Happiness as Correlate of Sustainable Behavior: A Study of Pro-Ecological, Frugal, Equitable and Altruistic Actions That Promote Subjective Wellbeing

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Abstract

Sustainable behavior (SB) generally encompasses a series of actions intended at protecting both the physical and the social environments. SB may be indicated by pro-ecological, frugal, altruistic, and equitable conducts and one of the aims of environmental psychology is to investigate the psychological consequences of such actions. Previous studies had reported that the practice of pro-ecological and altruistic behaviors might result in enhanced levels of happiness; people living in more equitable countries seem to be happier, while a frugal consumption often conduces to a state of satisfaction and intrinsic motivation. Yet, so far no study considering the relationship between an aggregate of the four abovementioned instances of SB, on the one hand, and subjective wellbeing, on the other hand, had been conducted. Six-hundred-and-six undergraduate students at a Mexican university responded to an instrument assessing pro-ecological, altruistic, frugal and equitable behaviors, as well as their report of happiness. By using structural equations we modeled a higher-order-construct of "sustainable behavior", indicated by the interrelations of their four first-order (pro-ecological, altruistic, frugal and equitable) factors. The higher-order-factor coherently emerged from such interrelation. In turn, sustainable behavior significantly influenced a "happiness" factor, also specified within the structural model. Implications for the study and promotion of sustainable behaviors are discussed within the framework of a positive psychology of sustainability.

Keywords: *Happiness, pro-ecological behavior, altruism, frugality, equity.*

Introduction

The deterioration of the biosphere in its three levels (atmosphere, soil, water) represents one of the most serious threats that humankind faces nowadays. Human behavior plays a paramount role in the emergence and sustenance of environmental problems; that is why a fundamental shift in people's behavior is required (Oskamp, 2000). Consumerism, waste and depredation of resources, contamination, egoistic and inequitable behaviors, etc. should be replaced by *sustainable behavior*, the set of deliberate and effective actions that result in the conservation of the *socio-physical* environment for present and future generations (Bonnes & Bonaiuto, 2002).

What are the behavioral aspects included in a sustainable lifestyle? In other words, what are the behaviors that identify a sustainably-oriented person? By considering the previously provided definition, sustainable behavior should include actions resulting in the conservation of the physical environ-

ment, and also behaviors aimed at protecting other individuals and groups, especially the most vulnerable. In engaging in those actions, sustainable individuals generate conditions that allow an equitable access to the use of natural resources (Ehrlich & Ehrlich, 2004); their consumption of those resources is moderate (De Young, 1996; Iwata, 2002), so that everybody might have access to them; also sustainably-oriented people are cooperative and assist others in need (Pol, 2002), which means that they are altruistically motivated (Schultz, 2001); in addition, these individuals constantly practice actions that result in the conservation of natural resources (Kaiser, 1998). All of this means that a sustainably-oriented person is aimed at conserving natural resources while also caring for his or her fellow human beings.

Accordingly, a series of studies and proposals indicate that sustainable actions encompass pro-ecological, frugal, altruistic and equitable behaviors (De Young, 1991; Iwata, 2001; Kaiser, 1998; Schultz, 2001; Winter, 2002). Pro-ecological behaviors include actions to conserve natural resources such as water, soil, air, energy, plants, animals and ecosystems, and are manifested in the form of reuse, recycling, composting, water and energy conservation, etc. (Kaiser, 1998; Thøgersen, 2005) and also as pro-environmental lobbying, reading and discussing about environmental problems, pro-ecological design/construction, and family planning (Bandura, 2002; Kellert, Heerwagen & Mador, 2008; Hsu, 2004; Suárez, 2000), among many others. Frugal behaviors are implied in a voluntary lifestyle of reduced consumption, avoiding unnecessary buying, expending and wasting of resources (De Young, 1991); these behaviors are clearly related to pro-ecological actions and result in the conservation of natural resources. In turn, altruistic behaviors along with equitable actions are aimed at looking for the wellbeing of others; subsequently, these actions impact the social environment. Altruism can be defined as actions intended at maximizing others' benefits (Van Lange, 2000), while equitable behaviors mean treating others fairly and without biases regardless of their demographic, biological, or personal characteristics. Equity also implies a fair distribution of resources among people regardless of their race, national origin, gender and age (Corral-Verdugo, García, Castro, Viramontes, & Limones, 2010). Although these four types of sustainable actions are clearly different from each other, previous studies have demonstrated that they are significantly interrelated, thus seemingly indicating the presence of a higher-order factor, (i.e., sustainable behavior) subsuming them (Corral-Verdugo et al, 2010; Schultz, 2001; De Young, 1996). Investigating sustainable behavior as an aggregate of pro-ecological, frugal, altruistic and equitable actions is congruent with the definition of such behavior, which conceives it as a set of actions and predispositions that result in the conservation of the socio-physical environment (Bonnes and Bonaiuto, 2002). This means that, by definition, a sustainably-oriented person is not pro-ecological *or* pro-social, but pro-ecological *and* pro-social (simultaneously).

Antecedents and consequences of sustainable behavior

Environmental psychologists have also found that factors such as environmental knowledge, pro-ecological attitudes, conservationist motives, personal norms, ecological beliefs and values, affinity towards diversity, among others, are antecedents and predictive of sustainable behaviors (see Bamberg & Möser, 2007; Corral-Verdugo, Bonnes, Carrus, Frias, Tapia & Fraijo, 2009). Most of these predispositions towards sustainability are learned culturally, which emphasizes the significant weight that socialization has on the development of sustainably-oriented citizens. By studying these antecedents, valuable information is obtained regarding the psychological drivers that predispose individuals to be more pro-sustainably oriented.

Yet, environmental conservation is not only associated to its antecedent factors but also to its *consequences*. Studying those consequences is important because human behavior is not only determined by its antecedents but also by its repercussions (Bechtel & Corral-Verdugo, 2010). In fact, most people often behave the way they do because they obtain positive reinforcement; in addition, they act to avoid unpleasant consequences, and this also applies to sustainable behaviors (Lehman & Geller, 2004). The more positive these repercussions are, the more the individuals are expected to behave sustainably.

These positive consequences may be of an *extrinsic* or an *intrinsic* nature. An extrinsic consequence of a behavior is provided by a source external to the individual who engaged in such a behavior. For instance, one may gain social recognition or save money (or both) from behaving pro-environmentally but, in either case, someone or something besides the individual should be providing the consequences (i.e., social reinforcement, rebates or money). Although such consequences are powerful instigators of sustainable behavior (Geller, 2002), their use as strategies to encourage sustainable actions has proven problematic: One problem is the very fact that the individual depends on external sources to receive the benefit (if no source is available, the consequence does not appear); another is that extinction of the (sustainable) behavior occurs after the removal of the extrinsic consequence. Of course, there are also problems associated with the cost of dispensing this extrinsic consequence (see Lehman and Geller [2004] for a more detailed discussion).

Moreover, Crompton and Kasser (2009) add an additional problem associated to extrinsic consequences. Extrinsic materialistic goals are rather associated with ecologically

degrading attitudes and behaviors; materialistic people are less pro-environmentally oriented and, at least in resource-dilemma games, report being more motivated by greed and use up more of the limited resources. Thus, although the extrinsic positive repercussions of sustainable behavior will surely continue in use, due to their proved benefits, the consideration of their limitations should oblige to pay attention to the alternative intrinsic reinforcement of sustainable behaviors.

Intrinsic consequences — the natural and automatic results of behavioral respondses (Horcones, 1983) — are not only cheaper, and lead to more pro-environmentally oriented behaviors, but are also effective, and do not depend on external sources, since they result from just engaging in the associated behavior (Kasser, 2009), as we will see. Before that, we will comment on what the experts in sustainability assume to be the positive benefits of being pro-environmentally oriented.

According to these experts, the sustainability achieved by a society results in a series of physical, social, institutional and economic positive consequences. Most of them agree that a sustainable community presents satisfactory levels in the *physical-environmental* (access to fresh water, refuse management, greenhouse gases control, etc.), *social* (justice, living conditions, low corruption levels, access to education), *political/institutional* (infrastructure, science participation, low corruption levels, etc.), and *economic* (economic activity ratio, income distribution, employment, among others) areas (Gouveia, 2002; Flavin, 2002; Gardner, 2002). Therefore, a sustainable society provides its citizens with the conditions to satisfy their needs, is equitable in the distribution of its natural and social resources, promotes progress in the acquisition of knowledge, and maintains the integrity of all its natural resources.

Happiness as a consequence of sustainable behavior

Furthermore, in recent times, additional indicators and positive consequences of sustainability have been proposed. Those, which are of a psychological nature, are not as tangible as the abovementioned (environmental, political, social, and economic) ones; however they are fundamentally important for all individuals: Satisfaction, personal wellbeing, intrinsic motivation, and psychological restoration are among them (Kasser, 2009; Iwata, 2001; Hartig, Kaiser & Bowler, 2001). A state of satisfaction, for instance, is repeatedly reported as resulting from being pro-ecological and frugal (De Youong, 1991; Iwata, 2000); personal wellbeing — the development of personal capacities and growth — is enhanced in altruistic and pro-ecological individuals (Corral-Verdugo, Montiel, Sotomayor, Frías, Tapia, & Fraijo, in press); intrinsic motivation occurs as a consequence of being pro-environmental (De Young, 1996); and there are indications that being pro-ecological promotes,at least indirectly, a state of psychological restoration (i.e., the recovery of exhausted psychological states produced by stress) (Hartig et al., 2001).

One more positive consequence of paramount importance is *happiness* or *subjective wellbeing* (Talbert, 2008). According to experts, a society that practices sustainable behaviors should be a happy society or, at least, should be one on its way to achieve such a psychological state (Gardner & Prugh, 2008; Talbert, 2008). Therefore, happiness is a separate positive consequence of sustainability that should be considered when analyzing the repercussions of people's pro-environmental behavior (Gardner & Prugh, 2008), and this psychological state can be considered an "autonomous" or intrinsic consequence of being sustainable (Crompton & Kasser, 2009; Kasser, 2009). At the official level this has begun to be considered: For instance, the *Happy Planet Index* (HPI), administered country by country, assesses the ecological efficiency with which people achieve long and happy lives. The HPI is computed by multiplying an index of life satisfaction and the life expectancy average, then dividing the obtained product by the ecological footprint (Marks, 2006). Marks also presents evidence showing that the HPI (and, therefore, a happy life) is higher in countries that are more sustainable in terms of their consumption of natural resources.

In addition, some European countries, and also Australia have established achieving the subjective wellbeing of their inhabitants as a national and sustainable policy goal and, in a more decisive way, the Kingdom of Bhutan has declared that its official goal is no longer economic growth, assessed as "Gross National Product," but "Gross National Happiness" (Gardner & Prugh, 2008). By doing so, they intend to increase their educational levels and fight extreme poverty, preserving simultaneously the physical environment and the cultural traditions of the country. This is the first time in history that happiness, as a positive consequence of acting, is assumed as a governmental goal explicitly linked to sustainability.

Yet, at the individually psychological level, psycho-environmental researchers have traditionally focused on studying the *negative* consequences of environmentally relevant behavior. Of course, this is not exclusive to environmental psychology since, as Seligman and Csikszentmihalyi (2000) acknowledge, psychology in general has been traditionally more interested in the negative aspects of human behavior and experience such as behavioral or mental alterations, suffering, and incapability. In the case of environmental psychology, for example, studies have been conducted to assess guilt or shame due to insufficient environmental protection (Kaiser, Schultz, Berenguer, Corral-Verdugo, & Tankha, 2008; Kals, 1996) or negative emotions such as indignation and anger generated from observing ecologically destructive

acts (Montada & Kals, 1995). Furthermore, in some cases researchers aim to induce cognitive dissonance by making people feel bad (or feeling conscious of hypocrisy) due to their anti-environmental acting (Dickerson, Thibodeau, Aronson & Miller, 1992).

Authors such as Lindenberg and Steg (2007) suggest that hedonic goals (i.e., searching for pleasure) often oppose pro-environmental behavior. According to them, people who aim to feel good should not maintain environmental conservation among their goals, since these imply personal sacrifice, a decreased consumption, and other factors that, supposedly, are opposed to wellbeing. Based on this perspective, it seems that inconvenience and negative effects are linked to sustainable actions (and its opposed behaviors, as well), more than positive consequences. However, there is theory and evidence indicating that this is not necessarily the case.

In fact, psychological theories provide clues for an explanation of the positive psychological consequences of sustainability. Evolutionary psychology, for instance, establishes that humans gain happiness because their brains evolved to experience positive emotional experiences (Haviland-Jones, Rosario, Wilson, & McGuire, 2005) and these are associated with pursuing one's and other's benefits. Happiness might result from either behavioral strategy: egoistic or altruistic, and altruism, as noted, is an indicator of sustainability (Schultz, 2001). Egoism allows an immediate access to resources for oneself, which allows for an also immediate reward and pleasure, yet it has its long-term inconveniences since sometimes these resources are not shared by the individual, resulting in negative consequences for others. These others will respond negatively and the egoistic person will become isolated (and sometimes hated). Furthermore, those affected by the externalities will often respond imitating the negative-egoistic actions, leading to a "tragedy of the commons" (Hardin, 1968; Vlek & Steg, 2007). In the end, nobody benefits, nor are they happy. Altruism, the alternative strategy to egoism, allows for compassionate behavior, which, according to evolutionary psychologists, offers more "Darwinian Happiness" (i.e., avoidance of stress and use of reward mechanisms offered by the brain) than egoistic behavior (Grinde, 2005). Since altruism is a behavioral disposition towards sustainability, being altruistic offers a double benefit: it allows the emergence of pro-environmental behaviors and promotes happiness. Grinde also points to the fact that the likelihood of obtaining sustainable development may be improved by considering that consumption beyond sustenance is not important for wellbeing.

Behaviorism, one more psychological standpoint, also provides clues for understanding the relationship between happiness and sustainability. According to behaviorists, people's actions depend on the consequences of their conduct. This is fundamental, since the consequences of behavior make further engagement in (environmental) action more likely. For example, resource conservation results in their future availability, so that the individual and his/her fellows might continuously use and enjoy its benefits. The consideration of such a positive consequence might lead to further conservation behaviors. That is, *positive consequences* such as extrinsic benefits reinforce and maintain pro-environmental actions (Geller, 2002). Additional gains, experienced in the form of psychological positive states, such as happiness, and other intrinsic consequences could result from practicing sustainable actions and this is an important research area to consider within the field of environmental psychology (Bechtel & Corral-Verdugo, 2010; Brown & Kasser, 2005).

The literature shows evidence of a relationship between sustainable behaviors and happiness. Some studies have found, for instance, that equitable individuals experience higher levels of subjective wellbeing (Amato, Booth, Johnson, & Rogers 2007; Chibucos, Leites, & Weiss, 2005), though, coincidently, suffer more when they realize that inequity affects their fellow citizens (Napier & Jost, 2008). Altruistic individuals tend to be happier than the egoistic ones: altruism makes people feel good in the long-term (Schroeder, Penner, Dovidio, & Piliavin, 1995) and leads them to experience happiness in their close relationships with significant others (Buunk & Schaufeli, 1999). Frugality, as a sustainable lifestyle, predicts a state of satisfaction that leads not only to psychological wellbeing (Brown and Kasser, 2005) but also to satisfaction and intrinsic motivation allowing the maintenance of a lighter consumption (De Young, 1996; Iwata, 2001). Something similar occurs with those behaviors aimed at the conservation of the physical environment: People who frequently practice pro-ecological behaviors perceive themselves as being happier than those who do not engage in such a practice (Brown & Kasser, 2005; Bechtel & Corral-Verdugo, 2010; Turcotte, 2006).

Aim of the study

All these studies have been conducted by investigating *specific* instances of sustainable behavior (i.e., altruism *or* equity *or* frugality *or* pro-ecological behavior) and no research has been carried out to investigate the whole set of sustainable behaviors in their relationships with happiness. Consequently, the purpose of the present study was to investigate whether happiness is a correlate of sustainable behavior, framing such behavior within the aims of positive psychology since this approach is aimed at developing psychological traits and behaviors benefiting individuals and their communities (Seligman & Csikszentmihalyi, 2000). The central hypothesis of this study predicted that sustainable behavior, indicated by pro-ecological, frugal, altruistic *and* equi-

table actions, is more frequently practiced by people obtaining psychological benefits in the form of subjective wellbeing.

A particularly interesting aspect of this research project is that it was conducted in Mexico, where few studies on environmentalism are conducted. As most developing nations, Mexico experiences serious environmental problems, both at the physical (air, water, and soil pollution; depredation of ecosystems; threats to biodiversity, etc.) and social (interpersonal and community violence, poverty, inequity, loss of cultural diversity, etc.) levels, and little is known regarding the determinants of the sustainable behaviors that might help in counteracting the negative effects of those environmental problems.

Method

Participants

Six-hundred-and-six undergraduate students at a public university in Ciudad Obregón, a middle-sized northwestern Mexican city (population = 400,000), were the participants in this study. They were 366 females and 240 males; their age ranged from 18 to 44 years (mean = 21.61; SD = 7.22); their average family monthly income was = $1,690.00 USD (SD = 2,046.00) and their schooling level was 14.0 years (SD = 4.5).

Instruments

The study used a scale assessing *altruistic actions*, self-reporting 12 behaviors aimed at assisting or helping others, such as visiting sick people at hospitals, economically helping the poor, supporting the Red Cross, etc. Corral-Verdugo et al (2010) reported the use of this scale, providing indications of validity and reliability; the scale uses a 4-point response-option format (0=never...3=always engage in such an action). Another scale measured *pro-ecological behavior*, considering 14 items from Kaiser's (1998) General Ecological Behavior Scale; this instrument includes the report of actions such as reuse, recycling, energy conservation, etc., which are assessed in a 0 (never) to 3 (always) scale. *Frugality* was assessed in actions such as buying the strictly necessary, the reuse of clothing, taking meals at home, etc., which were reported using a 5-point Likert-options of response (0 = totally agree...4=totally disagree); this instrument was designed by Corral-Verdugo and Pinheiro (2004). *Equity*, was measured with a scale developed by Corral-Verdugo et al (2010), which included ten items indicating behaviors and descriptions of situations such as providing equal educational opportunities for girls and boys, and treating the rich and the poor as equals, etc., using response options from 0 (totally disagree) to 4 (totally agree). Finally, three items from Lyubomirsky and Lepper's (1999) Happiness scale were administered. This is a measure of global subjective happiness developed and validated in USA, using a 7-point (1 = not very happy... 7 = very happy) Likert format of responses to items such as "In general I consider myself happy" and "Compared to most of my peers, I consider myself happy." The authors of all these scales reported evidence of reliability and validity for their measures. These instruments have also been administered and validated in the studied Mexican population. In addition, demographic variables of participants' age, economic income and schooling level were investigated.

Procedure

The instruments were administered at the participants' classrooms. Participants were debriefed by telling them the aims of the study and their informed consent to participate was obtained. None refused to collaborate with the study. The administration of the scales took about twenty minutes.

Data analysis

Results were analyzed by using univariate statistics (means, standard deviations and frequencies). The internal consistency of the scales was also analyzed calculating their Cronbach's alphas.

Interrelations among latent variables were estimated within a structural equation model, using three parcels by studied construct (and the three items in the case of the Happiness scale). Five first-order factors were constructed: 1) pro-ecological behavior, 2) altruistic behavior, 3) frugality, 4) equity, which were the indicators of a second order-factor of "sustainable behavior;" and 5) happiness. The specified model assumed that the second-order factor would significantly influence happiness.

An alternative model, specifying the four first-order factors, without the second-order factor of sustainable behavior, was tested, which also included the happiness factor. This was a confirmatory factor analysis (CFA) producing a *phi* matrix (Bentler, 2006) of interrelations among the five analyzed factors.

Results

Table 1 shows the univariate statistics of the used scales, as well as their internal consistency. Since the range of responses to the scales of pro-ecological behavior and altruism was from 0 to 3, and the range of responses to the frugality and equity scales varied from 0 to 4, it can be concluded that moderate levels of altruistic (mean = 1.86), pro-ecological (mean = 1.62), and frugal (mean = 2.44) behaviors were reported by the participants, while their report of equity was

Table 1. Univariate statistics and reliabilities of the used scales

SCALES/items	*N*	*Mean*	*(Sd)*	*Min*	*Max*	*Alpha*
PRO-ECOLOGICAL BEHAVIOR	604	1.62	(0.95)	0	3	.70
Waits until having a full load before doing laundry	604	2.11	(0.99)	0	3	
Collects and recycles used paper	604	1.39	(1.02)	0	3	
Brings empty bottles to a recycling bin	604	1.01	(0.97)	0	3	
Has pointed out unecological behavior to someone	604	1.71	(0.95)	0	3	
Buys products in refillable packages	604	1.59	(0.85)	0	3	
Buys seasonal produce	604	2.34	(0.77)	0	3	
Reads about environmental issues	604	1.28	(0.95)	0	3	
Talks with friends about environmental problems	604	1.27	(0.89)	0	3	
Turns down the air conditioning when leaving place	604	2.46	(0.87)	0	3	
Looks for ways to reuse things	604	1.90	(0.90)	0	3	
Encourages friends and family to recycle	604	1.26	(0.95)	0	3	
Conserves gasoline by walking or bicycling	604	1.63	(1.00)	0	3	
Buys convenience foods	604	1.48	(0.78)	0	3	
Uses a clothes dryer	604	1.28	(1.44)	0	3	
ALTRUISM	604	1.86	(0.83)	0	3	.77
Assists a person in need	604	2.50	(0.69)	0	3	
Contributes financially with the Red Cross	604	2.00	(0.81)	0	3	
Assists senior citizens	604	1.89	(0.95)	0	3	
Gives money to the homeless	604	1.99	(0.81)	0	3	
Participates in fund-collection rallies	604	1.18	(0.99)	0	3	
Cooperates with colleagues	604	2.36	(0.72)	0	3	
Gives clothes to the poor	604	2.33	(0.76)	0	3	
Assists people who fall or get hurt	604	2.50	(0.69)	0	3	
Visits the sick at hospitals	604	1.01	(0.86)	0	3	
Helps a senior citizen crossing the street	604	1.89	(0.95)	0	3	
Guides persons asking for direction	604	2.39	(0.91)	0	3	
Donates blood in response to campaigns	604	0.60	(0.87)	0	3	
FRUGALITY	604	2.44	(1.33)	0	4	.63
Does not buy a new car if old functions.	604	2.71	(1.32)	0	4	
Wears same clothing.	604	2.51	(1.32)	0	4	
Wouldn't buy jewelry.	604	2.93	(1.29)	0	4	
Buys lots of shoes.	604	2.15	(1.41)	0	4	
Buys more food than needed.	604	2.31	(1.40)	0	4	
Uses most earnings for buying clothing.	604	2.16	(1.34)	0	4	
Always takes meals at home.	604	2.43	(1.20)	0	4	
Rather walks than drives.	604	2.75	(1.45)	0	4	
Reuse notebooks and paper.	604	2.52	(1.46)	0	4	
Likes living lightly.	604	1.93	(1.18)	0	4	
EQUITY	604	3.25	(1.24)	0	4	.70
Wives should have the same rights husbands have at home.	604	3.66	(0.84)	0	4	
At work, the boss should treat his/her subordinate fellows like his/her equals.	604	3.02	(1.12)	0	4	
Children in my home have the same rights as adults in making important decisions.	604	2.20	(1.27)	0	4	
Even people who don't work should have guaranteed their access to health services	604	3.48	(0.91)	0	4	
In my family, men and women have the same cleanup chores.	604	3.44	(0.97)	0	4	
Native Americans are equally capable to be in charge of a business as White people	604	3.56	(0.84)	0	4	
I treat rich and poor people equally.	604	2.89	(1.17)	0	4	
Poor people should live in the same city zone where the rich live	604	2.74	(1.18)	0	4	
At school, a student is as important as a professor	604	3.66	(1.79)	0	4	
In my family, girls and boys have the same educational opportunities.	604	3.84	(0.60)	0	4	
Natural resources should be equitably distributed among people	604	3.27	(1.09)	0	4	
HAPPINESS	606	5.76	(1.10)	1	7	.81
In general, I consider myself happy	606	5.83	(1.05)	1	7	
Compared to most of my peers, I consider myself happy	606	5.87	(1.07)	1	7	
I enjoy life, regardless of what's going on	606	5.59	(1.20)	1	7	

higher (mean = 3.25). The level of happiness was markedly high (mean = 5.76, considering a response range of 0 to 7). Assisting a person in need, and assisting people who fall or get hurt were the most reported altruistic actions by the respondents, while the most frequently self-reported pro-ecological behaviors included turning down the air conditioning when leaving a room, and buying seasonal produce. Not buying a car if the old one still functions and not buying jewelry were the most acknowledged facets of their practicing frugality, while providing girls and boys with the same educational opportunities and considering a student as important as a teacher were the equity items with the highest values. Values of responses to the three happiness items did not differ from each other.

The Cronbach's alphas of the scales ranged from .63, the minimum, to .81, the maximum, indicating an adequate level of internal consistency.

Figure 1 represents the results of the structural model specified to assess the relations between sustainable behavior and happiness. Since the factor loadings connecting the first-order factors (i.e., proecological behavior, altruistic behavior, frugality, equity) with their corresponding indicators were high and significant (p<.05) we concluded that their assessment revealed convergent construct validity. Also, these four factors saliently and significantly converged on the second-order construct of sustainable behavior, as predicted. This is revealed by the value and statistical significance (p<.05) of their factor loadings. The structural coefficient connecting sustainable behavior to happiness (.31) was salient and significant as we also expected. The goodness of fit indicators of the model are exhibited in the bottom of figure 1. They seem to indicate that the data support the hypothesized model of relations.

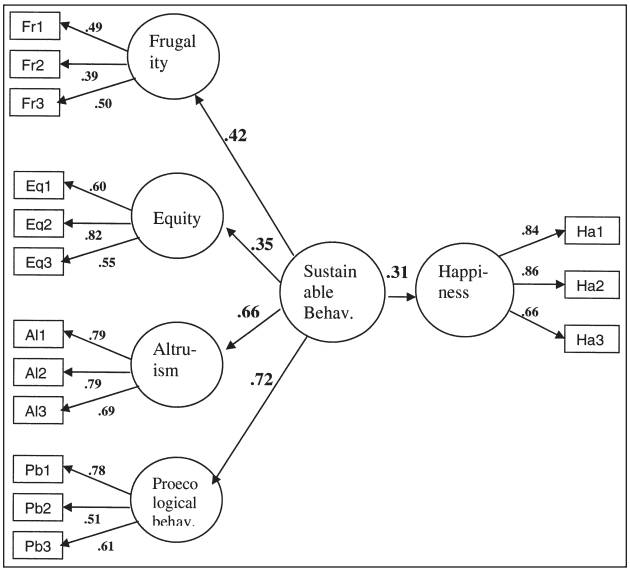

Figure 1. The model of relations between sustainable behaviors and happiness. Goodness of fit: X^2=144.36 (85 *df*), p <.001; *NNFI*=.97; *CFI*=.97, *RMSEA*=.03. R^2 Pro-ecological behavior = .52; R^2 Altruistic behavior = .44; R^2 Equity = .12; R^2 Frugality = .17; R^2 Happiness = .10.

Table 2. Phi matrix of covariances between happiness and sustainable behaviors. Results from a confirmatory factor analysis (Method = ML; Goodness of fit: X^2=132.12 [80 df], p <.001; *NNFI*=.97; *CFI*=.98, *RMSEA*=.03).

	Equity	Frugality	Proecology	Altruism	Happiness
Equity	1.00				
Frugality	.26*	1.00			
Proecology	.25*	.35*	1.00		
Altruism	.20*	.21*	.49*	1.00	
Happiness	.14*	.04	.18*	.27*	1.00

* p <.05

Table 2 exhibits the results of the alternative confirmatory factor analysis (CFA) model, which indicates significant interrelations among the five (first-order) assessed constructs. The only non-significant covariation occurred between frugality and happiness. The highest correlation with happiness occurred between this factor and altruism, followed by those with pro-ecological behavior, equity, and frugality. The goodness of fit indicators are not saliently different from the ones obtained in the alternative CFA model.

Discussion

Similar to most areas of behavioral science, environmental psychology has traditionally neglected the study of the positive correlates of its objects of study. Fortunately, a growing number of reports evidence a link between pro-environmental or sustainable behavior and several psychological positive consequences; happiness is one of them. This link has inaugurated an area of research that may be labeled the "positive psychology of sustainability." Such area takes in account not only the positive antecedents of sustainable behavior but also its positive consequences, especially the intrinsic ones.

The model of relations between sustainable behavior and happiness that we tested in this study revealed a significant association between these two psychological factors. According to our results, it might be assumed that the more pro-ecological, altruistic, frugal and equitable a person is, the more her/his feeling of happiness (s)he experiences.

A possible exception to this conclusion is the relationship between frugality and happiness. Although frugal behaviors were highly correlated to the rest of the sustainable-

behavior indicators, and this aggregate of actions significantly predicted happiness, the *phi* matrix of the alternative model revealed that frugality and happiness presented an almost-zero correlation. This would indicate that the respondents did not feel they obtain a source of subjective wellbeing from their practicing a voluntary reduced consumption. Although this finding seems to contradict previous results indicating that voluntary frugal behaviors result in happiness (Brown & Kasser, 2005) the seemingly anomalous finding might be explained by one demographic characteristic: the age of the respondents. Whereas Brown and Kasser assessed this relationship amongst a general population, our study was conducted with participants in their 20's. It is likely that some of these respondents link their subjective wellbeing with consumerism, as many young people do according to some sources (see United Nations, 2003), while others do not. One more explanation for the lack of correlation between frugality/simplicity and happiness is that frugality may not have been voluntary. Prospective studies should investigate this relationship by contrasting the correlations between subjective wellbeing and voluntary frugality across age samples and levels of willingness.

The *phi* matrix of the alternative model also revealed that the strongest association between happiness and sustainable acting was that produced between subjective wellbeing and altruism, followed by the correlations of happiness with altruism and equity. Thus, the sustainable actions most efficient in promoting happiness are those behaviors intended at maximizing the benefits for others; this replicates a number of findings from the literature on social psychology (Williams & Shiaw, 1999, Schroeder, Penner, Dovidio, & Piliavin, 1995).

Pro-ecological behavior, altruism, equity and frugality were sufficiently interrelated to shape a higher-order construct that we labeled "sustainable behavior," which confirmed previous assumptions and findings establishing that these four factors are indicators of a sustainably-oriented type of acting (Corral-Verdugo et al, 2010). This finding evidences the pertinence of using these four factors as indicators of pro-environmental or sustainable behavior. The other major finding is that the aggregate variable of those indicators significantly correlate with happiness, at least as assessed by Lyubomirsky & Lepper (1999) measure. However, the model of the four separate (i.e., non-aggregated) behaviors was as coherent as the second-order factor representation. This latter result and the finding that the correlations between happiness and the four sustainable behaviors were not uniform across those behaviors suggest that further studies should model sustainable practices in these alternative options: as an aggregate of actions, and as separate behaviors.

One implication of these results is that the practice of pro-ecological, altruistic, equitable, and (perhaps) frugal behaviors may promote an enhanced level of happiness. However, if this effect is found, why do some people not practice sustainable behaviors? One possible answer is: because they do not know about this positive consequence. Thus, environmental educational strategies have to pursue a connection between environmental clues and the intrinsic consequences (happiness, in this case) of behaving sustainably. Behaviorist psychology provides some insight for the way this connection might by established. According to this perspective, the antecedents of behavior, recognized as "discriminative stimuli" provide the occasion for action. These stimuli are instigators of behaviors and may manifest as prompts or *affordances* (as Gibson [1979] describes), which offer opportunities for behaving in an expected way and, most importantly, *offer the promise of a positive consequence*, as Skinner (1958) assures. An interesting, additional strategy is posited by O'Brien (2006), who suggests including information in formal education so that students and teachers have an opportunity to associate happiness with sustainability. She coined the term "Sustainable happiness" which is happiness that contributes to individual, community and/or global wellbeing without exploiting other people, the environment or future generations.

Therefore, the use of antecedents of behavior, such as information, affordances or discriminative stimuli offers a potential solution to the problem of connecting environmental requirements with the psychological positive consequences of behaving sustainably.

Another implication is that, as Kasser (2009) suggests, intrinsic positive consequences of being sustainable are preferred over the external repercussions, since the former are "automatic" and are less biased towards the materialistic goals of consumerism and environmental depredation. If happiness is one of these intrinsic consequences, this is good news for those interested in the promotion of pro-environmental behaviors. In his writing, this author suggests a series of strategies intended to discourage materialistic, extrinsic values, and to promote the intrinsically oriented ones. Decreasing people's exposure to materialistic models, increasing their resilience to materialistic messages, and helping people to act more consistently with the intrinsic goals that they value are among those strategies.

Some limitations of this study should be mentioned. Although some of the demographic characteristics of the studied sample correspond to those of the general population, we cannot conclude that our participants are representative of the Mexican population they were extracted from. Indeed, the age range is very limited, which makes it extremely difficult to test differences in sustainable behavior and happiness ex-

plained by such demographic characteristic. It is also likely, as we discussed above, that the absence of correlation between happiness and frugality could be explained by the young age of these participants. Therefore, a further study considering a more representative sample of the general population should be conducted.

Besides, in this study, self-reports were used as a method assessing sustainable actions and people's self-reported behavior is not necessarily identical to their actual behaviors. Another limitation of the study has to do with the non-experimental design used in our research. Although we, along with most authors in the area, assume that happiness is an intrinsic consequence of being sustainable we cannot conclude that the significant covariation between these two factors proves a causal relationship, with happiness being the effect and sustainable behavior the cause. Therefore, an experimental study is required in order to verify the assumption of a causal relationship. We could require, for instance, participants to engage in sustainable actions and subsequently assess a possible increase in their happiness levels.

There is also an alternative explanation to the correlation between happiness and sustainable behavior: happiness positively influences sustainable acting (Bechtel and Corral-Verdugo, 2010). One more possible explanation is that the causal flow between these two psychological factors is bidirectional: happier people act more sustainably and their behavior makes them feel more happiness. A further and interesting explanation is that when people break out of the conditioned habits of consumption, competition, and inequity practices this is liberating. Individuals take greater control over their life, understanding that they can make conscious choices that contribute to their own well-being, the well-being of others, and the natural environment. In any case, the important fact is that the connection between acting sustainably and happiness seems to be established and environmental psychologists and educators may take advantage of it in their interventional strategies.

Endnote

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