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This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Prati, G., Albanesi, C., Pietrantoni, L. (2017). The interplay among environmental attitudes, pro-environmental behavior, social identity, and pro-environmental institutional climate. A longitudinal study. ENVIRONMENTAL EDUCATION RESEARCH, 23(2), 176-191 [10.1080/13504622.2015.1118752].

Availability:

This version is available at: <https://hdl.handle.net/11585/544672> since: 2022-02-08

Published:

DOI: <http://doi.org/10.1080/13504622.2015.1118752>

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The final published version is available online at:

<https://doi.org/10.1080/13504622.2015.1118752>

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The Interplay among Environmental Attitudes, Pro-Environmental Behavior, Social Identity, and Pro-Environmental Institutional Climate. A Longitudinal Study

Abstract

By using a panel design in a sample of 298 undergraduate/master students at an Italian public university, the present study aimed to test longitudinally the interplay among environmental attitudes, pro-environmental behavior, social identity, and pro-environmental institutional climate. The relationships were tested with cross-lagged analysis based on two waves over a 2-month period. The cross-lagged panel analysis revealed positive cross-lagged effects of social identity on environmental attitudes and pro-environmental institutional climate perceptions on social identity. Environmental attitudes and social identity at Time 1 did not predict Time 2 pro-environmental behavior. Pro-environmental behavior at Time 1 did not predict Time 2 environmental attitudes. Pro-environmental institutional climate perceptions at Time 1 did not predict Time 2 pro-environmental behavior. Finally, social identity at Time 1 did not predict Time 2 pro-environmental institutional climate perceptions.

Keywords: attitude, pro-environmental behavior, social identity, pro-environmental climate, longitudinal

Introduction

Adaptation and mitigation responses to climate change are strongly influenced by behavioral and lifestyle choices (Intergovernmental Panel on Climate Change 2014). Energy conservation (i.e., reduced energy consumption) is one of the most appropriate behavioral responses to address climate change. Understanding the processes that underlie pro-environmental behavior in the form of energy conservation is essential to reduce the negative consequences associated with climate change. Using a longitudinal design, the aim of this study was to investigate the interplay between environmental attitudes, pro-environmental behavior, social identity, and pro-environmental institutional climate.

Theoretical foundation for the study

Several studies focused on the role of environmental attitudes and revealed that people with high levels of environmental attitudes tend to act more pro-environmentally (Chen et al. 2011, Kollmuss and Agyeman 2002, Maiteny 2002, Fielding and Head 2011). According to the value-belief-norm theory of environmentalism (Stern 2000, Stern et al. 1999), environmental attitudes affect pro-environmental behavior through a causal chain involving personal norms, awareness of consequences, and ascription of responsibility to self. Specifically, value-belief-norm theory posits that pro-environmental behavior is more likely when people feel they ought to take action (personal norms), believe they are responsible for (ascription of responsibility to self), are aware of consequences that can arise from action and/or inaction (awareness of consequences), and report pro-environmental attitudes. Based on the value-belief-norm theory, pro-environmental attitudes are conceptualized as worldviews on human-environment relations. These worldviews —included in the new ecological paradigm scale (Dunlap et al. 2000) — focus on beliefs about humanity's adverse effects on a fragile biosphere. Specifically, the new ecological paradigm

scale is a widespread measure of environmental concern that reflects pro-environmental attitudes or pro-ecological orientation. There is a continuing debate in the literature about whether attitudes and behavior are associated (Kollmuss and Agyeman 2002, Heimlich and Ardoin 2008, Newman and Fernandes 2015, Carmi, Arnon, and Orion 2015). However, despite the acknowledgment of many barriers that are responsible for the gap between environmental attitudes and pro-environmental behavior, there are both theoretical and empirical reasons to support this association (Turaga, Howarth, and Borsuk 2010, Steg et al. 2014).

In addition to pro-environmental attitudes, social identity has been considered an important predictor of pro-environmental behavior (Clayton and Opatow 2003). Social identity is the part of an individual's self-concept derived from a perceived membership in a group or category of people (Turner 1987, Tajfel 1982). The social identity theory (Turner 1987, Tajfel 1982, Tajfel and Turner 1986) posits that people are motivated to achieve and maintain positive concepts of themselves and that their self-concept is derived from knowledge of their membership in a group (or groups). The perception of belonging to a group that provides a positive social identity may engender internalization of, and conformity to, group values, goals, and norms and homogeneity in attitudes and behavior. Therefore, social identification with a particular group leads people to act in accordance with the relevant group's goals, values, beliefs, and behaviors. In line with this theory, there is evidence that social identity influences pro-environmental behavior (e.g., Gatersleben, Murtagh, and Abrahamse 2012, Dresner et al. 2015) and environmental attitudes (Van der Werff, Steg, and Keizer 2013, Bonaiuto et al. 2002, Bonaiuto, Breakwell, and Cano 1996). However, it is also possible that the relationship between social identity and environmental attitudes may be reciprocal, rather than unidirectional (Clayton and Opatow 2003). Clayton (2003, 46) argues that "environmental identities come from

interactions (e.g., with the natural world) and from socially constructed understanding of oneself and others (including nature).” As such, is it possible to hypothesize that an interplay between environmental social identity (i.e., part of an individual’s self-concept derived from a perceived membership in a group that cares for the environment) and pro-environmental attitudes (as captured by the new ecological paradigm scale) exists.

Although social identity and environmental attitudes are usually considered antecedent of pro-environmental behavior, it is possible to hypothesize that social identity and environmental attitudes can both be influenced by past pro-environmental behavior. The rationale for this hypothesis is based on the self-perception theory, which posits that “individuals come to ‘know’ their own attitudes, emotions, and other internal states partially by inferring them from observations of their own overt behavior” (Bem 1972, 2). Therefore, the more often people acted environmental friendly in the past, the more likely it is that they will endorse pro-environmental attitudes and perceive themselves to be members of the environmentalist group. It should be noted that self-perception theory did not explicitly focus on social identity; however, Van der Werff, Steg, and Keizer (2013) found that environmental social identity can be influenced by past pro-environmental behavior.

In their theoretical framework of pro-environmental behavior, Kollmuss and Agyeman (2002) included institutional factors as well as cultural norms. The focus theory of normative conduct (Cialdini, Reno, and Kallgren 1990) highlights the utility of social norms in accounting for human behavior, including pro-environmental behavior. In addition, the focus theory of normative conduct posits that the extent to which social norms influence behavior depends on the saliency of a particular norm. Based on the focus theory of normative conduct, Norton, Zacher, and Ashkanasy (2014) argue that employees’ pro-environmental behavior depends on the extent

that they perceived that their organization holds pro-environmental social norms (in the form of formal organizational policies, procedures, and practices relating to environmental sustainability), that support a pro-environmental work climate. Norton, Zacher, and Ashkanasy (2014) found that pro-environmental work climate perceptions are related to employees' pro-environmental behavior.

We argue that the role of climate perceptions can be extended to other contexts. As organizational leaders play a key role in the creation of work climate, also local and national government authorities could play a key role in the creation of a pro-environmental institutional climate, by adopting environmental policies and showing commitment and concrete efforts to the protection of the environment. We argue that pro-environmental social norms within a society are created via citizens' perceptions of pro-environmental institutional climate, which is defined as the perceptions of formal institutional policies, procedures, and practices relating to environmental sustainability. Pro-environmental institutional climate describes citizens' perception of the local and national authorities' policies, interests, and commitment to the protection of the environment.

According to Ockwell, Whitmarsh, and O'Neill (2009), political engagement and social norms represent crucial factors in promoting pro-environmental behavior. By making the environment a political issue, institutional actors can play a powerful and effective role in shaping pro-environmental social norms (Carvalho and Burgess 2005). These studies highlight the important normative role of citizens' pro-environmental institutional climate perceptions in promoting pro-environmental behavior. Specifically, citizens' perception that institutional actors have a positive orientation toward environmental sustainability (i.e., pro-environmental institutional climate) is associated to the perception that the society approves or supports

environmentally friendly behavior (i.e., the perception of pro-environmental social norms). Therefore, according to focus theory of normative conduct (Cialdini, Reno, and Kallgren 1990), citizens' pro-environmental institutional climate perceptions would influence their pro-environmental behavior.

There is evidence that climate perceptions may also affect social identity. Pro-environmental institutional climate perceptions can provide people with information about the value of an environmental identity. As previously noted, the social identity theory (Tajfel and Turner 1986) posits that people are more likely to identify with groups that enhance their self-esteem. A positive institutional climate concerning a societal issue (e.g., environment, migration) indicates that the related identity (e.g., environmentalist, migrant) is valued and is likely to increase the pride associated with this identity (Priesemuth et al. 2013).

An alternative explanation for the relationship between pro-environmental institutional climate perceptions and social identity or pro-environmental behaviors is provided by the theory of selective exposure (Festinger 1957) or congeniality bias (Eagly and Chaiken 2005, 1993). Specifically, the idea of selective exposure or congeniality bias suggests that, to defend their attitudes, beliefs, and behaviors, people tend to seek information that is likely to support them and to avoid information that is likely to challenge them. The reason behind selective exposure or congeniality bias is that people are motivated to avoid unpleasant feelings (i.e., dissonance) caused by conflicting cognitions. To prevent the experience of unpleasant feelings, individuals might prefer only to seek information that confirms their existing beliefs or attitudes. There is compelling evidence that people report a moderate preference for congenial over uncongenial information (Hart et al. 2009). Based on the idea of selective exposure or congeniality bias, it is possible to hypothesize that the extent to which people identify themselves as environmentalist

would influence their pro-environmental institutional climate perceptions. For example, people who strongly identify with environmentalist groups may be more likely to select information provided by institutional actors who report positive attitudes toward the environment.

The present study

To examine the directionality of the association between environmental attitudes, pro-environmental behavior, social identity, and pro-environmental institutional climate, we used longitudinal data and a cross-lagged panel structural equation modeling analysis. Specifically, we tested three sets of hypotheses. The first set of hypotheses builds upon the predictions of the value-belief-norm theory (Stern et al. 1999), the social identity theory (Tajfel and Turner 1986), and the self-perception theory (Bem 1972).

Hypothesis 1a. Social identity at the first assessment point will predict subsequent levels of pro-environmental behavior, consistent with the social identity theory (Tajfel and Turner 1986).

Hypothesis 1b. Environmental attitudes and social identity at the first assessment point will predict subsequent levels of pro-environmental behavior, consistent with the value-belief-norm theory (Stern et al. 1999).

Hypothesis 2a. Pro-environmental behavior at the first assessment point will predict later social identity, consistent with the self-perception theory (Bem 1972).

Hypothesis 2b. Pro-environmental behavior at the first assessment point will predict later environmental attitudes, consistent with the self-perception theory (Bem 1972).

The second set of hypotheses is derived from the predictions of the social identity theory (Tajfel and Turner 1986) and from the idea of a reciprocal relationship between environmental attitudes and social identity (Clayton and Opatow 2003).

Hypothesis 3. Social identity at the first assessment point will predict later environmental attitudes, consistent with social identity theory (Tajfel and Turner 1986).

Hypothesis 4. Environmental attitudes at the first assessment point will predict subsequent levels of social identity, consistent with the idea of a reciprocal influence between social identity and environmental attitudes (Clayton and Opatow 2003).

The third set of hypotheses builds upon the predictions of focus theory of normative conduct (Cialdini, Reno, and Kallgren 1990), and upon the studies on the role of climate perceptions (Norton, Zacher, and Ashkanasy 2012, 2014) and social identity (Priesemuth et al. 2013, Thorbjørnsen, Pedersen, and Nysveen 2007).

Hypothesis 5a. Pro-environmental institutional climate perceptions at the first assessment point will predict later social identity (Cialdini, Reno, and Kallgren 1990), climate perceptions (Norton, Zacher, and Ashkanasy 2012, 2014), and social identity (Priesemuth et al. 2013, Thorbjørnsen, Pedersen, and Nysveen 2007).

Hypothesis 5b. Pro-environmental institutional climate perceptions at the first assessment point will predict later pro-environmental behavior, consistent with focus theory of normative conduct (Cialdini, Reno, and Kallgren 1990) and the studies on the role of climate perceptions (Norton, Zacher, and Ashkanasy 2012, 2014).

Hypothesis 6. Social identity at the first assessment point will predict subsequent levels of pro-environmental institutional climate perceptions, consistent with the theory of selective exposure (Festinger 1957) or congeniality bias (Eagly and Chaiken 2005, 1993).

Method

Participants

Potential participants comprised 308 undergraduate/master students of two schools (i.e., the School of Pharmacy, Biotechnology and Sport Science and the School of Political Sciences) at Bologna University. Courses on topics related to environmental issues were not included in their university course. At the time of the study, participants were attending first-cycle degree programs/bachelor (open to those in possession of a high school diploma) or second-cycle degree programs/master (open only to graduates). We removed from the final sample ten individuals who failed to complete both T1 and T2 assessment. Thus, the final sample included 298 participants. Women were concentrated in these degree programs. Thus, there were considerably more women than men in our sample. Demographic information about participants are shown in Table 1.

Measures

We asked participants to fill out the same questionnaire at Time 1 and Time 2. The questionnaire included measures of environmental attitudes, pro-environmental behavior, social identity, and pro-environmental institutional climate. Scale items are available in supplemental materials. Table 2 shows the descriptive statistics and reliability of the scales.

Environmental attitudes

The 15-item Italian version of the new ecological paradigm scale was used (Dunlap et al. 2000, Prati and Zani 2012). Items were scored on a 5-point scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). An overall score of environmental attitudes was created, after reversing the negatively worded items, so that higher scores indicated higher pro-environmental attitudes.

Social identity

To measure social identity as an environmentalist, we used the 12-item Italian version of the Social Identification Scale (Cameron 2004, Cicognani et al. 2012). Sample items are “Generally, I feel good when I think about myself as an environmentalist” and “Being an environmentalist is an important reflection of who I am.” Responses were rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Pro-environmental behaviour

We used the conservation scale of the pro-environmental behavior scale (Markle 2013). The conservation scale includes seven items addressing how often participants reduce their consumption of hot water, air-conditioning, heating, and lighting. These items used a 5-point scale ranging from 1 (*never*) to 5 (*always*).

Pro-environmental institutional climate perceptions

We developed a 5-item scale to assess pro-environmental institutional climate perceptions based on a measure of green work climate perceptions (Norton, Zacher, and Ashkanasy 2012, 2014). Participants reported their perception of policies, interests, and commitment concerning the protection of the environment of the local and national authorities. Responses were provided using a 5-point scale ranging from 1 (*never*) to 5 (*always*).

Procedure

Data were collected from a questionnaire on a website accessible only to participants. Participants received partial course credit for being involved in this study. We invited students to participate at the beginning or at the end of class sessions. Before beginning, participants were provided explanations of the study and their rights as participants (e.g., the voluntary and confidential nature of participation). After informed written consent was obtained, participants

filled out the questionnaire at their convenience. Two months later, we asked participants to complete a second questionnaire with identical questions by again accessing the study website at their convenience. We chose a two-month follow-up because the predominant causal influence between predictors of pro-environmental outcomes and related outcomes is supported in a short term perspective (Thøgersen and Ölander 2002).

Statistical Analysis

Missing values were less than 1% of the total number of cases, we chose listwise deletion over imputation (Graham 2009). Although Cronbach's alpha has become the most common measure of reliability, it is considered a lower bound on true reliability (Raykov 1997). Therefore, to measure internal consistency we calculated Cronbach's alpha and composite reliability (CR; Fornell and Larcker 1981) as an alternative estimator of true reliability. The path analysis was conducted using Mplus version 7 (Muthén and Muthén 1998-2012). The WLSMV estimator (a robust weighted least squares estimator using a diagonal weight matrix) was used because tests of multivariate skew and kurtosis (i.e., Small's test, Srivastava's test, and Mardia's test) indicated that the assumption of multivariate normality (DeCarlo 1997) was violated. To test our hypothesis using structural model, we include the following parameters: covariance among the latent variables; covariance between error terms of each indicator at T1 and the corresponding indicator at T2; auto-regressive effects (to control for baseline levels for each variable); and cross-lagged relationships to test the hypotheses (Cole and Maxwell 2003). Finally, given that male and female participants were not equally represented, equivalences of the path coefficients between men and women were examined using multi-group analysis.

Results

Preliminary Analyses

Table 2 shows correlations and descriptive statistics for the study variables. Pro-environmental behavior correlated positively with pro-environmental attitudes and social identity both synchronously and over time. Pro-environmental attitudes correlated both synchronously and over time with social identity. Pro-environmental institutional climate at Time 1 was positively related to social identity at Time 1 and Time 2 and negatively related to Time 1 pro-environmental attitudes. Pro-environmental institutional climate at Time 2 correlated negatively with pro-environmental attitudes at Time 2. The relationship between pro-environmental institutional climate and pro-environmental behavior was not significant both synchronously and over time. Moreover, the study variables were rather stable, since their autocorrelations varied between .57 and .85.

Tests of Hypotheses

Figure 1 shows the model with the hypothesized cross-lagged associations. The path model provided a good fit to the data ($\chi^2(2896) = 4033.41, p < 0.001$; NNFI = 0.96; CFI = 0.96; RMSEA = 0.036). The cross-lagged panel analyses supported the expected positive cross-lagged effects of social identity on environmental attitudes (hypothesis 3; $\beta = .10, p < .05$) and pro-environmental institutional climate perceptions on social identity (hypothesis 5a; $\beta = .09, p < .01$). The level of significance of the positive cross-lagged effects of pro-environmental behavior on social identity (hypothesis 2a; $\beta = .09$) and of environmental attitudes on social identity (hypothesis 4; $\beta = .08$) was $p = .05$.

Contrary to our hypotheses, environmental attitudes ($\beta = .10, p > .05$) and social identity ($\beta = .01, p > .05$) at the first assessment point did not predict subsequent levels of pro-environmental behavior (hypothesis 1a and 1b). In addition, pro-environmental behavior ($\beta = -.03, p > .05$) at the first assessment point did not predict later environmental attitudes (hypothesis

2b) and pro-environmental institutional climate ($\beta = .06, p > .05$) at Time 1 did not predict subsequent pro-environmental behavior (hypothesis 5b). Finally, social identity ($\beta = .00, p > .05$) at the first assessment point did not predict subsequent levels of pro-environmental institutional climate (hypothesis 6).

Testing Model Invariance by Gender

To investigate whether difference between female and male participants with respect to the hypothesized cross-lagged relationships existed, we tested for multigroup invariance. We compared a solution that allowed the cross-lagged relationships to differ in each group with one that required it to be constant across groups. Multigroup invariance was assessed using the $\Delta\chi^2$ test. In the comparison of two nested models, a statistically nonsignificant $\Delta\chi^2$ value suggests that the two models are equivalent across male and female participants. Comparison of a model in which all the cross-lagged relationships are constrained equal across groups and one in which, no equality constraints are imposed, yielded a $\Delta\chi^2$ value of 12.573 with $\Delta df = 9$ ($p = .18$). Therefore, the hypothesized cross-lagged relationships did not seem to differ across gender.

Discussion

The aim of the present study was to investigate the interplay among environmental attitudes, pro-environmental behavior, social identity, and pro-environmental institutional climate using a longitudinal study. Our results provided new insight into focus theory of normative conduct, social identity theory, and value-belief-norm theory applied to pro-environmental behavior in different ways.

First, we found longitudinal support for the influence of social identity on environmental attitudes as assumed in the social identity theory (Tajfel and Turner 1986). This finding supports the existing evidence that social identity plays a role in shaping environmental attitudes (Van der

Werff, Steg, and Keizer 2013, Bonaiuto et al. 2002, Bonaiuto, Breakwell, and Cano 1996). The relationship between social identity and environmental attitudes may be reciprocal rather than unidirectional. According to Clayton (2003), on the one hand, a socially constructed understanding of the nature may influence the development of an environmental identity. On the other hand, if people believe that human actions have adverse effects on a fragile biosphere, they are more likely to develop an environmental identity because they believe that such identification might be useful or meaningful to address the issue.

Second, contrary to the predictions of self-perception theory (Bem 1972), pro-environmental behavior at the first assessment point did not predict later environmental attitudes. Third, contrary to the predictions of value-belief-norm theory (Stern et al. 1999) and social identity theory (Tajfel and Turner 1986), environmental attitudes and social identity did not have an additional impact on pro-environmental behavior. Although the size of the correlation indices between pro-environmental behavior and pro-environmental attitudes and social identity was large both synchronously and over time, when controlling for past behavior, the cross-lagged relationships were not significant. This finding highlights the role of habit or old behavior patterns (Maiteny 2002, Kollmuss and Agyeman 2002). Specifically, conservation behavior seems to be enacted in a habitualized fashion and with less conscious control than it is predicted by value-belief-norm theory (Stern et al. 1999) and social identity theory (Tajfel and Turner 1986). The theory of interpersonal behavior (Triandis 1977) posits that when the level of habit in performing the behavior increases, it becomes automatic and, thus, performed with a decreased conscious deliberation. Therefore, attitudes and social identity may be less relevant in predicting ordinary conservation behavior.

Another explanation for the non-significant relationships between social identity or environmental attitudes and pro-environmental behavior might be the way in which we operationalized the constructs. As higher levels of specificity in the attitude and behavior measures increase the size of the relationship between attitudes and behavior (Carmi, Arnon, and Orion 2015), the non-significant cross-lagged relationship between environmental attitudes and pro-environmental behavior may be due to the broad focus on pro-environmental attitudes of the new ecological paradigm scale. The new ecological paradigm scale (Dunlap et al. 2000) measures general attitudes toward very broad environmental issues. For instance, it is possible that past environmental behaviors may be related to attitudes toward more specific environmental issues (or attitudes toward the specific behaviors) instead of environmental worldviews.

In the present study, consistent with previous research on pro-environmental behavior (Gatersleben, Murtagh, and Abrahamse 2012, Dresner et al. 2015), we used a definition of social identity based on Tajfel's social identity theory. According to Tajfel, social identity is "that part of an individual's self-concept which derives from his [or her] knowledge of his [or her] membership of a social group (or groups) together with the value and emotional significance attached to that membership" (Tajfel 1978, 63). Our conceptualization of environmental social identity differs from the concept of environmental self-identity and environmental identity. Clayton (2003, 45) defined environmental identity as "a sense of connection to some part of the nonhuman natural environment, based on history, emotional attachments, and/or similarity, that affects the ways in which we perceive and act toward the world." Van der Werff, Steg, and Keizer (2013) defined environmental self-identity as the extent to which people see themselves as a type of person who acts environmentally-friendly. General definitions of environmental

identity have the advantage of being potentially predictive of different types of pro-environmental behaviors at the expense of becoming distal predictors of such behaviors. Specific self-identities (i.e., the extent to which people see themselves as the type of person who enacts that particular pro-environmental behavior) may be more promising for the prediction of the relevant behaviors. For example, self-identity as a recycler predicted recycling behavior (Nigbur, Lyons, and Uzzell 2010).

Fourth, consistent with the predictions of focus theory of normative conduct (Cialdini, Reno, and Kallgren 1990), this was the first study to show the longitudinal influence of pro-environmental institutional climate perceptions on social identity. We speculated that a positive pro-environmental institutional climate increases the value and the pride associated with pro-environmental identity (Priesemuth et al. 2013). It is also possible that a positive pro-environmental institutional climate enhances the saliency of a pro-environmental identity. Since social norms are reinforced via perceptions of the climate (Norton, Zacher, and Ashkanasy 2014), the stronger the perceived social norms, the more salient the social identity will become (Thorbjørnsen, Pedersen, and Nysveen 2007). This finding supports the utility of including pro-environmental institutional climate perceptions in investigating the origin of pro-environmental social identity. Finally, we remark that, despite evidence of preference for congenial over uncongenial information (Hart et al. 2009), pro-environmental institutional climate perceptions was not predicted by pro-environmental social identity.

Contrary to the predictions of focus theory of normative conduct (Cialdini, Reno, and Kallgren 1990), the cross-lagged effect of pro-environmental institutional climate perceptions on pro-environmental behavior was not statically significant. Our explanation of this result is that the effects of pro-environmental institutional climate perceptions on pro-environmental behavior

might be short-lived. For example, one can decide to save energy only shortly after having been exposed to a pro-environmental communication campaign.

Practice implications

The present findings suggest that attitudes, identity, and perception are not sufficient to influence conservation behaviors. Therefore, the findings of the present study encourage researchers and practitioners to move away from these strategies to ones that have consistently been proven to work better. Implementation intention and environmentally prepared cueing tools may be successful in improving conservation behavior (Holland, Aarts, and Langendam 2006). Implementation intention refers to intentions that spells out the when, where, and how of goal striving in advance. Implementation intentions follow the proposition “If situation X is encountered, then I will initiate goal-directed behavior Y!” A meta-analysis of 94 studies revealed that implementation intentions were effective in facilitating the realization of goal achievement even in presence of antagonistic habits (Gollwitzer and Sheeran 2006). In everyday life, implementation intentions are effective if opportunities and responses are viable, instrumental, and specified precisely (Gollwitzer and Sheeran 2006). For example, having merely formed the goal intention to “save energy tomorrow” instead of deliberate about when, where, and what to do in a specified situation is unlikely to be effective. In their experimental study, Holland, Aarts, and Langendam (2006) demonstrated that the provisions of instructions for forming implementation intentions improved recycling behavior. Specifically, researchers asked employees of a tele-company to plan when, where and how to recycle their old paper and used plastic cups and to visualize and write down their implementation plans. In the same study, the researchers also demonstrated that changes in the situation (i.e., a personal recycling box for old paperwork was noticeably placed near each employees’ desk) may also break old and undesirable habits and create new and desirable habits. Finally, given the significant role of previous pro-environmental

behaviors, the present findings suggest an important role for environmental education during the early childhood years (Hedefalk, Almqvist, and Östman 2014, Davis 2009, Duhn 2011) to develop pro-environmental habits.

Although social identity and pro-environmental attitudes did not affect conservation behaviors, this does not mean that social identity and pro-environmental attitudes do not play an important role in the promotion of pro-environmental behaviors. For example, social identity and pro-environmental attitudes may play a role in the promotion of other pro-environmental behaviors (e.g., voting for a political candidate that supports pro-environmental policies) or of some (but not all) of the conservation behaviors. Moreover, given the challenge of climate change, social identity and pro-environmental attitudes can be seen as valuable outcomes in their own right (e.g., Duarte, Escario, and Sanagustín 2015, Izadpanahi, Elkadi, and Tucker 2015, Shephard et al. 2014, Green, Kalvaitis, and Worster 2015, Williams and Chawla 2015).

The findings of the present study also highlight the role of pro-environmental institutional climate perceptions in promoting pro-environmental identity, which, in turn, plays a role in the promotion of pro-environmental attitudes. Local and national authorities should provide consistent communication on policies, procedures, and practices relating to environmental sustainability and on their interests and commitment concerning the protection of the environment. Such communication can provide clarity about the priorities of a society thereby supporting the development of an environmental consciousness.

Limitations

We acknowledge that our research has limitations that need to be mentioned when evaluating the present study. Our measures were based on self-reports and may thus suffer from common method bias, that is, the spurious variance that is attributable to the common

measurement method and has biasing effects on estimates of the relationships between two constructs (Podsakoff, MacKenzie, and Podsakoff 2012). Nevertheless, we used a longitudinal design, which reduces the risks for common method bias.

Another limitation was that we collected data from a convenience sample (undergraduate/master students), thus raising the question of representativeness. We note that there is no evidence that the hypothesized relationships may differ among segments of the population. In addition, the involvement of students allowed us to attain high follow-up response rates.

Finally, another limitation is due to the use of self-report measures, as social desirability or recall bias may have influenced the results. Future research may wish to include observational data and other sources of corroborative information.

Conclusions

The present results can be interpreted as consistent with a causal chain in which pro-environmental institutional climate perceptions predicts social identity that, in turn, predicts environmental attitudes. In the present study, no variable was able to predict subsequent pro-environmental behavior, except for baseline pro-environmental behavior. The results seem to highlight the habitualized nature of pro-environmental behavior. From an applied perspective, interventions targeting the situational cues involved the automatic activation of habitual behaviors can add to the promotion of pro-environmental behaviors in people's daily lives.

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Table 1

Sample Characteristics

	%	<i>M</i>	<i>SD</i>
<hr/>			
Gender			
Male	24.0		
Female	76.0		
Age		26.00	6.57
Education			
High school diploma	28.5		
Bachelor's degree	68.1		
Master's degree	3.4		
Italian citizenship	97.0		
Employed	34.9		
Living arrangements			
Living with roommate(s)	50.0		
Living with parent(s)	31.5		
Living with partner	10.8		
Living alone	5.4		
Other	2.3		
<hr/>			

Table 2

Descriptive Statistics, Reliability Estimates, and Correlations among the Study Variables (N = 298)

	M	DS	α	CR	1	2	3	4	5	6	7	8
1. Pro-environmental institutional climate (T1)	2.87	0.70	.88	.91	—							
2. Pro-environmental institutional climate (T2)	2.81	0.71	.90	.93	.57	—						
3. Social identity (T1)	4.22	1.23	.95	.96	.17	.09	—					
4. Social identity (T2)	4.11	1.26	.95	.96	.21	.09	.81	—				
5. Pro-environmental attitudes (T1)	3.84	0.41	.78	.84	-.12	-.07	.44	.42	—			
6. Pro-environmental attitudes (T2)	3.85	0.41	.80	.85	-.08	-.15	.45	.47	.85	—		
7. Pro-environmental behavior (T1)	3.90	0.65	.70	.80	.07	.04	.42	.42	.33	.28	—	
8. Pro-environmental behavior (T2)	4.02	0.64	.76	.84	.10	.11	.37	.45	.33	.35	.77	—

Note. Correlations (Pearson's r) greater than $\pm .11$ are significant at $p < .05$ (two-tailed test). *CR* = composite reliability.

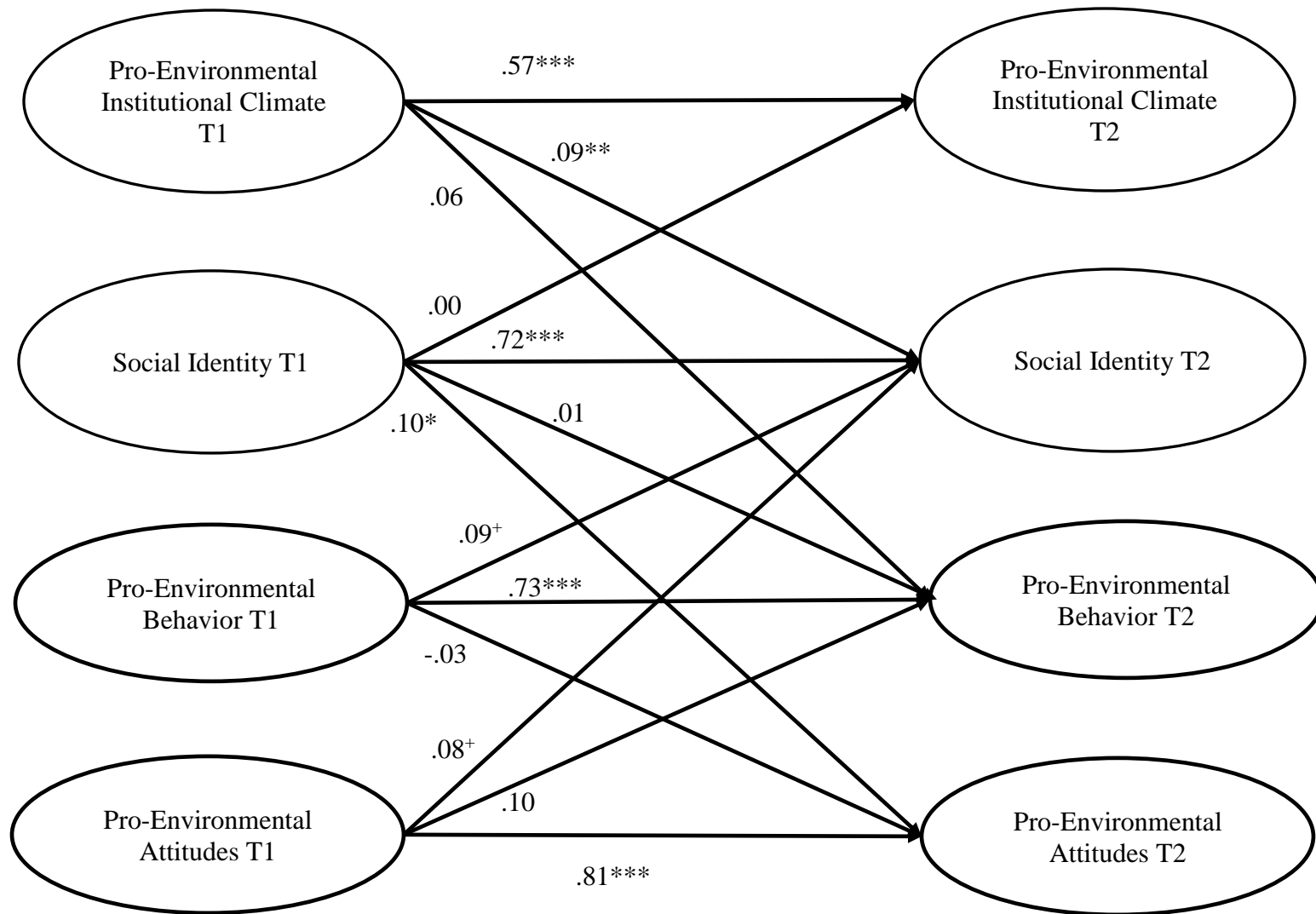


Figure 1. The interplay between pro-environmental institutional climate, social identity, pro-environmental behavior, and environmental attitudes at Times 1 and 2. Regression coefficients are standardized. ⁺ $p = .05$; * $p < .05$; ** $p < .01$; *** $p < .001$.