe* is unique to ballet; dribbling a basketball is unique to that sport; and cursive writing of the alphabet is unique to the physical act of writing.
7. See Smith-Sebasto (1992) for a summary of the literature chronicling the locus-of-control concept.

8. Smith-Sebasto worked with Fortner (1994) to create a generalizable measurement tool that addresses locus of control toward environmental actions.
9. Various factors related to responsible environmental behavior have been studied by Hsu and Roth (1999), Marcinkowski (1989), Ramsey (1989), Sia, Hungerford and Tomera (1985, 1986) and Sivek (1989) among others.
10. See Nickerson (2003) for a review of this research related to recycling.
11. Ways of knowing assumes that there are multiple, inherent strategies individuals and cultures use to create meaning. As conservation is culturally embedded, there are different ways in which people come to know what they believe is true.

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