FURTHER VALIDATION OF THE MOTIVATION TOWARD THE ENVIRONMENT SCALE

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ABSTRACT: A study was conducted to further validate the Motivation Toward the Environment Scale (MTES). Results confirmed both the convergent and discriminant validity of the MTES by showing that peer reports corresponded to self-reports of environmental self-regulation and that environmental self-regulation was relatively distinct from self-regulation in academic and political domains. Results also pointed to some possible sources of autonomous self-regulation. Individuals were more likely to engage in autonomous environmental behaviors if (a) their parents had shown an interest in their developing attitudes about the environment, (b) their peers supported their freedom to make decisions about the environment, and (c) they had already developed life aspirations such as concern for their community. Finally, results

AUTHORS' NOTE: *This study was funded by grants from the Social Science and Humanities Research Council of Canada (SSHRC) and the Fonds pour la Formation de Chercheurs et l'Aide a la Recherche, Quebec (FCAR) to Richard Koestner.* *Correspondence concerning this article should be sent to Mark Villacorta, Department of Psychology, University of Michigan, 525 East University Ave., Ann Arbor, Michigan, 48109-1109; e-mail: mvillaco@umich.edu.*

ENVIRONMENT AND BEHAVIOR, Vol. 35 No. 4, July 2003 486-505
DOI: 10.1177/0013916502250753

confirmed the adaptive value of developing an autonomous regulatory style toward environmental activities. Thus, autonomous individuals were shown to report stable proenvironmental attitudes over time, a greater number of environmental behaviors, and higher levels of well-being.

Keywords: *environment; motivation; autonomy; self-regulation; self-determination*

Despite the best efforts of federal and regional governments, schools, and activist groups to educate the public, environmental problems continue to plague the planet (Oskamp, 2000). Increased greenhouse gas emissions are contributing to global warming, threatening forests, farms, and water supplies. Energy resources are being depleted, leading to economic and environmental problems. Air pollutants are contributing to rising rates of respiratory problems. Land is continuously being filled with waste despite the push to recycle, disrupting the biodiversity of local ecosystems (Oskamp, 2000).

Concern over these and other environmental problems is at an all-time high (Oskamp, 2000; Seguin, Pelletier, & Hunsley, 1999). However, although the majority of people in the United States and Canada know about these environmental problems, it is not clear that such environmental knowledge leads to proenvironmental action. Indeed, the little research that has been conducted in this area failed to support the link between environmental knowledge and behavior (Maloney & Ward, 1973; Seligman, 1985). For example, Finger (1994) found that although environmental activism and exposure to an environmental catastrophe were related to environmental behavior, environmental information and acquisition of knowledge had little influence on behavior.

A motivational approach to understanding environmental behaviors was proposed by Pelletier, Tuson, Green-Demers, Noels, and Beaton (1998). These authors applied Deci and Ryan's (2000) (Ryan & Deci, 2000) Self-Determination Theory, which will be further explored shortly, to the environmental domain. The Motivation Toward the Environment Scale (MTES) was developed to assess individuals' levels of autonomy as they pertain to environmental behavior. Pelletier (2002) summarized the validation work done on the MTES to date. Past research suggests autonomous motivation is related to (a) frequency of proenvironmental behaviors (Green-Demers, Pelletier, & Menard, 1997; Pelletier et al., 1998), (b) performance of difficult environmental behaviors (Green-Demers et al., 1997; Pelletier & Bellier, 1999), and (c) withstanding well-argued critiques of the value of recycling (Koestner, Houlfort, Paquet, & Knight, in press). Recently, the scale was also used to confirm a model of environmental action that included the elements of information seeking, confidence in information sources, and perceptions

of health risks (Seguin, Pelletier & Hunsley, 1999). The present study was designed to provide further validation for the MTES.[1] Before our specific hypotheses are described, it is necessary to provide a brief review of self-determination theory and how individual differences in autonomous self-regulation have been operationalized.

Self-determination theory (Deci & Ryan, 1991; Ryan 1995; Ryan & Deci, 2000) distinguishes among three broad forms of motivation for behavior in a given domain: intrinsic motivation, extrinsic motivation, and amotivation. These motivations can be ordered along a continuum to the extent to which they are autonomously endorsed by the individual. Intrinsic motivation represents the most self-determined of all behaviors. It involves doing an activity for its own sake because it is naturally interesting and fun, i.e. because of its inherent appeal.

Extrinsic motivation refers to a wide variety of instrumental behaviors that are engaged in as a means to an end. Deci and Ryan (2000) distinguish among four types of extrinsic motivation that may be ordered from the least to most autonomous, namely external regulation, introjection, identification, integration. External regulation corresponds to behaviors that are motivated directly by external means, such as by rewards and constraints. These behaviors are the least autonomous of the types of extrinsic motivation because they are not chosen and the reason for participation is outside of the person. Introjection, by contrast, is the taking in of external regulations, but not fully integrating them within the self. Behavior is therefore motivated by a sense of obligation related to self- and other approval, and is accompanied by feelings of pressure and compulsion. With identification, activities are perceived as chosen and valued by oneself and become part of one's values, goals, and identity. Here, instrumental behaviors have been completely internalized, and goal-directed activity is done completely of one's personal choice. Integration represents complete unification of external regulations with the individual's core sense of self, i.e. it becomes part of his or her self-definition.

Finally, amotivation reflects the perceived lack of contingency between one's actions and the outcomes that are produced. It creates feelings of incompetence and lack of control and is the least self-determined of all types of motivation because there is no accompanying sense of purpose, reward, or change of course with respect to those behaviors.

Intrinsic, extrinsic, and amotivation are typically assessed by asking people their reasons for engaging in various actions (Ryan & Deci, 2000). A widely used method of quantifying the influence of the different styles of motivation is the Relative Autonomy Index (RAI) (Blais, Sabourin, Boucher, & Vallerand, 1990; Vallerand & Bissonnette, 1992). The RAI involves

assigning weights to the corresponding constructs ranging from the most to the least self-determined. For example, intrinsic motivation is the most self-determined and would thus be given a weight of +3. Integration, identification, introjection, and external regulation decrease accordingly with respect to the amount of self-determination they represent and therefore would be given the corresponding weights of +2, +1, –1 and –2, respectively. Finally, amotivation, which represents the least self-determined of all behaviors, would receive the lowest weight of –3. The RAI allows researchers to summarize the extent to which individuals regulate their behavior in a given domain in a more or less autonomous fashion. Numerous studies conducted in various domains such as academics, politics, sports, and relationships have used the relative autonomy index to confirm self-determination theory's central proposition: More autonomous forms of self-regulation are associated with healthier and more adaptive behaviors and emotions (for a summary, see Ryan & Deci, 2000).

PRESENT STUDY

This study was designed to explore three sets of issues regarding motivation toward the environment: (a) the convergent and discriminant validity of the MTES, (b) the antecedents of self-regulation toward the environment, and (c) outcomes associated with autonomous self-regulation toward the environment. A short-term longitudinal design in which surveys were administered to participants at three time points was employed. A college student sample was selected because the early twenties have been identified as a period of development in which individuals emerge from childhood dependency on parents and adolescent dependency on peers to begin to independently explore a variety of life directions and world views (Arnett, 2000). A college education leads to exposure to a variety of different world views, and there is evidence that proenvironmental attitudes appear to be an integral part of an egalitarian worldview that often develops among college students (Winter, 2000).

The convergent validity of the MTES was explored by collecting peer reports of environmental self-regulation in addition to self-reports. The discriminant validity of the MTES was explored by collecting self-reports of regulation style in two other domains (academic and politics) besides the environment. We expected that peers would confirm participants' self-reports of environmental self-regulation and that the manner in which

participants regulated their behavior toward the environment would be relatively distinct from how they regulated their behavior in other domains. No previous study has used peer reports to confirm the validity of individuals' reasons for action in a given domain, nor has much empirical attention been given to testing the domain-specificity of self-regulation styles.

The possible origins of environmental self-regulation were explored by asking participants to describe the influence of parents and peers and also to report on their own life aspirations. A recent hierarchical model of motivation posits that both social (e.g., parental influence) and personal factors (e.g., personal values) determine the type and level of motivation that people display in various life contexts (Vallerand, 1997; Vallerand & Ratelle, 2002). It was expected that perceptions of parental and peer behavior would be associated with college students' autonomy regarding environmental activities. Establishing such autonomy should be particularly important to college students because they view accepting responsibility for oneself and making independent decisions as essential criteria for establishing adult status. Grolnick and Ryan (1989) showed that parental autonomy support and involvement were significantly related to children's relative autonomy toward academics. No study has explored the role of peer socialization in the context of self-determination theory, yet such influence is foreseeable given substantial evidence that peers are more influential than parents with regard to the adoption of roles and behaviors outside the home (Harris, 1995).

It was also predicted that environmental autonomy would relate to other life values and aspirations (Winter, 2000). Recent work by Kasser and Ryan (1993, 1996) indicated that life aspirations could be categorized as related to intrinsic needs versus extrinsic goals. We expected that environmental self-determination would relate to intrinsic values such as self-acceptance, affiliation, and community involvement.

The consequences of autonomous self-regulation in the environmental domain were examined in three ways. First, autonomous self-regulation was expected to predict a greater number of proenvironmental behaviors. Seguin and colleagues (1999) recently showed a direct link between autonomous environmental regulation and environmental behaviors. Our aim was to have participants spontaneously generate the actual behaviors that they perform, rather than have them rate a predetermined list of behaviors, in order to minimize certain response biases.

Second, relative autonomy toward the environment was expected to predict greater stability of proenvironmental attitudes over time. A recent study in the political domain showed that more autonomous reasons for following politics were predictive of more stable political attitudes (Losier, Perreault, Koestner, & Vallerand, 2001). Autonomous beliefs are more integrated with

the self and are therefore less vulnerable to change as a result of random events or persuasion.

Third, autonomous environmental self-regulation was expected to relate to positive emotional outcomes. Research in the domains of religion and academics indicated that high levels of autonomy were associated with reports of greater adjustment and well-being (Koestner, Fichman, & Losier, 2001; O'Connor & Vallerand, 1989).

METHODS

PARTICIPANTS AND PROCEDURE

Participants were recruited via advertisements in the student newspaper, various sign-up sheets placed throughout the campus, and through classroom solicitation. The participants were 134 female and 34 male McGill University students with a mean age of 20.9. Of the participants, 41% were living with their families. The study was described as focusing on attitudes and aspirations in different life areas, and participants were compensated $20 for participation. McGill is a large, urban university in a multicultural and multilingual city. Environmental issues such as the importance of recycling and the dangers of global warming are prominent on campus, as might be expected given that proenvironmental attitudes are significantly associated with youth, education, liberal political opinions, and urban residence (Winter, 2000).

Participants visited the lab in groups of three to five to complete a package of questionnaires. The package included an assortment of measures relevant to the current study (e.g. environmental, academic, and political motivation) as well as a few that were unrelated to the current study. Demographic data were also included.

Participants were also asked if they would be willing to participate in follow-up studies in the upcoming weeks. The first follow-up questionnaire was sent to all willing participants approximately 3 weeks later. The second follow-up was sent approximately 3 weeks after the first. Both follow-up surveys contained the measures of environmental, political, and academic attitudes, and well-being over the past few weeks.

Finally, each participant was asked to give one questionnaire to two peers. An envelope addressed to the lab with prepaid postage accompanied each peer report questionnaire. Each report contained measures concerning their friend's (the participant) self-regulation in the areas of the environment, academics, and politics.

MEASURES

MTES (Pelletier et al., 1998) consists of 24 items on which participants rate the degree to which various statements correspond to their reasons for engaging in environmentally friendly behaviors. On a 1 to 7 Likert-type scale (1 = *does not correspond at all* to 7 = *corresponds exactly*), participants rate the degree to which they agree with intrinsic (e.g., "for the pleasure I experience when I find new ways to improve the quality of the environment"); integrated (e.g., "because being environmentally conscious has become a fundamental part of who I am"); identified (e.g., "because I think it's a good idea to do something about the environment"); introjected (e.g., "because I would feel bad if I didn't do anything"); externally regulated (e.g., "to avoid being criticized"); or amotivated items (e.g., "honestly, I don't know; I truly have the impression I'm wasting my time doing things for the environment"). The reliability and validity of the MTES have been shown to be satisfactory (Pelletier et al., 1998).

The mean of the six responses was used to create summary scores for each of the motivation subscales. The means revealed that participants were mostly identified ($M = 5.73$, $\alpha = .81$) and introjected ($M = 4.49$, $\alpha = .83$) toward the environment, but they also endorsed intrinsic ($M = 3.93$, $\alpha = .89$) and integrated ($M = 3.51$, $\alpha = .88$) reasons. In general, they were less externally motivated ($M = 1.77$, $\alpha = .83$) and amotivated ($M = 1.73$, $\alpha = .75$) toward the environment.

Political Motivation Scale is known as PMS (Koestner, Losier, Vallerand, & Carducci, 1996). Respondents were asked four questions regarding their reasons for following Canadian politics. "Why is it important that you get information concerning the position of the different parties and leaders in the ongoing debate about the future of Quebec within Canada?" "Why is it important to voice your concern in relation to political issues?" "Why is it important to weigh all the issues before voting?" "Why is it important to vote in elections and referendums?" For each question, respondents indicated their level of agreement on a 7-point scale (1 = *does not correspond at all* to 7 = *corresponds exactly*) toward four statements. The statements were selected to reflect intrinsic motivation ("for the pleasure of doing it"); identification ("I chose to do it for my own good"); introjection ("because I am supposed to do it"); and amotivation ("I don't know, I don't see what it does for me"). This methodology was successfully adopted by Koestner and his colleagues (1996) to consider reasons for following political events. Losier et al. (2001) reported that the scales possess adequate internal and test-retest reliability, as well as considerable evidence of predictive validity. The PMS does

not include external regulation or integration scales because it was developed primarily to distinguish among intrinsic, identified, and introjected forms of political motivation.

Summary scores for each of the motivation subscales were created by calculating the mean of the four types of responses. Means revealed that participants were mostly identified ($M = 4.71$, $\alpha = .79$) toward politics, but they also endorsed introjected ($M = 2.88$, $\alpha = .77$), and intrinsic ($M = 2.84$, $\alpha = .82$) reasons. They were less amotivated ($M = 1.82$, $\alpha = .84$) toward politics.

Academic Motivation Scale (AMS) (Vallerand et al., 1992, 1993) consists of 28 items to which individuals respond on a 7-point scale (1 = *does not correspond at all* to 7 = *corresponds exactly*). For the purposes of the present study, the scale was edited to contain an equal number of items for the five self-regulatory styles of interest: amotivation, external regulation, introjection, identification, and intrinsic motivation. Participants were asked to consider, "Why are you going to school?" In the version used for this study, four items were given that reflect amotivation (e.g., "I don't know; I can't understand what I am doing in school"); external regulation (e.g., "in order to have a better salary later on"); introjection (e.g., "to prove to myself that I am capable of completing my degree"); identification (e.g., "because this will help me make a better choice regarding my career orientation"); and intrinsic motivation (e.g., "because I experience pleasure and satisfaction while learning new things"). The AMS does not include an integration scale because its developers focused on distinguishing among three types of intrinsic motivation toward learning. Vallerand, Fortier, and Guay (1997) reported that the scales possess adequate internal reliability and predictive validity.

Summary scores for each of the motivation subscales were created by calculating the mean of the four types of responses. The means revealed that participants were mostly identified ($M = 5.18$, $\alpha = .73$); intrinsically motivated ($M = 4.92$, $\alpha = .82$); and externally regulated ($M = 4.72$, $\alpha = .84$) toward academics, but they also endorsed introjected ($M = 3.77$, $\alpha = .83$) reasons. In general, they were less amotivated ($M = 1.56$, $\alpha = .75$) toward academics.

Relative Autonomy Indices (RAIs) were created using participants' scores on the MTES, PMS and AMS. Weights were assigned to the total score of each motivational scale according to their ordering on the continuum of self-determination. For the MTES, intrinsic motivation, integration, identification, introjection, external regulation, and amotivation were assigned the weights of +3, +2, +1, –1, –2, and –3, respectively. For the AMS, intrinsic motivation, identification, introjection, external regulation, and amotivation were assigned the weights of +2, +1, 0, –1, and –2, respectively. For the PMS,

intrinsic motivation, identification, introjection, and amotivation were assigned weights of +2, +1, –1, and –2, respectively. This is consistent with the usage of the scales in past studies (cf., Blais et al., 1990; Vallerand & Bissonnette, 1992). The reliabilities of all three RAIs were superior to α = .80.

Environmental socialization was measured with a 6-item survey that assessed the extent to which participants' parents and peers supported their autonomy and were involved in their efforts regarding environmental issues. Four statements assessed autonomy support, and two statements addressed involvement. Participants rated, on a 7-point Likert-type scale (1 = *strongly disagree* to 7 = *strongly agree*), the extent to which the behavior of their peers and their parents coincided with each statement. For example, participants were given the autonomy supportive statement, "My ____ respect my choices regarding my environmental stance," and then rated the statement separately for their peers and for their parents. The items are based on the work of Grolnick and Ryan (1987, 1989), which demonstrated the positive relation of parental autonomy support and involvement on children's academic self-regulation, teacher-rated adjustment and competence, and achievement. The decision was made to include peer influences in addition to parental influences because of Harris's (1995) review, which concluded that peer socialization has a far greater impact on personality development than does parental socialization. Reliabilities were greater than α = .70.

The *Aspiration* index was created when participants rated the extent to which a set of 21 possible aspirations was important to them. The aspirations were either intrinsic or extrinsic in nature. Intrinsic aspirations (e.g., affiliation) are those that are thought to promote satisfaction of the needs for competence, relatedness, and autonomy; whereas extrinsic aspirations (e.g., fame) are those that are thought to be either irrelevant or antagonistic to the needs for competence, relatedness, and autonomy (Kasser & Ryan, 1993, 1996). There were 12 intrinsic aspirations, 3 each for the domains of physical fitness, self-acceptance, affiliation, and community feeling. There were 9 extrinsic aspirations, 3 each for the domains of financial success, social recognition, and attractiveness. These aspirations were taken from the work of Kasser and Ryan, who also outlined the theoretical and empirical bases for their selection. Summary scores for each of the aspiration subscales were created by calculating the means of the importance ratings. All subscales yielded reliabilities greater than α = .70, except for self acceptance, α = .38. Because our critical analyses focused on the summary index of intrinsic and extrinsic aspirations, we were not concerned about this poor reliability.

Environmental attitudes were measured by an 8-item survey that assessed the extent to which participants displayed positive versus negative attitudes toward environmental action. Three items assessed positive environmental attitudes (e.g., "I am very concerned about the impact that the present environmental problems might have on future generations"), and five items assessed negative environmental attitudes (e.g., "quite honestly, I'm not too concerned about recycling"). Summary scores for each of the environmental attitude subscales were created by calculating the means of the proenvironmental and antienvironmental attitude items. These items were used in a study on persuasion by Koestner et al. (2001) and yielded acceptable levels of reliability (αs > .70).

Environmental behaviors were examined. Participants were asked to indicate some environmentally friendly behaviors they perform. A trained research assistant rated the number of discrete behaviors that were indicated by each participant. Examples of environmental behaviors participants listed included the following: reuse grocery bags, reuse containers, recycle old bottles, print on unused side of paper, walk to school, compost, use alternative cleaning products such as vinegar, shut off lights when not in room, collect signatures for proenvironmental petitions.

The *Positive and Negative Affect Schedule* (PANAS) (Watson, Clark, & Tellegen, 1988) contains a 10-item Positive Affect (PA) scale and a 10-item Negative Affect (NA) scale. The participants rated the extent to which they felt each emotion over the past few weeks (1 = *very slightly*; 2 = *extremely*). The scales have been shown to have similar psychometric properties in populations of students, adults, and clinical patients. Reliabilities were greater than $\alpha = .80$ in the present study.

Follow-up assessments were conducted in the weeks after the first assessment. The first follow-up questionnaire was mailed to each participant approximately 3 weeks after the laboratory session. The second follow-up was mailed approximately 3 weeks after the first. With respect to this study, the forms contained the Environmental Attitudes questionnaire and the PANAS. A total of 128 questionnaires were received for the first follow-up (76.2%), and 118 were received for the second (70.2%).

The *Stability of Environmental Attitudes* index was constructed using the follow-up questionnaires. First, for each participant, the standard deviation among the summary attitudes toward the environment was computed across the three assessments. Because lower scores on this measure indicated

greater stability, the scale was reversed by subtracting the standard deviation scores from the constant 10. This revised variable is more easily interpreted because higher scores reflect higher stability and lower scores reflect lower stability in proenvironmental attitudes.

Peer reports were also taken. Participants were asked to give two very brief questionnaires to two friends who would complete it and mail it back to the lab in a preaddressed, stamped envelope. Participants were told that the questionnaires asked some of the same questions they had been asked and were only to provide complementary information to what they had already completed. They were permitted to look at the questionnaires if they desired to assure themselves the questionnaires contained nothing of a private nature and to encourage them to comply. Peer Reports contained measures concerning their friends' (the participant) self-regulation in the areas of the environment, academics, and politics. Each domain had 1 representative item for each level of self-determination, e.g. one item for intrinsic motivation, one item for identification, and so on for the three domains. The environment had 6 items, academics had 5 items, and politics had 4 items. It was not possible to calculate internal reliabilities because only single items had been used in the peer assessments. In total, 138 participants had at least one peer report returned (82.1%), and 103 participants had both returned (61.3%).

RESULTS

EVIDENCE FOR THE CONVERGENT AND DISCRIMINANT VALIDITY OF THE MTES

Self-Peer Agreement on Domain-Specific Relative Autonomy

Table 1 displays the correlations between the self- and peer-rated RAIs. The ratings of the two peers were combined for these analyses. Participants' ratings of their own relative autonomy in a given domain were highly significantly positively correlated with their peers' ratings of their relative autonomy for the same domain. Specifically, significant positive correlations were obtained between self- and peer-rated environmental relative autonomy, $r(141) = .35$, $p < .01$; academic relative autonomy, $r(142) = .44$, $p < .01$; and political relative autonomy, $r(139) = .32$, $p < .01$. Thus, it seems that peer reports show some convergence with self-reports of regulatory styles in the environment, academic, and political domains.

TABLE 1
Pearson Correlations for Self- and Peer-Rated Relative Autonomy Indices for the Environmental, Academic, and Political Domains

	PR Environment	*PR Academics*	*PR Politics*
SR environment	.35**	.10	.07
SR academics	.14	.44**	.09
SR politics	.17*	.16	.35**

NOTE: PR = peer-rated; SR = self-rated.
*$p < .05$; **$p < .01$.

TABLE 2
Pearson Correlations for Self-Rated Relative Autonomy Indices for the Environmental, Academic, and Political Domains

	Environment	*Academics*	*Politics*
Environment	—	.38**	.11
Academics	.38**	—	.21**
Politics	.11	.21**	—

**$p < .01$.

Discriminant Validity of RAIs

Table 2 displays the correlations between participants' RAIs for the three different domains. Participants' RAIs for two of the three domains were significantly positively correlated with each other. Specifically, significant, positive correlations were obtained between the RAIs of environment and academics, $r(166) = .38, p < .01$, and academics and politics, $r(163) = .21, p < .01$. These results suggest a certain amount of consistency in the quality of self-regulation across domains. However, the amount of variance accounted for was quite small, and there was no relation between the political and environmental domains, providing some support for the discriminant validity of the three respective scales.

DEVELOPMENTAL CORRELATES OF SELF-REGULATION TOWARD THE ENVIRONMENT

Parental and Peer Socialization

To examine the relation of perceived socialization factors to environmental self-regulation, a regression analysis was performed with the environ-

TABLE 3
Standardized Regression Coefficients of Environmental Relative Autonomy Index (RAI) by Parent and Peer Developmental Influences

	Environmental RAI
Parental autonomy support	–.13
Parental involvement	.32**
Peer autonomy support	.42**
Peer involvement	.02

**$p < .01$.

mental RAI as the dependent variable. Parent and peer involvement and parent and peer autonomy support were entered together as the first set of predictors. All possible interactions were entered as the second set of predictors.

Table 3 displays the standardized regression coefficients for the four predictors. It can be seen that parent involvement ($B = .32$, $p < .01$) and peer autonomy support ($B = .42$, $p < .01$) were significantly positively related to autonomous environmental self-regulation. No other effects approached significance. These results suggest that both parents and peers play a role in promoting integration of a concern for the environment. Parents' expression of interest and engagement with environmental issues were associated with greater autonomy. Peer support of teenagers' point of view to decide for themselves was also highly predictive of autonomous environmental self-regulation.

Relation of Environmental Relative Autonomy to Life Aspirations

Table 4 presents the correlations between the environmental RAI and the importance of the four intrinsic aspirations and the three extrinsic aspirations. The environmental RAI was significantly positively correlated with the importance of each of the four intrinsic aspirations: physical fitness, $r(166) = .21$, $p < .01$; self-acceptance, $r(166) = .23$, $p < .01$; affiliation, $r(166) = .19$, $p < .01$; and community feeling, $r(166) = .31$, $p < .01$. The environmental RAI was unrelated to the importance of each of the three extrinsic aspirations: financial success, $r(166) = .03$, *ns*; social recognition, $r(166) = .00$, *ns*; and appealing appearance, $r(166) = –.09$, *ns*.

Taken together, these results suggest that autonomous self-regulation toward the environment is significantly positively associated with a focus on intrinsic aspirations while unrelated to extrinsic aspirations.

TABLE 4
Pearson Correlations for Environmental Relative Autonomy Index (RAI) and Importance of Intrinsic and Extrinsic Aspirations

	Environmental RAI
Intrinsic aspirations	
Physical fitness	.21**
Self-acceptance	.23**
Affiliation	.19*
Community	.31**
Extrinsic aspirations	
Finances	.03
Social recognition	.00
Attractiveness	–.09

**$p < .01$.

SOME POSSIBLE CONSEQUENCES OF AUTONOMOUS ENVIRONMENTAL SELF-REGULATION

Environmental Self-Regulation and Beliefs and Behaviors

The mean number of environmental behaviors was 2.4, with a range of 0 to 7. Autonomous environmental self-regulation was significantly positively related to the reported number of environmental behaviors, $r(165) = .17$, $p < .05$. This indicates that greater autonomy toward the environment was associated with reports of greater proenvironmental action.

Autonomous Self-Regulation and Stability of Attitudes

Table 5 presents the correlations between the environmental RAI and participant's proenvironmental and antienvironmental attitudes for Time 1, Time 2, and Time 3. Autonomous environmental self-regulation was significantly positively related to proenvironmental attitudes at Time 1, $r(166) = .52$, $p < .01$; Time 2, $r(131) = .59$, $p < .01$; and Time 3, $r(123) = .57$, $p < .01$. Conversely, environmental self-regulation was significantly negatively related to antienvironmental attitudes at Time 1, $r(166) = –.24$, $p < .01$; Time 2, $r(162) = –.36$, $p < .01$; and Time 3, $r(166) = –.39$, $p < .01$. In addition, there was a significant negative relation between the environmental RAI and the stability of proenvironmental attitudes, $r(166) = –.23$, $p < .01$. Taken together, these results indicate that greater environmental autonomy is associated with

TABLE 5
Pearson Correlations for Environmental Relative Autonomy Index (RAI) and Proenvironmental Attitude Variability, Proenvironmental Attitudes and Antienvironmental Attitudes for Time 1, Time 2, and Time 3

	Environmental RAI
Proenvironmental attitudes Time 1	.52**
Proenvironmental attitudes Time 2	.59**
Proenvironmental attitudes Time 3	.57**
Antienvironmental attitudes Time 1	–.27**
Antienvironmental attitudes Time 2	–.36**
Antienvironmental attitudes Time 3	–.39**
Proenvironmental attitude stability	.23**

**$p < .01$.

more proenvironmental attitudes and fewer antienvironmental attitudes over time and that the proenvironmental attitudes remain stable over time.

Environmental Self-Regulation and Subjective Well-Being

Correlations were computed between the environmental RAI and the affect indices (aggregated across the 3 assessments). Environmental self-regulation was significantly positively related to positive affect, $r(165) = .24$, $p < .01$, and significantly negatively related to negative affect, $r(165) = –.15$, $p < .05$. These results indicate that young people who have developed a personalized interest in the environment report greater positive affect and less negative affect compared to those who have not integrated this value.[2]

DISCUSSION

The results of this study supported the convergent and discriminant validity of the MTES. Thus, it was shown that peer reports tended to correspond with self-reports of environmental self-regulation, and that environmental self-regulation was relatively distinct from self-regulation in the domains of academics and politics. This is the first study to use peer reports to validate self-ratings of self-determination and among the first to examine the domain specificity of self-regulation styles. In their theorizing, Ryan and Deci (2000) proposed there is likely to be only a limited amount of consistency in how people self-regulate in various domains of their life. This is because self-

regulation styles develop as a result of direct experiences with activities and people related to a given domain.

The results of the present study also shed light on some possible developmental antecedents of autonomous environmental self-regulation. There was evidence that both parents and peers are perceived as playing a role in promoting integration of a concern for the environment. Parents' expression of interest and engagement with environmental issues were associated with reports of greater autonomy. Peer support of young people's ability to decide for themselves was also highly predictive of autonomy. Previous studies in the academic domain had pointed toward the importance of parental involvement and support in promoting autonomy, but this is the first study to explore the influence of peers on the development of self-determined forms of self-regulation. The fact that peer support was especially related to more autonomous forms of self-regulation likely resulted from the unique developmental position of participants in the current study. College students are particularly likely to orient themselves toward their peers as they explore various identities and worldviews (Arnett, 2000). It is also possible that the peers of emerging adults are more sensitive to their friends' strivings for self-responsibility and independent decision-making because they are themselves wrestling with the identical developmental prerogatives. Despite the apparently strong influence of peers, there also seems to be a role for parents to play. By showing an interest in environmental issues and spending time in discussion with their children, parents can help young people begin to develop a personal view toward environmental activities. A longitudinal study would be useful for sorting out the timing of the relative influences of parents and peers on environmental motivation.

An autonomous orientation toward environmental behavior seems to develop alongside a more general orientation to invest in intrinsic life aspirations such as affiliation, self-development, and community involvement. Thus, autonomous environmental self-regulation was positively correlated with all four intrinsic aspirations and uncorrelated with all three extrinsic aspirations. These results are consistent with the work of Kasser and Ryan (1996). It suggests that concern for the environment is aligned with intrinsic aspirations such as concern for one's community.

The results of the present study also shed light on some possible adaptive consequences of autonomous environmental self-regulation. Thus, autonomous environmental self-regulation was significantly related to the possession of proenvironmental attitudes, the absence of antienvironmental attitudes, and, most important, the stability of positive environmental attitudes over time. These are important results because of their implications for

long-term environmental sustainability. Specifically, if environmental change is to be effected and maintained, collective long-term commitment to the goal must be achieved.

There was a significant positive relation between autonomous self-regulation and reports of engaging in proenvironmental behaviors. These results contribute to the growing body of motivational literature that points to the importance of self-determination in promoting and sustaining environmentally friendly behavior (Green-Demers et al., 1997; Seguin et al., 1999). Whereas previous research has made use of preestablished self-report scales to measure proenvironmental behavior, the present study required participants to spontaneously list the proenvironmental behaviors they performed in their everyday life. Such a procedure may be less vulnerable to socially desirable responding. Of course, the present study would have been far stronger if it had included objective measures of environmental behaviors. This could have been accomplished by having parents and/or peers report on participants' proenvironmental activity or by directly measuring garbage and recycling output.[3]

Finally, consistent with self-regulation research in other domains, more environmentally autonomous individuals were more likely to experience positive affect and less likely to experience negative affect (Blais et al., 1990; Vallerand, Fortier, & Guay, 1997; O'Connor & Vallerand, 1989). Taken together, the present results support the construct validity of the MTES and make significant contributions to the growing literature concerning models of environmental motivation and their theoretical bases.

This study suffered certain limitations that merit discussion. Most important, all of our statistical analyses were correlational, and it is therefore not possible to imply causation. Experimental manipulations designed to promote recycling or other environmental behavior should be explored. For example, recycling instructions could be varied so that they differed in the extent to which autonomy-supportive versus controlling language was used, and participants' self-regulation toward environmental behavior could be measured. Second, the present study was restricted to a rather homogeneous sample of university undergraduates. Although such emerging adults are an important population as far as long-term environmental sustainability is concerned, it is important to perform similar studies with other age groups, such as students at the elementary and high school levels, and working populations.

NOTES

1. Although the previous studies examined the validity of the MTES, none examined the major constructs of interest in this study (i.e. peer-reported self-regulation, relation to self-regulation in the domains of academics and politics, longitudinal well-being, stability of environmental attitudes, peer and parental influences on environmental behaviors, and influences in intrinsic and extrinsic aspirations).

2. Regression analyses were done in order to control for the effects of intrinsic and extrinsic life aspirations on positive and negative affect. All analyses indicated that relationships between environmental self-regulation and subjective well-being held when controlling for aspirations.

3. It must be acknowledged that the significant relation between autonomous self-regulation and reports of proenvironmental behavior was relatively modest (Pearson $r = .17$), raising the issue of whether the finding has any practical significance. Rosenthal and Rubin (1982) introduced the Binomial Effect Size Display to assist in estimating the practical significance of statistical effects. The display shows that r is identical to the difference between two success rates (e.g., an increase in success rate from 42% to 59% is associated with a Pearson r of .17). Interestingly, during the debate concerning the 2001 electricity shortage in California, public officials noted that a relatively small change in consumer behavior, such as reducing personal energy consumption by as little as 6%, would resolve the crisis without any need to increase the energy supply.

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