

UNDER MY (GREEN) THUMB: THE INFLUENCE OF GREEN IDEOLOGY AND  
AUTOMATIC VALUE ACTIVATION UPON PRO-ENVIRONMENTAL ATTITUDES  
AND BEHAVIORS

ISSN 2277-5846

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## Abstract

*Research predicting pro-environmental behavior has identified numerous determinants over the years, yet few of these studies explore the role that non-conscious mechanisms play in these processes. To address this gap, the current study employs three experiments to assess the influence of both mindful and subliminal priming upon pro-environmental attitudes and behavior. The three studies demonstrated converging evidence that individuals primed with pro-environmental traits demonstrated greater environmental concern. Additionally, Study 3 found that priming of pro-environmental traits significantly influenced the likelihood to engage in a pro-environmental behavior. Implications and future directions are discussed.*

## ***1. Introduction***

Each day people are inundated with innumerable stimuli; oftentimes intended presented with the intent to influence behavior or perceptions. Much of these intentional stimuli originate from organizations seeking to align the receiver's attitudes with an ideal type, i.e. one that benefits the organization. Today, much of these stimuli attempt to influence one's perception of the "green" profile of an object or a service.

As the social psychology literature has noted (e.g. Wegner & Bargh, 1998), many stimuli are able to influence cognitions, attitudes, beliefs, moods, and emotions; however, few have been found to influence actual behavior. Researchers believe this is due to the conscious nature of behavior which provides individuals with a host of alternatives in which to engage; however, it is possible that the chronic exposure to certain stimuli may cause an individual to behave without conscious recognition of one's actions. The current research seeks to uncover stimuli that not only influences an individual's perception of green ideologies, but also impacts their environmental behavior.

The purpose of this study is to assess the extent in which pro-environmental stimuli are able to influence one's perceptions of pro-environmental attitudes and associated behavior. Our paper contributes to the environmental psychology literature by demonstrating the influence of priming techniques upon an individual's environmental attitudes, as well as their pro-environmental behavior. Furthermore, we inform the managerial and organizational cognition literature by illustrating another cognitive process that can be manipulated by priming and, perhaps more importantly, the potential for priming to influence behavior.

The paper is divided in the following manner: the next section briefly discusses the foundations of the priming literature and its applicability to organizational issues. A survey of the pro-environmental literature follows, with particular emphasis on how priming currently, and potentially, impacts the study of pro-environmental ideologies. The methodologies and results of the three studies are then outlined. The article concludes with a discussion regarding the implications, limitations, and opportunities for future generated by this project.

## ***2. Theory Development***

### **2.1. Automaticity/Nonconscious Processes**

The roots of automaticity, or the study of automatic processing by the mind, can be traced to William James' concept of habituation and the Freudian concept of hidden, motivated influences of thought (Wegner & Bargh, 1998). James' concept of habituation posits that behavior can be

programmed in the mind through chronic exposure, thus making performance of those behaviors a highly efficient and fairly effortless process. The Freudian concept, now termed preconscious processing, seeks to understand the process in which an individual first perceives a novel environment. As this occurs prior to the individual being fully engaged with the environment, it is considered an automatic process which occurs outside of awareness (Wegner & Bargh, 1998).

The theoretical logic for the activation of such nonconscious behaviors can be derived from Collins and Loftus' (1975) spreading activation theory. The model contends that the greater the similarity between two concepts, the greater the proximal coding of those concepts in the mind. As den Heyer and Briand (1986) noted, "distance represents the degree to which two concepts are related" (p. 315). Thus the more distinct a concept is from another, the more distant or proximal it will be stored in the mind from that concept. This is analogous to a ripple effect, where the intensity of the ripple is higher at the point of origin and diffuses as it spreads. Therefore, with proximally coded concepts that are characterized by a high degree of similarity there is a potential that when one concept will be activated, the other will be as well. Thus there is an inverse relationship between the likelihood of trait activation and proximity of the trait concepts. In other words, when a closely related trait is activated, the permeability for the activation of similar traits is lowered and traits activation (those that are similar) is facilitated.

Contemporary scholars have wedded the two processes (habituation and preconscious processing) to form the concept of automatic (or nonconscious) processing. Previous studies have shown that nonconscious processing (a) operates in conjunction with conscious processes to form a dual process model, (b) processes chronically activated concepts more quickly, (c) increases stimuli detection speed when the individual has chronic exposure to the stimuli, (d) occurs without intent and outside of conscious control, and (e) can be overridden by conscious processing (Neely, 1976, 1977; Posner & Snyder, 1975; Shiffrin & Schneider, 1977). However, more recent research has also shown that automatic processing can override conscious processing (Bargh, 1989) and that nonconscious influences are not restricted to internal thoughts, as originally thought, but can also be influenced by the actions of others (the perception-behavior link) (Bargh, Chen, & Burrows, 1996). Since its initial study, the perception-behavior link has found strong empirical support on a myriad of outcomes such as goal directed behavior (Aarts & Dijksterhuis, 2000; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001), behavioral consistence with norms (Aarts & Dijksterhuis, 2003), mimicry of others (Chartrand & Bargh, 1999), and performance levels (Dijksterhuis & van Knippenberg, 1998).

Research dating back to William James focused on the ability of the mind to be influenced by chronic exposure to relevant stimuli. James (1890) asserted that the mere thought of a behavior would increase the likelihood of that behavior being performed. Berkowitz supported this notion and utilized it to explain the increased proclivity of violence in viewers of violent images. In other words, the more images of violence one witnessed (in Berkowitz's instance, from mass media) the more likely that individual would behave violently. Berkowitz (1984) demonstrated the effectiveness of this process to operate highly efficiently because it operates outside of conscious processing and does not use any of the individual's attentional resources. Although the current study does not directly test chronic exposure, this research is still important to the current findings. Most importantly, if we find that acute exposure is able to manipulate individuals on the key dependent measures, this would suggest that the strength of the findings would possibly be even more significant when exposure becomes habitually.

Currently, the study of these automatic processing has been shown to influence a wide array of behaviors outside on an individual's awareness (Aarts & Dijksterhuis, 2000; Bargh, 1989; Bargh et al., 1996; Bless & Schwarz, 1999; Chartrand & Bargh, 1999; Niendenthal, 1990; Shah, 2003) including one's goals (Aarts & Dijksterhuis, 2000; Chartrand & Bargh, 1996; Fitzsimons & Bargh, 2003; Gillath, Mikulincer, Fitzsimons, Shaver, Schachner, & Bargh, 2006; Shah, 2003), affect and emotions (Bargh, 1989; Bargh et al., 1996; Bless & Schwarz, 1999; Niendenthal, 1990), intelligence (Dijksterhuis & van Knippenberg, 1998), stereotyping (Bargh et al., 1996; Dijksterhuis & van Knippenberg, 1998), nonverbal behavior (Bargh et al. 1996), and social interaction (Aarts & Dijksterhuis, 2003; Bargh et al., 1996; Bargh & Ferguson, 2000). This body of literature suggests that situational and environmental cues (stimuli) have the potential to subconsciously influence perceptions and actions of the individual.

The studies recounted above illustrate the significance the perception-behavior link hypothesis has on a wide range of behaviors, thus making it a potentially useful lens of analysis for studying pro-environmental ideologies and behaviors. Of particular interest to the current research is how one's environmental attitudes and behavior vary contingent on the types of stimuli present. In other words, to what extent does the exposure to pro-environmental terminology in the media or in the organization impact one's perception of ecological practices and behaviors? Due to the growing interest in ecological issues within psychological and organizational research and given the potential of automatic process to influence a wide range of behaviors, we feel determining the extent to which environmental attitudes and behaviors can be nonconsciously activated is an important topic.

## 2.2. Environmental attitudes and concern

The topic of environmental attitudes is a well-researched topic in environmental psychology; nearly two-thirds of all publications in the field are devoted to issues relating to environmental attitudes (Kaiser, Wölfling, & Fuhrer, 1999). Perhaps part of the topic's popularity is the recognition that many of the current environmental problems can be attributable to human activity (Du Nann Winter & Koger, 2003; Gardner & Stern, 1996; Steg & Vlek, 2009; Vlek & Steg, 2007). Much of the extant research is motivated by the desire to gain a greater understanding of the formation of environmental attitudes and subsequent behavior, as measures could then be taken to influence relevant behavior and attempt to reduce environmentally-destructive behaviors.

The degree to which an individual expresses concern for environmental issues plays a significant role in the extent to which they are willing to act in a pro-environmental manner in a particular situation. To date, the environmental psychology literature has identified three types of environmental concern; attitudes regarding the natural environment, attitudes toward a specific environmental behavior (e.g. recycling or the use of energy efficient light bulbs), and the degree to which they subscribe to the New Ecological Paradigm (NEP) (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000; Kaiser et al., 1999). The first type, studies that determine one's attitude regarding the natural environment, are often the most general of the environmental attitude assessments, whereas the second type of study, those that gauge specific attitudes, often draw from the Theory of Planned Behavior (Ajzen, 1991). The third type, studies that employ the NEP construct, adopts a single measure of environmental concern. The NEP studies assess the value system of the respondent, specifically the relationship between the individual and the ecosystem. It is apparent that the NEP scale is unique in this stream of inquiry as it distinguishes between values and attitudes and is able to measure elements that transcend specific contexts (Schwartz, 1992; Verplanken & Holland, 2002); therefore, the NEP provides a level of generalizability that most other measures of environmental concern lack.

The NEP scale is the most widely used appraisal of an individual's environmental concern. The scale, originally known as the New Environmental Paradigm, has been employed in a multitude of contexts (e.g. Dunlap, 2008) and as such, has gained status as the "standardized" assessment instrument of environmental attitudes (Hawcroft & Milfont, 2010). The NEP scale measures a single component of environmental attitude (Kaiser et al., 1999) with higher scores indicating agreement with the "new ecological" perspective. This worldview subscribes to the beliefs that humans are equal, rather than superior, to the natural world and that the earth has a limited quantity of resources

that should be effectively managed to ensure availability for future generations (Dunlap & Van Liere, 1978; Dunlap et al., 2000; McDonald & Patterson, 2007).

Originally developed to reflect the fundamental values of the early environmental sociologists (McDonald & Patterson, 2007), the scale was updated in 2000 to more fully encompass the various issues associated with an ecological worldview and to balance the amount of anti- and pro-NEP items on the scale. The NEP scale has shown strong correlations with environmental attitudes (Blake, Guppy, & Urmetzer, 1997; Ebreo, Hershey, & Vining, 1999; O'Connor, Bord, & Fisher, 1999; Roberts & Bacon, 1997; Schultz & Zelezny, 1998; Vining & Ebreo, 1992), but shows less consistent results when predicting behavior (Hawcroft & Milfont, 2010).

Based on the logic from both the environmental psychology and social psychology literature, we expect the presence of a stimuli (e.g. a manipulated level of pro-environmental traits) will increase the likelihood of that stimuli activating a cognition, as this is consistent with the logic of Collins and Loftus' (1975) spreading activation theory. In other words, presenting traits of either a pro- or anti-environmental ideology will activate similar minded trait concepts within the mind, thus manipulating their evaluation of the ideology. Furthermore, since research has shown that the NEP scale is correlated with environmental attitudes, we posit that the presence of pro- or anti-environmental traits should impact that individual's NEP score. Specifically, we hypothesize that:

*Hypothesis 1:* Those individuals in the Pro-Environmental condition will have a significantly higher NEP score than those individuals in the Anti-Environmental condition.

### 2.3. Environmental attitudes and behavior

Research in environmental psychology has been successful in identifying various aspects of environmental attitudes; however, there has been little success in efforts to establish a link between those attitudes and environmental behavior. In order to define environmental behavior, we follow the precedent established by Stern (2000), also implemented by Steg & Vlek (2009), and begin with a broad conceptualization that considers "all types of behavior that change the availability of materials or energy from the environment or alter the structure and dynamics of ecosystems or the biosphere" (p. 309). Building off this definition, we consider pro-environmental behavior to consist of any action that reduces or mitigates one's environmental impact.

Pro-environmental behavior is often conceived as a function of two different, possibly conflicting, motivations in an individual; self interest and concern for others. Research examining pro-environmental behavior can also be classified along these dimensions (Bamberg & Möser, 2007). Studies that conceive of pro-environmental behavior as primarily a function of an

individual's desire to pursue solely self-serving goals utilize rational choice models, which are generally adapted versions of Ajzen's (1991) Theory of Planned Behavior model (see for example, Kaiser et al., 1999). Studies that consider pro-environmental behavior to be driven by a concern for others employ derivations of Schwartz's (1977) Norm Activation Model. Research in this stream focus on the influence of norms: which researchers consider being an interaction between cognitive, emotional and social elements (Bamberg & Möser, 2007). For pro-environmental behavior, awareness of environmental issues may have the greatest influence upon norms, though causal attribution, guilt, internalization of social norms, also play an important role (Bierhoff 2002; see for examples Stern, Dietz, & Kalof, 1993; Dunlap et al., 2000; Schwartz, 1977; Cialdini, Reno, & Kallgren, 1990).

Two meta-analyses exploring the psycho-social determinants of pro-environmental behavior provide a succinct overview of the research stream (Hines, Hungerford, & Tomera 1987; Bamberg & Möser, 2007). These two studies provide converging evidence that an individual's attitude provides at least a modicum of influence ( $r = .37, .42$  respectively) upon pro-environmental behavior. Yet, some researchers still contend that the research in this field is plagued by mixed or nonsignificant results (Steg & Vlek, 2009).

In our survey of the literature, we found that studies employing the NEP scale to predict pro-environmental behavior have experienced mixed results. Whereas some researchers have experienced success in predicting a willingness to pay for pro-environmental electricity (Ek & Soderholm, 2008) and organic meat (Verhoef, 2005), as well as a propensity to engage in environmental actions (Cooper, Poe, & Bateman, 2004), others have been less than successful in establishing a connection between an individual's NEP score and behavior. These include Vining and Ebreo's (1992) study of the recycling behavior of residents of an Illinois town. While they were able to establish significant relationships between two of the scales factors, the amount of variance explained in the behavior was minimal (5.6%). In another study analyzing the ability of environmental concern (as measured by the NEP scale) to predict recycling behavior, Valle, Rebelo, Reis, and Menezes (2005) found that environmental concern significantly influenced an individual's attitudes towards recycling. Yet they too were unable to establish a link between attitudes and behavior.

Van Liere and Dunlap (1981) provide one possible explanation for this general disconnect between attitude and behavior, such that the manner in which an individual expresses environmental concern is often dependent upon context; specific environmental issues may elicit a response, while others may not. However, when one considers that the NEP construct is independent of context



(Schwartz, 1999; Verplanken & Holland, 2002), it would seem that other factors may come into play that affected the attitude-behavior relationship. Stern (2000) suggests drawing from other psychological theories to enhance environmental behavioral researcher's ability to predict behavior. Of particular promise are dual process models (Smith & DeCoster, 2000) which distinguish between conscious and automatic behaviors.

While it is important to recognize the influence of individual motivation upon pro-environmental behavior, the factors that lay beyond motivation, such as context, have been underrepresented in the literature (Steg & Vlek, 2009; for exceptions see Black, Stern, & Elworth, 1985; Guagnano, Stern, & Dietz, 1995; Hunecke, Blöbaum, Matthies, & Höger, 2001). Similar to behavior in general, contextual factors play a large role in determining environmental behavior (Wapner & Demick, 2002). Factors such as economic status, availability of opportunity, and social pressure influence the individual's propensity to act in an environmental manner (Kaiser et al., 1999). However, one type of contextual factor that has received relatively little interest in the environmental psychology literature is nonconscious processing.

The few studies analyzing nonconscious processes using priming techniques are characterized by equivocal findings. Working under the assumption that values motivate behavior only when an *ex ante* activation of that value occurs, Verplanken & Holland (2002) conducted a series of experiments to assess the influence of priming upon environmental behavior, in this case the hypothetical purchase of a new television. They found that when a subject's environmental values were an important aspect of their self-concept (in other words, environmental values had high centrality), priming procedures intended to promote pro-environmental behavior were effective. Conversely, subjects for whom environmental values were not central to their self-concept were not influenced by the priming procedures.

Another study that examined the effects of priming upon environmental behavior was unable to establish a relationship between three priming conditions (in support of, in opposition to, and a neutral stance) regarding environmental conservation and the valuation of public goods (Clarke, Bell, & Peterson, 1999). The authors did find that the priming activity influenced the subjects' attitudes towards public goods; a finding that lends credence to the disconnect between attitude and actions that was previously mentioned.

The most promising for study employing priming techniques appears in the marketing literature. Cornelissen, Pandelaere, Warlop, and Dewitte (2008) were able to use superliminal priming techniques (referred to as "cueing" in their study) to successfully alter the subject's pro-environmental behavior. Specifically, the authors were able show that exposure to common pro-



environmental behavior, such as not littering or cycling to work, influenced the subject's choice of product and use of scrap paper.

Following the recommendation from Stern (2000) we seek to uncover the link between one's nonconscious processes and pro-environmental attitudes and behaviors. To achieve this goal we conducted three studies to assess this link. Studies 1 & 2 utilized different priming mechanisms in an attempt to provide converging evidence on the ability of priming to influence pro-environmental attitudes. Study 3 sought to confirm the ability of subliminal priming to influence attitudes, but more importantly, pro-environmental behavior.

### 3. Study 1

#### 3. 1. Methods

*Subjects.* Upper level undergraduate business students (N=40), 21 male and 19 female, with a mean age of 23.55 years, participated in exchange for extra credit in which. Twenty-nine subjects (72.5%) were currently employed, and 15 (37.5%) had previous managerial experience.

*Materials.* The subject's environmental attitude (EA) was assessed through the administration of the New Environmental Paradigm scale (See Appendix A) (Van Liere, Mertig, & Jones, 2000). The instrument consists of 15 items measured on a five-point Likert scale. The scale has shown acceptable reliability in the past (Dunlap et al., 2000), which is on par with the current study, .74. The NEP was designed to measure an individual's environmental worldview and higher scores (indicating a more favorable view of the environment) are significantly correlated with pro-environmental behavior (Dunlap et al., 2000).

*Procedure.* Each iteration of the experiment consisted of a single subject. Upon arrival, the subject was met by the experimenter and accompanied into the room where the procedure was explained. At this point, the subject was then asked if he or she wished to proceed with the study. Those subjects who consented then filled out the consent form and demographic data (see Appendix B). Subjects were systematically assigned such that every odd-numbered subject received the Pro-environmental condition and the even-numbered subjects received the Anti-environmental condition. They were then informed that the experiment consisted of a series of unrelated tasks. The first task was a mindful priming technique (see Dijksterhuis & van Knippenberg, 1998), which analyzed the individual's ability to come up with either the benefits or detriments of behaving pro-environmentally. For this task, the experimenter distributed a notepad to the subject and asked them to describe in as much detail as possible either the benefits (for the pro-environmental condition) or

detriments of being pro-environmental (for subjects assigned to the anti-environmental condition). The experimenter re-entered the room after five minutes, collected the materials, and handed the subject the NEP Scale and were told upon completion to bring the materials to the experimenter's office. In an attempt to increase internal validity, the exact nature or topic of the questionnaire was not disclosed as we did not want to elicit any biases during the priming procedure.

Upon completion of the questionnaire the subjects underwent the funneled debriefing procedure recommended by Bargh and colleagues (see Bargh & Chartrand, 2000; Bargh et al, 2001; Chartrand & Bargh, 1999; Bargh et al., 1996) and as administered in past studies (e.g. Authors, 2011; Author, 2011). Once the debriefing was complete, the hypothesis and purpose of the study was fully explained. The researcher addressed the comments, questions, and concerns and then thanked the subjects for their participation in the study.

### 3. 2. Results

*Manipulation.* The means of the scale generated by the respondents was analyzed via a one-way analysis of variance (ANOVA) with the independent variable (condition level). Gender of participant was originally entered as a variable (via a 2 X 2 ANOVA & ANCOVA) but removed from the final analysis due to insignificance.

To test Hypothesis 1, we analyzed the means of the scales via a between-subjects analysis of variance (ANOVA). There was a significant main effect for Condition,  $F(1, 38) = 4.35, p < .05$ , effect size = .103, such that those individuals in the Pro-Environmental condition had a higher NEP score ( $M = 3.67$ ) than those in the Anti-Environmental condition ( $M = 3.35$ ), thus providing support for Hypothesis 1.

### 3.3. Discussion

As predicted, having subjects describe the benefits or detriments of being pro-environmental significantly influenced their NEP score. Specifically, individuals in the pro-environmental condition exhibited higher NEP scores than those individuals in the anti-environmental condition. This provides initial confirmatory evidence for the findings by Verplanken & Holland (2002) that priming can impact pro-environmental ideologies. This finding implies that those individuals that are bombarded with pro-environmental related stimuli may have their pro-environmental judgments unknowingly altered. Although these findings provide initial support for such a claim, it is possible that the subjects may have been aware of the intent of the two tasks and simply provided answers consistent with the assigned condition. As such, Study 2 addresses this possibly by utilizing a

subliminal priming technique that is outside of the individual's awareness. Consistent with our hypothesis for Study 1, we hypothesize:

*Hypothesis 2:* Those individuals in the Pro-Environmental condition will have a significantly higher NEP score than those in the Anti-Environmental condition.

## 4. Study 2

### 4.1. Methods

*Subjects.* Upper level undergraduate business students (N=44) participated in exchange for extra credit. Two subjects were removed from analysis due to a technical error during the visual acuity test, thus resulting in a final sample size of 42. The final sample had 23 men and 19 women with a mean age of 23.33 years. Twenty-seven subjects (64.3%) were currently employed and 11 (26.2%) had previous managerial experience.

*Materials.* The researchers assessed the subject's environmental attitude (EA) with the New Environmental Paradigm scale (Van Liere, Mertig, & Jones, 2000). The NEP's alpha in the current study was .81, thus suggesting good internal consistency.

*Procedure.* Subjects followed the same procedure in Study 1 with the exception of the priming technique. Rather than the mindful priming technique used in Study 1, the researchers employed a subliminal priming procedure (described below). Consistent with Study 1, participants underwent a funneled debriefing to determine their level of awareness to the priming manipulation.

*Visual Acuity Test.* The visual acuity task (adopted from Bargh & Pietromonaco, 1982; Chartrand & Bargh, 1996) consisted of a parafoveal priming procedure in which subjects were presented a number in the center of the screen and flashes of the words used as priming cues on each side of the screen. The software program presented 75 numbers (on screen for 1.5 seconds each) and 75 stimuli flashes (on screen for 60 milliseconds each) that took approximately 2 minutes total for the subjects to complete. For each condition, five related words were presented 15 times each in a random order. For the Pro-Environmental condition the traits were *recycle*, *salvage*, *conserve*, *preserve*, and *sustainable*. For the Anti-Environmental condition the terms included *pollute*, *litter*, *emissions*, *trash*, and *waste*. These words were to reflect synonyms of core concepts of Pro- and Anti-Environmental ideologies.

The subjects were also asked to calculate the sum of the series of numbers, which ranged from zero to three. The subjects were also required to indicate which side of the screen in which a flash appeared. To accomplish this second task, subjects were instructed to press the *p* button on a

keyboard for flashes occurring on the right side, and the *q* button for flashes on the left side of the screen. The summation task was used as a manipulation check to insure that subjects were focusing their attention on the number task and not the flashes on the side of the screen. This technique has proven effective in terms of activating trait concepts outside of one's awareness in past research (e.g. Authors, 2010; Author, 2010) and as such was deemed suitable for this study.

## 4.2. Results

*Manipulation.* The means of the scale generated by the respondents was analyzed via a one-way analysis of variance (ANOVA) with the independent variable (condition level). Gender of participant was originally entered as a variable (via a 2 X 2 ANOVA & ANCOVA) but removed from the final analysis due to insignificance.

To test Hypothesis 2, we analyzed the means of the scales via a between-subjects analysis of variance (ANOVA). There was a significant main effect for Condition,  $F(1, 40) = 5.06, p < .05$ , effect size = .112, such that those individuals in the Pro-Environmental condition had a higher NEP score ( $M = 3.36$ ) than those in the Anti-Environmental condition ( $M = 3.02$ ), thus providing support for Hypothesis 2.

## 4.3. Discussion

As predicted, subliminally priming subjects with trait concepts representing pro-environmental trends significantly influenced an individual's NEP score. Specifically, those individuals primed with traits of behaving pro-environmental (i.e. recycling) had higher NEP scores than those individuals primed with traits of anti-environmental (i.e. trash). This provides additional converging evidence with study 1 and confirmatory evidence with Verplanken and Holland's (2002) findings that priming can influence one's pro-environmental ideologies. This finding may indicate that the presence of pro-environmental terminology (such as EnergyStar, hybrid, conserve, etc.) may serve to activate these ideologies. Despite the promise of these findings, the question remains as to whether such stimuli can alter one's pro-environmental behavior, as the presentation of stimuli may be impactful enough to influence an individual's cognition, but may fail to influence behavior. As such, we designed the third study to measure the impact of stimuli on environmental behavior. Consistent with our previous hypotheses, we hypothesized:

*Hypothesis 3:* Those individuals in the Pro-Environmental condition will have a significantly higher NEP score than those in the Anti-Environmental condition.

*Hypothesis 4:* Individuals will exhibit environmental behavior that is consistent with their priming condition.

## 5. Study 3

### 5.1. Methods

*Subjects.* Twenty male and 18 female upper-level undergraduate business students (N=38, mean age of 22.76 years) participated in exchange for extra credit. Twenty-seven subjects (71.1%) were currently employed, and 18 (47.4%) had previous managerial experience.

*Materials.* The participant's environmental attitude (EA) was assessed through the administration of the New Environmental Paradigm scale (Van Liere, Mertig, & Jones, 2000). In the current study the scale demonstrated an acceptable alpha level of .71. As the purpose of Study 3 was to determine the extent to which priming influenced environmental behavior, we developed a simple task at the end of the priming event. As the subjects were leaving they were asked to "please take care of" (ambiguously stated so as to avoid bias) an empty soda can sitting upon a table. The subjects had the choice to place the can in either a recycling or trash bin; both located equidistant from the exit.

*Procedure.* Subjects followed the same procedure as Study 2 with the exception of the additional dependent measure following the administration of the NEP scale.

*Visual Acuity Test.* The same priming procedure, and same traits, was utilized as in study 2. Consistent with Study 1 and Study 2, participants underwent a funneled debriefing to determine their level of awareness to the priming manipulation.

### 5.2. Results

*Manipulation.* The means of the scale generated by the respondents was analyzed via a one-way analysis of variance (ANOVA) with the independent variable (condition level). Gender of participant was originally entered as a variable (via a 2 X 2 ANOVA & ANCOVA) but removed from the final analysis due to insignificance.

To test Hypothesis 3, we analyzed the means of the scales via a between-subjects analysis of variance (ANOVA). There was a significant main effect for Condition,  $F(1, 36) = 6.67, p < .05$ , effect size = .158, such that those individuals in the Pro-Environmental condition had a higher NEP score ( $M = 3.49$ ) than those in the Anti-Environmental condition ( $M = 3.14$ ), thus providing support for Hypothesis 3.

To test Hypothesis 4 we conducted a binary logistic regression to analyze the extent of the influence of priming techniques upon environmental behavior. If the subject's action was consistent with their priming condition, the event was coded with a one. For actions that were not in alignment with the corresponding condition, the researchers coded the event as a zero. In the pro-environmental condition, all but one of the 19 subjects placed the soda can in the recycling bin and 10 of the 19 subjects in the anti-environmental condition conformed to expectations. In total, 28 of the 38 subjects acted in the expect manner, thus supporting Hypothesis 4 (Wald = 6.12; Exp(B) = .062,  $p < .05$ ).

### 5.3. Discussion

As predicted, subliminally priming subjects significantly influenced an individual's NEP score; specifically, individuals primed pro-environmental cues exhibited higher NEP scores than individuals subjected to anti-environmental cues. This finding is important as it replicates the findings from Study 2 and provides greater confidence that subliminal priming of these traits influences an individual's NEP score. Of particular importance, priming techniques were also shown to significantly influence an individual's environmental behavior. Specifically, those individuals in the pro-environmental condition were more likely to recycle than subjects in the anti-environmental condition.

## 6. General Discussion

In the current research we have documented in three studies that demonstrate the potential for priming to influence an individual's pro-environmental ideology and behavior. Specifically we have shown that individuals primed with pro-environmental terminology led to significantly higher pro-environmental (NEP) scores than those individuals primed with traits of anti-environmental behavior. This was confirmed using two different priming techniques: mindful (Study 1) and subliminal (Studies 2 & 3). More importantly, we showed in Study 3 that the effects of priming did not merely influence an individual's cognitions, but also can influence an actual behavior (disposing of a soda can).

Our research contributes to the environmental psychology literature as it demonstrates that when context is controlled and confounding variables are removed, researchers have the ability to predict pro-environmental behavior. Moreover, this study demonstrates the importance of context in relation to pro-environmental behavior. Individuals may be inclined to act in a pro-environmental manner, but may face constraints that restrict their ability to do so. Howes and Gifford (2008) examined the influence of context in their study of the dynamic nature of environmental values. The

authors found that situational variables had a significant effect upon an individual's reported environmental values, particularly in situations in which two perspectives were in conflict.

Our findings also have several implications for organizations. Over the past 15 years, since the seminal works of Hart (1995), Shrivastava (1995), Gladwin, Kennelly, & Krause (1995), and Starik and Rands (1995), management scholars have become more cognizant of the importance of green ideologies and behaviors. Our research suggests that exposure to pro-environmental stimuli, such as pro-environmental terminology, may activate the pro-environmental trait concept within the individual and create greater alignment between an individual's evaluations and behaviors and the pro-environmental ideology. To the extent that a manager is trying to implement a pro-environmental culture within their organization, it is important that they present their employees with the pertinent stimuli that are likely to activate similar evaluations and behaviors. The media and political advocates constantly bombard people with pro- or anti-environmental rhetoric and behaviors. As our research suggests, it is likely that this exposure is able to influence observers to think or behave in a similar manner. Thus, if a firm wants to enact a more pro-environmental culture, they need to 'walk the walk' and 'talk the talk' as this rhetoric and behavior can serve as a stimulus for enacting the behaviors within the employees. Furthermore, to the extent that a firm has already enacted a pro-environmental culture and seeks to strengthen or expand that culture (such as moving beyond recycling to also reducing consumption of resources), our methodology provides managers with a means for doing so.

There are several strengths to our study. First we provide converging evidence across multiple studies and the utilization of two different priming techniques (mindful and subliminal). The consistency of the findings across all three studies on the NEP scale provides confidence in the reliability that these ideologies can be influenced by priming. The use of two different priming techniques further provides confidence that these ideologies can be influenced by priming. Moreover, the convergence of evidence by using subliminal priming helps lessen worries that subjects were able to detect the true purpose of study 1 (i.e. the link between the mindful priming technique and the scale).

Our study was able to illuminate the environmental psychology literature by demonstrating that the pro-environmental stimuli activate trait concepts that influence individuals on the cognitive and behavioral level. The latter part of that statement, the influence of behavior is perhaps most important, because our study provides one of the first studies in the management literature that shows priming is able to influence behavior, as well as cognition. On a similar note, as the strength of laboratory studies is the elimination of influence from confounding variables, we were able to more



accurately measure the impact of these nonconscious influences on environmental ideologies and behavior, as we controlled for innumerable variables that would have been present in a field setting. However, stemming from the current findings, we would suggest a natural extension would be to conduct this study in a field setting to assess the generalizability of our findings. Although the majority of studies that have demonstrated the ability of certain stimuli to automatically activate an individual's perceptions or behavior have been conducted in a laboratory setting, it seems reasonable to posit that nonconscious processing may also play an important role in field settings, provided the large number of documented influences and the fundamental nature of these processes. Furthermore, although we studied the impact of acute exposure of these traits, we noted that we pulled these traits from popular press (i.e. sources that individuals are commonly exposed to). We would argue that this chronic exposure would likely intensify and prolong the effects found here, thus increasing the importance of future research on the longevity of such effects.

The limitations of our research are as follows. First, as with all experimental studies, our study lacks external validity as the study was conducted in a controlled environment (conference room). Second, the third study used a simple behavioral task that may not simulate more complex or important decisions. Based on this we would suggest future research assessing a more difficult or conflicting environmental task. In other words, one that makes the individual have to make an overt decision to litter or recycle even though it requires more effort. Third, we did not assess subject's initial NEP level. We recommend that future research does so because it provides a clearer understanding of how impactful these nonconscious influences have on the individual's ideologies and behaviors. Fourth, in line with the previous point, we did not use a control group and thus do not have clarity on the impact of the priming manipulation. In other words, we cannot conclusively say that both conditions activated different concepts. Based on this, we would suggest future research that utilizes a control group to assess this impact. Fifth, in the third study, the researcher's presence in the lab may have exerted an unintentional pressure on the subjects to recycle, raising the possibility of confounded results. However, we feel this is unlikely because if there was researcher influence, we would expect an equivalent distribution of recycling behavior across both conditions. Instead, we saw a significant difference across the two conditions that mirror the priming manipulations, leading us to conclude that any researcher effect was minimal. Finally, we failed to test the influence of behavioral intent upon pro-environmental behavior. Hines et al.'s model (1987) and Bamberg and Moser's (2007) verification of the model show that behavioral intent mediates the effects of all other psycho-social determinants.

Although we feel the design of the Study 3 reduced the majority of constraints upon the behavior and thus decreased the influence of intent upon action, future researchers may wish to explore the mediating role of intent on the relationship between automatic values activation and pro-environmental behavior.

Our research provides a multitude of future research opportunities. First, it would be informative for scholars to assess if this priming technique is able to influence individuals in a field setting. In other words, does the exposure to these stimuli influence the individual more so than the presence of other stimuli in the workplace? Possible avenues for this research may include the presence and actions of co-workers and organizational pressure to reduce costs. Second, it would behoove environmental psychologists to assess the impact of priming on different pro-environmental behaviors such as reduction of consumption of picking up litter in a company parking lot. Third, our study was designed so that the pro-environmental behavior required the same level of effort as the other behavior. Future research may wish to assess the level of effort individuals are willing to exert in order to mitigate their environmental impact. Research assessing an individual's capabilities (c.f. Dietz, Stern, & Guagnano, 1998) may benefit from such research. Fourth, future research should look at other pertinent stimuli and see how they are able to influence individuals. Finally, researchers should assess the length of influence the priming has on the individuals. Priming studies have shown that such acute manipulations can influence the individual for up to 15 minutes (Dijksterhuis & van Knippenberg, 1998) known as an "after-effect" (Ferguson, Bargh, & Nayak). However, chronic manipulations should strengthen these effects as the more an individual is exposed to them, the more influence these stimuli will have (e.g. Aarts & Dijksterhuis, 2000; James, 1890; Posner & Snyder, 1975).

Moreover, our research suggests that certain terminology is able to influence pro-environmental cognitions and behavior. It would be interesting to assess the actual impact of an individual observing another individual behaving with a pro-environmental orientation and measure its influence. Additionally, researchers may wish to integrate behavioral consequences into the existing model to determine the influence of priming when faced with negative consequences. Of interest might be to what extent negative consequences will moderate the relationship between pro-environmental stimuli and pro-environmental behavior. Further research may also explore the influence of priming techniques upon other psycho-social determinants of pro-environmental behavior, such as problem attribution, guilt, perceived behavioral control, moral norms, and behavioral intention (Bamberg & Möser 2007). Finally, future research should eliminate the potential influence of the researcher. In the current study, the researcher was in the room when the individual

disposed of the can, although we do not feel this confounded our results, future research should conduct a study where the researcher is not present, thus eliminating any argument for a researcher effect.

In conclusion, we feel our research makes an important contribution by documenting the impact of priming pro- and anti-environmental traits on individuals' cognitions and behaviors. These results illustrate the potential of this methodology to be used in the management and organizational behavior literature for studying prevalent issues and the impact of nonconscious thought to influence them. As such, we feel that priming can provide a rich and diverse perspective on studying management and organizational behavior issues.

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**Appendix A: NEP Scale**

1	2	3	4	5
strongly disagree	moderately disagree	neutral or uncertain	moderately agree	strongly agree

1. \_\_\_\_ We are approaching the limit of the number of people the earth can support.
2. \_\_\_\_ Humans have the right to modify the natural environment to suit their needs.
3. \_\_\_\_ When humans interfere with nature it often produces disastrous consequences.
4. \_\_\_\_ Human ingenuity will insure that we do NOT make the earth unlivable.
5. \_\_\_\_ Humans are severely abusing the environment.
6. \_\_\_\_ The earth has plenty of natural resources if we just learn how to develop them.
7. \_\_\_\_ Plants and animals have as much right as humans to exist.
8. \_\_\_\_ The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. \_\_\_\_ Despite our special abilities humans are still subject to the laws of nature.
10. \_\_\_\_ The so-called "ecological crisis" facing humankind has been greatly exaggerated.
11. \_\_\_\_ The earth is like a spaceship with very limited room and resources.
12. \_\_\_\_ Humans were meant to rule over the rest of nature.
13. \_\_\_\_ The balance of nature is very delicate and easily upset.
14. \_\_\_\_ Humans will eventually learn enough about how nature works to be able to control it.
15. \_\_\_\_ If things continue on their present course, we will soon experience a major ecological catastrophe.

**Appendix B: Demographic Data**

1. Are you presently employed?

Yes; Full-time

Yes; Part-time

No

2. How many years of work experience do you have? \_\_\_\_\_

3. How many years of managerial experience do you have? \_\_\_\_\_

4. Have you ever been terminated by an employer?

Yes

No

5. Have you ever had to terminate an employee?

Yes

No

6. Age \_\_\_\_\_

7. Gender

Male

Female

8. Country of birth

United States

Other

9. Ethnicity

Caucasian (white)

African American

Asian American

Hispanic

Other, please specify: \_\_\_\_\_