The Impact of Behavioural Difficulty on the Saliency of the Association Between Self-Determined Motivation and Environmental Behaviours

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Abstract

The goal of the study is to evaluate the impact of the perceived level of difficulty of environmental behaviours on the magnitude of the relationship between environmental self-determination and the occurrence of environmental behaviours. The participants (n = 444) completed the Motivation Toward the Environment Scale, along with self-report measures of environmental behaviours and perceived difficulty of environmental behaviours. Three types of environmental behaviours are examined: Recycling, purchasing environmentally-friendly products, and educating oneself as to what can be done for the environment. It is hypothesized that the level of self-determination of environmental motivation predicts the occurrence of environmental behaviours significantly. Moreover, the magnitude of the relationship between self-determination and environmental behaviours is expected to increase with the level of perceived difficulty of the behaviours. Data are subjected to structural equation modeling analyzes (EQS). Results support the proposed hypotheses. Self-determination displays a significant relationship with environmental behaviours, and the magnitude of this relationship increases with the difficulty of the environmental behaviour. Current environmental research trends and applied intervention strategies are discussed on the basis of this finding. Strategies for the promotion of environmental behaviours are proposed.

Résumé

Cette étude évalue l'impact du niveau de difficulté perçue des comportements sur la relation entre l'autodétermination et la fréquence des comportements écologiques. Les participants (n = 444) ont complété l'échelle de motivation vis-à-vis les comportements écologiques ainsi que des échelles en mesurant la fréquence et la difficulté. Trois types de comportements ont été examinés: le recyclage, l'achat de produits non-nocifs pour l'environnement, et la recherche d'information sur l'environnement. Il est postulé que le niveau d'autodétermination permettra la prédiction significative des comportements écologiques. De plus, cette relation devrait être plus élevée lorsque le niveau de difficulté du comportement augmente. Les données ont été soumises à des analyses par équations structurelles (EQS). Les résultats confirment les hypothèses proposées. L'autodétermination permet une prédiction significative de la fréquence des comportements écologiques et cette association est plus forte lorsque la difficulté est plus élevée. Les courants actuels en recherche et en intervention environnementales sont discutés en fonction des résultat obtenus, et des stratégies pour promouvoir les comportements écologiques sont proposées.

Environmental damage is not the exclusive product of industrial irresponsibility. The average citizen also contributes to the degradation of the environment in various ways (e.g.: careless waste disposal, poor consumption habits, etc.). It has been argued that current environmental problems result from a crisis of maladaptive behaviours (Maloney & Ward, 1973). Environmental research has documented this problem for decades, in the hope of finding ways to instill environmental awareness and promote environmentally-conscious behaviours. This endeavor has met with mixed results.

Environmental knowledge and attitudes are leading themes in the study of the determinants of environmental behaviours (see Arcury & Johnson, 1987, Kuhn & Jackson, 1989, for literature reviews). Substantial resources have been invested in environmental education programs for the public. Yet, the level of environmental knowledge of most people remains low (Arcury & Johnson, 1987, Brothers, Fortner, & Mayer, 1991). Moreover, although environmental knowledge is an obvious prerequisite to environmental action, it does not appear to be sufficient to ensure that such action will take place (Seligman, 1985). Alike environmental knowledge, environmental attitudes have been widely assumed to lead to environmentally-conscious behaviours. However, while the actual level of environmental concern is undoubtedly high (Dunlap, 1987; Shetzer, Stackman, & Moore, 1991), support for the alleged relationship between environmental concern and action is notoriously inconsistent

(Baldassare & Katz, 1992; Oskamp, Harrington, Edwards, Sherwood, Okuda, & Swanson, 1991; Weigel & Weigel, 1978).

In addition to the study of environmental knowledge and attitudes, behavioural intervention strategies such as reinforcement and feedback (see Geller, 1989, for a literature review) have also been a popular focus of environmental research. These strategies are generally effective in the short run. Unfortunately, studies involving long-term follow-ups revealed that behavioural strategies almost systematically failed to induce enduring changes in environmental behaviours (e.g., Geller, Winett, & Everett, 1982; Katzev & Johnson, 1984). As a consequence, these strategies are exceedingly costly because they need to be constantly maintained to ensure the occurrence of the behaviour. That is, the behavioural changes do not outlast the withdrawal of the contingencies (Aronson & Gonzales, 1990; De Young, 1986).

Thus, the investigation of the determinants of environmental behaviours has been faced with numerous problems that remain to be solved. In response to these difficulties, new research leads have recently emerged. For instance, the study of motivational factors has been proposed as a means to gain insight with respect to the correlates of environmental behaviour (De Young, 1986; De Young, Duncan, Frank, Gill, Rothman, Shenot, Shotkin, & Zweizig, 1993). Of particular appeal is the study of self-determined motivation (Deci & Ryan, 1985; 1992). Self-determination proved to be a worthwhile predictor of behaviour occurrence in a variety of life domains, such as education (Deci, Vallerand, Pelletier, & Ryan, 1991) and sports (Pelletier, Fortier, Vallerand, Tuson, Brière, & Blais, 1996). The purpose of the current study is to investigate the association between self-determined motivation and subsequent behaviour in the environmental domain. Thus, self-determination theory will first be briefly discussed in order to provide the reader with the conceptual foundations of this motivational perspective. More specifically, the goal of the study is to demonstrate that self-determined motivation becomes a better predictor of environmental behaviours when the level of difficulty of the behaviour increases. The rationale underlying this hypothesis will follow the section depicting self-determination theory.

SELF-DETERMINATION THEORY

According to self-determination theory (Deci & Ryan, 1985; 1992), there are three broad types of motives characterized by the level of self-determination underlying the behaviour: Intrinsic motivation, extrinsic motivation, and amotivation.

Intrinsic Motivation

An intrinsically motivated behaviour is performed for the sole pleasure and satisfaction derived from its practice. An intrinsically motivated person acts out of personal choice and interest. The behaviour is an end in and of itself.

Extrinsic Motivation. A behaviour is extrinsically motivated when it is performed for instrumental reasons. Thus, the goal of an extrinsically motivated behaviour is to bring about positive outcomes or to avoid negative ones. Yet, extrinsically motivated behaviours differ with respect to their implied level of self-determination. Four types of extrinsic motives have been proposed: external, introjected, identified, and integrated regulation.

External regulation. External regulation refers to behaviours that are entirely controlled by external constraints, such as rewards or punishments. It represents the lowest level of self-deter-mination among extrinsic behaviours. By definition, external regulation is largely similar to the behavioural regulation processes described by behaviorism and operant conditioning. A behaviour motivated by *intro-jected regulation* is prompted by internalized forms of external constraints, such as feelings of guilt and anxiety, or feelings related to self-esteem. Introjected regulation represents an increase in self-determination over external regulation because the source of behaviour regulation is situated within the person. The regulation of a behaviour is said to be *identified* when the behaviour is freely undertaken because its outcomes are congruent with one's goals and values. Identified regulation represents an improvement in self-determination over introjected regulation because, instead of merely reacting to internal sources of pressure, the person deliberately chooses to engage in the behaviour. The increased perceived free-dom heightens the level of behavioural self-determination. *Integrated regulation* occurs when the behaviour is valued to such an extent that it becomes a part of the person's self-concept. Integration is the highest possible level of self-determination because the congruency between the behaviour and the person's self-concept maximizes the perception of free-choice. The behaviour remains instrumental, but the unpleasantness related to the behaviour becomes overshadowed by the heightened sense of volition and the personal endorsement of the behaviour.

Amotivation

Amotivation entails the inability to predict the consequences of a behaviour. This renders the behaviour meaningless. Thus, when it is performed at all, an amotivated behaviour is mechanical and dispirited. Amotivation implies a sense of lack of control, of helplessness. It is akin to learned helplessness (Abramson, Seligman, & Teasdale, 1978).

The Self-Determination Continuum

The motivational subtypes described above are hypothesized to coexist on a continuum. The position of the

motivational subtypes on this continuum is defined by their level of self-determination. Intrinsic motivation depicts the height in self-determination because it qualifies behaviours emitted out of pleasure and freedom. Amotivation represents the lowest possible level of self-determination since it implies the loss of personal control. The different subtypes of extrinsic motivation coexist between these poles. Integration sits right below intrinsic motivation, while external regulation sits just above amotivation. Finally, introjected and identified regulation occupy the middle points of the continuum: introjected regulation is posited above external regulation, and identified regulation below integrated regulation. Thus, all motivational types are said to represent different levels of a core dimension: Self-determination. Moreover, Deci and Ryan (1985) theorize that high levels of self-determination lead to positive consequences, such as the occurrence of desirable behaviours. In line with self-determination theory (Deci & Ryan, 1985), it is hypothesized that the frequency of environmental behaviours varies as a function of the level of self-determination of the behaviour. Specifically, higher self-determination is expected to predict more frequent behavioural occurrence.

PERCEIVED DIFFICULTY OF ENVIRONMENTAL BEHAVIOURS

Within the current study, perceived difficulty refers to the amount of effort required to perform the behaviour. That is, the extent to which one will accept to invest time, energy, and similar personal resources to successfully carry out the desired action. The inclusion of this factor followed a thoughtful consideration of behavioural characteristics liable to compound the influence of motivation. It appeared intuitively reasonable to take the level of difficulty of the behaviour into account, since it can facilitate behaviour performance or interfere with it. Easier environmental behaviours are likely to be performed more often. This contention is supported by the results of studies targeting recycling behaviours. The frequency of recycling behaviours has been shown to be highly affected by their convenience (see Oskamp, 1995, for a review). For instance, curbside recycling programs where all materials (glass, paper, cans, etc.) were collected mixed together in a unique recycling bin achieved much higher rates of participation than programs where the materials had to be separated into different containers.

In addition to its main effect on behavioural occurrence, we believe that the difficulty of environmental behaviours interacts with self-determined motivation. Difficult environmental behaviours are less likely to be performed than easy behaviours, regardless of self-determination levels. However, when self-determination is high, the decrease in behaviour occurrence is likely to be of lesser magnitude than when self-determination is low. Also, when the level of difficulty of the behaviour is low, the predictive power of self-determination is surmised to be hindered because the low level of difficulty creates a ceiling effect. If the environmental behaviour requires little effort, low motivation could be enough to ensure it's performance. In this situation, an individual with relatively low self-determination might be barely motivated enough to perform the behaviour. Alternatively, a very motivated person is likely to be willing to expend much more effort than what is required by the behaviour. If the behaviour is easy, whether an individual is barely motivated enough or over-motivated might make little difference. Thus, the difference in the frequency of environmental behaviours between individuals of different levels of motivation could be of smaller magnitude for easy behaviours. The magnitude of this relationship will presumably increase with behavioural difficulty because behavioural occurrence then becomes a better test of motivation. In sum, we hypothesize that the usefulness of self-determined motivation as a predictor of environmental behaviour will increase with the level of difficulty of the behaviour.

SUMMARY OF GOALS AND HYPOTHESES

The goal of the study is to evaluate the impact of the perceived level of difficulty of environmental behaviours on the magnitude of the relationship between environmental self-determination and the occurrence of environmental behaviours. It is hypothesized that the level of self-determination of environmental motivation will predict the occurrence of environmental behaviours significantly. Moreover, the magnitude of the relationship between self-determined motivation and environmental behaviours is expected to increase as a function of the level of perceived difficulty of environmental behaviours.

Method

PARTICIPANTS AND PROCEDURE

Data were collected from 492 university students. Participants were recruited in various faculties during day and evening classes. The goal was to maximize sample heterogeneity in the hope of improving its representativity of the general population. Forty-eight questionnaires containing missing data were excluded from the analyses. Thus, the final sample included 444 participants. The students' age ranged between 17 and 50 years old ($M = 20.9$). The sample comprised 113 men, 328 women, and 3 participants that failed to report their gender. Participants completed the questionnaires during class time. Instructions stated that the goal of the study was to better understand peoples' motives for performing ecological behaviours. Participants were informed that they were free to participate or not in the study, and that their decision in this respect would in no way affect their mark for the course. Participants were finally assured that their answers would remain confi-

dential, and would be used only for research purposes.

INSTRUMENTS

Motivation Towards the Environment Scale

(MTES; Pelletier, Tuson, Green-Demers, Noels, & Beaton, in press). The 24 items of the MTES represent possible responses to the following questions: "Why are you doing things for the environment?" The items are divided into six subscales (4 items/subscales) which represent the motivational subtypes defined by Deci & Ryan (1985): intrinsic motivation (IM; E.g., For the pleasure I experience while I am mastering new ways of helping the environment), integrated (INTEG; E.g., Because taking care of the environment is an integral part of my life), identified (IDEN; E.g., Because it is a sensible thing to do), introjected (INTRO; E.g., Because I would feel guilty if I didn't), and external regulation (ER; E.g., To avoid being criticized) , and amotivation (AMO; E.g., I don't know; I truly have the impression that I'm wasting my time). Participants are asked to indicate the extent to which each item corresponds to their own motives for performing environmental behaviours on a Likert scale ranging from 1 ("Does not correspond at all") to 7 ("Corresponds exactly"). The factorial structure of the MTES has been supported by exploratory and confirmatory factor analyses. Its construct validity was further substantiated by relationships between its subscales and relevant psychological and environmental constructs. The MTES demonstrated satis-factory internal consistency and test-retest reliability. In the current study, for parsimony purposes, global self-determination indices were computed. Weights were assigned to the items as a function of the position of their subscale on the self-determination continuum. The weighted scores were summed to form global self-deter-mination indices (e.g., SDI1 = (3(IM1) + 2(INTEG1) + (IDEN1) - (INTRO1) - 2(ER1) -3 (AMO1))/6; Blais, Sabourin, Boucher, & Vallerand, 1990). Since there is 4 items per subscale, it was possible to generate four such self-determination indices. The reliability of these indices was satisfactory (α = .92). The four self-determination indices were utilized to assess self-determined motivation in the structural equation modeling procedure (see the section below: "Overview of the Analyses"). However, less sophisticated analyses (e.g., correlations, ANOVA) required the computation of a single self-determination score. For the purposes of these analyses, the four self-determination indices were averaged to yield a global score.

Inventory of Ecological Behaviours (IEB)

(Adapted from De Young, 1986). This scale consists of 3 subscales (3 items/subscale) designed to assess different classes of environmental behaviours, namely recycling (e.g., recycle newspapers), purchasing environmentally-friendly pro-ducts (e.g., buy biodegradable products), and educating oneself as to what can be done for the environment (e.g., read books or magazines on the environment). The totality of the items comprising the IEB are reported in Table 2. Participants are asked to rate how often they perform each ecological behaviour on a Likert scale ran-ging from 1 ("Rarely") to 7 ("Very often"). Items are pre-sented in random order. The subscales displayed adequate internal consistency (Recycling: α = .87; Purchasing: α = .75; Education: α = .77).

Perceived Difficulty of Environmental Behaviour (PDEB). This instrument was derived from the IEB (see above). The purpose of the PDEB is to measure the level of per-ceived difficulty of the ecological behaviours composing the IEB. The sole difference between the PDEB and the IEB is the dimension which is assessed by the Likert scale. Thus, the items of the PDEB are identical to those of the IEB. However, the PDEB asks participants to rate the level of difficulty of each ecological behaviour, instead of its frequency (1 = Not very difficult; 7 = Very difficult). The PDEB subscales demonstrated adequate internal consistency (Recycling: α = .81; Purchasing: α = .76; Education: α = .74)

Results

OVERVIEW OF THE ANALYSES

The study proceeds in several steps. First, preliminary analyses are carried out to identify potential departures from basic assumptions. Second, the factorial structure of environmental behaviours is tested, and the level of difficulty of the behaviours forming the resulting clusters is compared. Third, correlations between motivational subtypes and frequency of environmental behaviours of different levels of difficulty are evaluated. Fourth, the joint impact of the level of difficulty and self-determination on environmental behaviours is assessed. Finally, the magnitude of the relationships between self-determined motivation and frequency of environmental behaviours of different levels of difficulty are estimated and compared using a structural equation modeling procedure.

PRELIMINARY ANALYSES

Descriptive statistics of all variables under study were first examined to identify potential deviations from univariate normality. These indices are presented in Table 1.

Values of kurtosis ranged between -1.63 and .82, and skewness values between -.84 and 1.14. The few kurtosis and skewness values superior to one were not considered a problem since mean kurtosis (M = .74) and mean skewness (M = .51) were inferior to |1| (Mùthen & Kaplan, 1985).

STRUCTURE AND DIFFICULTY OF ENVIRONMENTAL BEHAVIOURS

The items of the Inventory of Ecological Behaviours were

TABLE 1
Descriptive Statistics of the Indicators Included in the Model of Environmental Motivation and Behaviour

Items	Mean	Standard deviation	Kurtosis	Skewness
Self-determination	2.39	1.45	.50	-.56
SDI1	2.44	1.72	.25	-.58
SDI2	2.38	1.61	.21	-.37
SDI3	2.09	1.52	.22	-.53
SDI4	2.68	1.66	.44	-.67
Frequency of Environmental Behaviours				
Easy (2.13)[a]	4.81	2.08	-1.11	-.52
REC1 (2.10)	4.83	2.23	-1.20	-.57
REC2 (2.22)	4.44	2.45	-1.63	-.27
REC3 (1.96)	5.16	2.30	-.92	-.84
Average (2.57)	4.17	1.53	-.63	-.09
PUR1 (2.35)	4.58	1.74	-.78	-.24
PUR2 (2.75)	3.80	1.89	-1.02	.20
PUR3 (2.63)	4.12	2.00	-1.20	-.53
Difficult (3.57)	2.82	1.46	-.21	.67
EDUC1 (3.46)	2.82	1.80	-.38	.82
EDUC2 (3.70)	2.45	1.53	.82	1.14
EDUC3 (3.55)	3.21	1.93	-.93	.49

Note. The theoretical range of self-determination is -6 to +6, while the theoretical range of all other variables is 1 to 7.
[a]The mean perceived level of difficulty of environmental behaviours is presented between parentheses.

TABLE 2
Exploratory Factor Analysis of the Inventory of Ecological Behaviours

Items	Education (α = .77)	Recycling (α = .87)	Purchasing (α = .75)
Educating oneself			
Read books or magazines on the environment	.96		
Exchange environmental information with friends	.65		
Seek out information on environmentally-conscious behaviours	.51		
Recycling			
Recycle glass jars and bottles		-.88	
Recycle steel and aluminum cans		-.87	
Recycle newspapers		-.74	
Purchasing environmentally-friendly products			
Buy biodegradable products			.82
Refuse to buy products with excessive packaging			.65
Buy products that do not damage the environment (e.g., phosphate-free soap)			.59

first subjected to an exploratory factor analysis in order to assess their construct validity. Since the data appeared normally distributed, maximum likelihood extraction technique was utilized. Oblique rotation ("Oblimin") was preferred because the environmental behaviour groups were likely to be correlated. The results are presented in Table 2.

A clean 3 factor solution was obtained. There were 3 eigenvalues superior to one and the 9 items clustered in three groups representing the three types of environmental behaviours being assessed. Together, the three factors accounted for 72% of the variance observed in the data. All items loaded significantly on their target loading (L > .50) and no cross-loadings were observed. Moreover, the internal consistency of the factors was acceptable ($.75 < \alpha < .87$).

The perceived difficulty of the environmental behaviours was examined next. As one can see in Table 1, recycling behaviours (REC) displayed the lowest perceived levels of difficulty, the level of difficulty of purchasing behaviours (PUR) was somewhat higher, and education behaviours revealed (EDUC) the highest levels of perceived difficulty. An anova was performed to assess whether these observed differences were statistically meaningful. Post hoc comparisons (Tukey method) were performed on the basis of a significant omnibus test ($F_{(2,886)} = 163.85; p < .0001$). Results revealed that the mean levels of perceived difficulty of recycling (M = 2.13), purchasing (M = 2.57), and educating oneself (M = 3.57) were all significantly different from each other.

Having established that behaviours clustered in groups corresponding to the different types of environmental behaviours that vary according to their level of perceived difficulty, we now turn to the main goal of the study: The assessment of relationships between self-determined motivation and the frequency of environmental behaviours of different difficulty.

RELATIONSHIPS BETWEEN SELF-DETERMINATION AND ENVIRONMENTAL BEHAVIOURS OF DIFFERENT LEVELS OF PERCEIVED DIFFICULTY

Correlations between environmental behaviours and motivational subtypes are presented in Table 3.

Results indicate that self-determined motives (intrinsic motivation, integrated and identified regulation)

TABLE 3
Correlations Between Motivational Types and Occurrence of Ecological Behaviours

	Easy Behaviours (Recycling)	Average Behaviours (Purchasing)	Difficult Behaviours (Education)
Intrinsic Motivation	.30**	.39**	.47**
Integrated Regulation	.36**	.40**	.54**
Identified Regulation	.28**	.29**	.32**
Introjected Regulation	.14**	.21**	.32**
External Regulation	-.02	-.02	.03
Amotivation	-.23**	-.22**	-.26**
Self-determination	.38**	.43**	.52**

**p<.01

display the highest correlations with the frequency of environmental behaviours. The magnitude of the correlations gradually decreases and, eventually, grows negative as the motivational types become less self-determined. These results support the hypothesized influence of the self-determination continuum. Moreover, the magnitude of the correlations tends to increase with the level of difficulty of the behaviour. In general, correlations between the different motives and behavioural occurrence are higher for difficult behaviours than for behaviours of average difficulty. Behaviours of average diffi-culty, in turn, show higher correlations with the various motives than easy behaviours.

Second, an analysis of variance was performed to compare the relative impact of self-determination and behavioural difficulty on the frequency of environmental behaviours. A median split was performed on self-determination scores to create two global categories representing high and low self-determination. Results are presented in Table 4.

Significant main effects were found for self-determination ($F_{(1,442)} = 139.30, p < .001$) and for the level of difficulty of the behaviours ($F_{(2,884)} = 619.87, p < .001$). Post hoc comparisons were performed using Scheffe's method for unequal numbers of participants. Results revealed that self-determined participants performed environmental behaviours significantly more often than non self-determined participants, for all three levels of difficulty. Also, for self-determined and non self-determined participants, difficult behaviours were performed significantly less frequently than behaviours of average and easy levels of difficulty. Likewise, behaviours of average difficulty

TABLE 4
Mean Frequency of Environmental Behaviours for Self-Determined and Non Self-Determined Participants, and for Easy, Average, and Difficult Behaviours

	Frequency of Environmental Behaviours			
	Easy Behaviours (Recycling)	Average Behaviours (Purchasing)	Difficult Behaviours (Education)	Mean
Self-determination				
High	5.70^a	4.92^b	3.54^c	4.72
Low	4.96^b	3.79^c	2.26^d	3.67
Mean	5.30	4.31	2.85	

Note. Means with different superscripts are significantly different ($\alpha = .01$).

were performed less often than easy behaviours. Finally, there was a significant interaction ($F_{(2,884)} = 8.49, p < .001$) between self-determination and behavioural difficulty. While higher difficulty diminished behaviour occurrence for all participants, the decrease in environmental behaviour was significantly less important for self-determined individuals.

Third, structural equation modeling procedures were performed (EQS; Bentler, 1992). These analyses were designed to test for differences between the magnitude of the relationships between self-determination and the frequency of easy, average, and difficult behaviours. A first model was estimated in order to assess whether self-determination predicts the frequency of environmental behaviours of different levels of difficulty. This model comprised four latent constructs representing self-determination, easy environmental behaviours (recycling), average environmental behaviours (purchasing), and difficult environmental behaviours (education). Measurement specifications included the estimation of all target loadings and error uniquenesses. All cross-loadings and item error covariances were fixed to 0. The structural model was specified to estimate the regression coefficients of self-determination on the three constructs representing easy, average, and difficult ecological behaviour. Residual variances for these three constructs were also estimated. The results are presented in Figure 1.

Various statistical and practical fit indices were examined to assess model fit: The likelihood chi-square ratio, the Normed Fit Index (NFI; Bentler & Bonett, 1980), the Non-Normed Fit Index (NNFI; Bentler, 1990), the Comparative Fit Index (CFI; Bentler, 1990) and the Tucker Lewis Index (TLI; Tucker & Lewis, 1974). With the exception of the likelihood ratio ($\chi^2(62, n = 444) = 205.34, p < .001$), the fit indices revealed that the correspondence between the estimated model and the sample covariance was very satisfactory (NFI = .93; NNFI = .94; CFI = .95; TLI = .94). All estimated parameters were significant, and of acceptable magnitude. Self-determination displayed

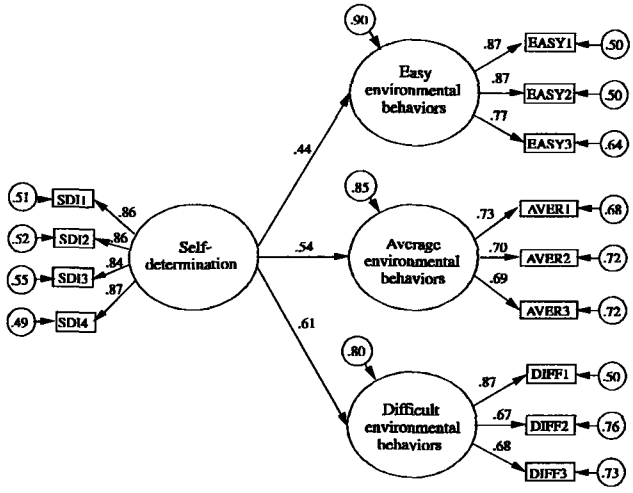

Figure 1. Relationships Between Self-Determined Motivation and Frequency of Environmental Behaviours of Easy, Average, and High Levels of Difficulty. All estimates are standardized and significant at the .01 level.

substantial relationships with the three constructs representing the occurrence of environmental behaviours. Moreover, as predicted, the magnitude of regression coefficients increased with the level of difficulty. Specifically, while self-determination predicted easy behaviours adequately (b_1 = .44), its association with average behaviours was higher (b_2 = .54), and its association with difficult behaviour greater still (b_3 = .61).

A second model was tested in order to assess whether the differences in magnitude between the regression coefficients of self-determination on ecological behaviours were significant. This model included the same specifications than the first model, save for one exception. The regression weights between self-determination and the three environmental behaviour constructs were estimated, yet constrained to be equal to each other. If the null hypothesis holds, that is, if there is no difference between the regression coefficients, the difference in the fit ($\Delta\chi^2$) of the first and the second model should be non-significant. However, the fit of the second model, was lesser than the fit of the first model ($\chi^2(64,n = 444)$ = 212.27, $p < .001$), and the difference between the fit of both models was indeed significant ($\Delta\chi^2(2,n = 444) = 6.93$, $p < .01$). Furthermore, the multivariate Lagrange Multiplier (LM) χ^2 (Bentler, 1992) of the two imposed constraints were both significant ($b_1 = b_2$: LM $\chi^2_{(1,n=444)} = 6.55$, $p < .01$; $b_2 = b_3$: LM $\chi^2_{(1,n=444)} = 7.33$, $p < .03$). Thus, both constraints hinder significantly the fit of the model. These findings suggest that self-determination predicts average behaviours significantly better than easy ones, and difficult behaviours significantly better than average behaviours.

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Discussion

Self-determination theory conjectures that autonomous motives are related to positive consequences. The goal of the current study was to ascertain the relationship between self-determined motivation and a specific consequence: the occurrence of ecological behaviours. Furthermore, it was hypothesized that the strength of the relationship between self-determination and environmental behaviours would increase with the level of difficulty of environmental behaviours. The results of the current study support these hypotheses.

The environmental behaviours clustered in three factors representing three types of ecological actions: Recycling, purchasing environmentally-friendly products, and educating oneself with respect to environmentally-conscious actions. Moreover, it was established

that these three groups of environmental behaviours differed significantly from one another in their perceived level of difficulty. These preliminary, yet necessary, findings laid the foundation for the investigation of the relationship between self-determination and the frequency of easy, average, and difficult environmental behaviour. Firstly, correlations between motivational subtypes and frequency of environmental behaviours generally increased in magnitude as the ecological behaviours increased in difficulty. Secondly, the mean frequency of environmental behaviours was affected by the level of self-determination, by the level of difficulty of the behaviour and by the combination of these factors. Behaviour frequency is higher when self-determination is higher and lower when behavioural difficulty is higher. Yet, the decrease in behaviour occurrence caused by the behaviours' difficulty is less important when people are more self-determined. Thirdly, the relationships between self-determination and easy, average, and difficult environmental behaviours were concurrently estimated using a structural equation modeling procedure. This procedure was successful. A satisfactory model was obtained and the magnitude of the relationships between self-determination and the frequency of environmental behaviours was significantly higher for average behaviours than easy behaviours, and significantly higher still for difficult behaviours. Thus, the current results seem to indicate that self-determination's usefulness as a predictor of environmental behaviours increases with the level of difficulty of the behaviour.

The determinants of environmental behaviours have been studied from various perspectives, such as environmental knowledge and attitudes, and behavioural strategies. Yet, these research efforts appear to have met with limited success. Environmental knowledge does not seem sufficient to ensure environmental action (e.g., Maloney & Wards, 1973). Also, support for the alleged relationship between environmental attitudes and behaviours is mixed (see Baldassare & Katz, 1992, for a literature review) and it is unlikely that this controversy will soon be resolved. Thus, the usefulness of environmental knowledge and attitudes as predictors of environmental behaviours is currently unclear, and it might take some time before the inferences drawn from these research areas can be converted into efficient guidelines for applied intervention. Behavioural interventions, such as reinforcement, modeling, and feedback received substantial empirical support (see Geller, 1989, for a literature review). Unfortunately, in the long run, behavioural strategies fail to provoke enduring changes in peoples' environmental behaviours (Katzev & Johnson, 1984). The contingencies have to be continuously maintained for the behaviour to persist. As a result, behavioural programs are not cost-effective (Pardini & Katzev, 1987).

The current study offers new directions for environmental research and potential applied intervention programs. Specifically, the current findings suggest that environmental behaviours could be encouraged by facilitating ecological behaviours and/or fostering environmental self-determination in people. Let's first consider the former. It is indeed possible to decrease the difficulty of environmental behaviours. For instance, recycling programs that provide people with convenient bins and pick up services make recycling easier than programs that simply offer collection sites. It is more probable that people will recycle when all that needs to be done is to throw the items in the blue box and put the box on the street, than when it is necessary to pack the items and deliver them to a site away from home. Thus, programs that facilitate environmental behaviours are likely to increase their occurrence. However, such programs are costly to implement and manage. Moreover, there is no guarantee that the behaviour will be maintained if the program is discontinued, or if the person is in a setting where the program is unavailable (e.g., on holidays or away from home).

On the other hand, behaviours performed out of self-determined environmental motives could presumably be maintained once they have been developed. We believe that encouraging the development of environmental self-determination could be advantageous. Higher self-determination is related to more frequent performance of environmental behaviours. Moreover, it seems to serve as a buffer insofar as it diminishes the negative impact of the perceived difficulty of the behaviour. This finding is congruent with self-determination theory's assumption that the aversiveness of the instrumental behaviour decreases as the behaviour becomes more integrated into the person's self-system. In addition, self-determined motives have been associated with stronger behavioural persistence in sports (Green-Demers, Legault, & Pelletier, 1992) and education (Vallerand & Bissonnette, 1992). Although the current study limited its scope to the frequency of environmental behaviours, further studies could investigate behavioural persistence in the environmental domain. However, it is difficult, at the present moment, to speculate on how expensive it would be to help people develop environmental self-determination. It is first necessary to identify ways to encourage it. The factors that foster the development of self-determined motives have been the focus of extensive studies in a variety of settings (see Deci & Ryan, 1987, 1991, for literature reviews). For instance, autonomy can be increased by involving people and providing them with a structure where their own initiatives and opinions are solicited and taken into account. Conversely, autonomy is decreased when contingencies and constraints are emphasized. Constructive feedback that promotes competence is another factor that can increase self-determination. Feedback that promotes feelings of incompetence has been shown to diminish self-determi-

nation. Alike the potential impact of environmental self-determination on behavioural persistence, the influence of the aforementioned factors on environmental self-determination remains to be assessed. The results of future studies on these issues could serve as a basis for environmental program design and evaluation. It is our hope that environmental self-determination will display long term effects on environmental behaviours that will make the programs designed to foster its development cost-effective.

We believe that the investigation of self-determined motivation holds much promise for the environmental research field. However, it remains important to acknowledge the exploratory status of the current findings. A first weakness relates to the self-report measures of environmental behaviours and perceived difficulty. The IEB and PDEB are liable to the common problems associated with self-reports (e.g., social desirability). Also, the list of behaviours included in these instruments is far from exhaustive. Future research could attempt to expand the range of environmental behaviours under study. Moreover, the inclusion of behavioural measures (e.g., electricity use, quantity of recycled materials) could provide a more objective test for the current hypotheses. Finally, the correlational design of the current study makes it impossible to ascertain the causal order between the variables. It would be interesting to test the validity of the current hypotheses using various methodological strategies. For instance, a quasi-experimental study could be performed using the availability of recycling facilities in different municipalities to control for the difficulty of the behaviour. Recycling is easier when a collection program is available than when people have to drop the items to recycle to a particular site, or when recycling facilities are altogether unavailable. People from municipalities of similar socioeconomic profiles providing different recycling facilities could be surveyed and their motivation and environmental behaviours could be assessed and compared.

In sum, the current study proposes that self-determination can be used to predict environmental behaviours. Provided that the validity of this finding holds, research devoted to the promotion of environmental behaviours could turn towards the study of self-determination antecedents. Much more work is needed before the merit of this approach can be judged. However, motivation is a proximal antecedent of behaviour and it has been related to positive consequences in a variety of life domains such as education (Deci, Vallerand, Pelletier, & Ryan, 1991; Vallerand et Bissonnette, 1992), interpersonal relationships (Blais, Sabourin, Boucher, & Vallerand, 1990); leisure (Pelletier, Vallerand, Green-Demers, Blais, & Brière, 1995) and sports (Green-Demers et al., 1993; Pelletier et al., 1996). It is our hope that similar fruitful results will one day be achieved in the environmental domain.

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