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ARE PSYCHOLOGICAL AND ECOLOGICAL
WELL-BEING COMPATIBLE? THE ROLE OF VALUES,
MINDFULNESS, AND LIFESTYLE

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ABSTRACT. Happiness and ecological well-being are often portrayed as conflictual pursuits, but they may actually be complementary. In samples of adolescents (Study 1) and adults (Study 2), we tested this proposition and examined the role of three factors in promoting both subjective well-being (SWB) and ecologically responsible behavior (ERB). In both studies, individuals higher in SWB reported more ERB. An intrinsic value orientation (Studies 1 and 2) and dispositional mindfulness (Study 2) related to higher SWB and ERB, while a lifestyle of voluntary simplicity (Study 2) related to higher ERB. Further analyses showed that the compatibility of SWB and ERB was explained by intrinsic values and mindfulness. These findings offer clues to a sustainable way of life that enhances both personal and collective well-being.

INTRODUCTION

Political discourse on the subject of ecological sustainability often suggests a conflict between human well-being and ecological welfare. For example, prior to the 1992 United Nations Rio Earth Summit, then-president George H. W. Bush stated that, “the American way of life is not up for negotiation” (McKibben, 2002). Such discourse suggests that to keep from destroying the environment people must practice restraint, which may mean acting contrary to personal desires, needs, and ultimately, happiness. As long as environmentally responsible behavior is framed in self-sacrificial terms, individuals will be faced with tough choices about how to act, because while the majority of the general public wants a safe and healthy environment (Gallup and Newport, 1990; Merck Family Fund, 1995), they also want happy lives. This apparent trade-off may make people less likely to behave in ways

that promote ecological well-being. Given widespread indications that the health of the environment is in serious danger (Abramovitz, 2003), in large part due to human consumption activity designed, ostensibly, to bolster personal well-being (United Nations Environment Programme, 2002), it is imperative to examine the veracity of the supposed trade-off between personal happiness and behavior that supports a healthy ecology.

The purported conflict between human happiness and planetary welfare is countered by a small body of research findings suggesting that subjective well-being (SWB) and ecologically responsible behavior (ERB) may be compatible pursuits. For example, DeYoung (1996, 2000) found that environmental and prosocial behaviors (including frugality and community participation) provide intrinsic satisfactions that bolster personal well-being. Individuals have also reported more happiness at Christmas when they engaged in environmentally friendly holiday behaviors (Kasser and Sheldon, 2002), although they also reported somewhat lower happiness when they limited their spending. Qualitative research by Eigner (2001) and Sohr (2001) suggested that personal well-being can be enhanced by involvement in environmental activism. These ideas are well-summarized by Myers and Diener (1995), whose review of happiness research concluded that the most important sources of life satisfaction are nonmaterial in nature. Thus, the pursuit of happiness does not appear to require consumption-based, environmentally damaging activity.

Although these findings are suggestive, research has neither systematically examined the compatibility of SWB and ERB, nor has it examined factors that might promote both of them. The present studies examined these issues using multiple measures of SWB and ERB in samples of adolescents and adults. In doing so, we drew from three literatures pointing to person-level factors that may support both forms of well-being, and that may help to explain how people can simultaneously be happy and live in ways that promote ecological health.

First, we examined the role of personal values. Values are broad psychological constructs with important implications for both motivated behavior and personal well-being. Kasser and Ryan's (1996) distinction between "intrinsic" values (which are oriented toward personal growth, relationships, and community involvement) and

“extrinsic” values (which are focused on financial success, image, and popularity) offered particular promise for understanding the potential compatibility of SWB and ERB. Substantial research has shown that intrinsically oriented individuals report greater personal well-being on a host of measures, in comparison to those who are extrinsically oriented (for a review see Kasser, 2002; for a counterpoint, see Nickerson et al., 2003). At the same time, an intrinsic value orientation has also predicted better ecological stewardship in resource dilemma tasks (Kasser and Sheldon, 2000; Sheldon and McGregor, 2000). Related work on materialism has yielded similar findings. For example, Richins and Dawson (1992) reported that materialistic (i.e., extrinsic) individuals have lower SWB and engage in fewer environmentally friendly activities like recycling in comparison to those low in materialism. These data suggest that an intrinsic value orientation may promote both SWB and ERB.

The second person-level factor we examined was “mindfulness,” a quality of consciousness that denotes a receptive attention to and awareness of ongoing internal states and behavior (Brown and Ryan, 2003, 2004). When people are mindful, internal and external realities are perceived openly and without distortion. Research has shown dispositional mindfulness to be distinguishable from a variety of constructs, including openness to experience, private self-consciousness, reflection, self-monitoring and other “reflexive” aspects of consciousness (Brown and Ryan, 2003). Of direct relevance to our purposes, Brown and Ryan (2003) also showed that mindful individuals exhibit higher personal well-being on a wide variety of indices. Although we know of no research examining associations between mindfulness, as defined here, and ERB, both Burch (2000) and Rosenberg (2004) have suggested that mindfulness may provide an antidote to consumerism, as this quality of consciousness encourages reflection on the ecological impact of one’s behavior and facilitates choicefulness in the face of consumerist messages designed to encourage materialistic pursuits. Similarly, Princen (1997) suggested that a precondition for conscious guidance of consumption behavior is an awareness of feedback messages regarding the environmental impact of such behavior. Such awareness is suggestive of mindfulness. This literature therefore suggests that mindfulness may simultaneously promote SWB and ERB.

A third person-level factor that may support both personal happiness and ecological health is the “voluntary simplicity” (VS) lifestyle, which involves a conscious shift away from material goals and toward intrinsically satisfying pursuits and the autonomous expression of talents and skills (Dominguez and Robin, 1992; Elgin, 1993). VS represents a conscious choice to reduce material consumption in order to increase nonmaterial benefits (Elgin, 1993; Etzioni, 1998). The voluntarily simple lifestyle has been a running theme through North American history and culture (Shi, 1985; Princen, 1997), and surveys suggest that VS currently claims adherents from as much as 10–15% of the American population (Elgin, 1993) and approval by a further 10–15% (Ray, 1997). Although quantitative research on VS is sparse (but see Leonard-Barton, 1981; Cowles and Crosby, 1986; Shama, 1988; Schor, 1998), qualitative research suggests that VS may simultaneously promote SWB and ERB, as adherents typically report motivations to enhance personal well-being and to reduce the ecological impact of their behaviors (Elgin, 1993; Pierce, 2000). As such, voluntary simplifiers could be expected to have higher levels of happiness and lower ecological impacts in comparison to the mainstream North American population.

The Present Research

Can people live so as to promote both personal and planetary well-being? Beginning with this central question, the present research had three primary hypotheses. First, inferring from past research, we predicted that SWB and ERB would be positively related. Second, we expected that higher levels of SWB and ERB would each be associated with a relative intrinsic value orientation, greater mindfulness, and a VS lifestyle. Finally, we hypothesized that these three person-level factors would explain the positive association between SWB and ERB; that is, they would help to clarify why the two are related. Study 1 tested the first hypothesis and the values portion of hypotheses two and three in a sample of adolescents, who are highly susceptible to consumerist messages (Levin and Linn, 2004). Specifically, this first study examined the relations between generosity (an intrinsic value), materialism (an extrinsic value), happiness, and environmental behavior. In Study 2 we again measured intrinsic and extrinsic values, and additionally assessed mindfulness and multiple indicators of SWB and ERB among VS and

matched, “mainstream” national samples to fully test our three hypotheses.

STUDY 1

Method

Participants

Participants were 206 (114 male, 91 female, and one unreported) students attending two Midwestern U.S. middle and high schools; 96% were Caucasian, with ages ranging from 10 to 18 ($M = 14.2$, $SD = 2.3$). Participants were recruited at school, returned the materials two days later, and received a \$3 honorarium.

Measures

Values. Four-item measures of materialism (Cronbach's $\alpha = 0.68$) and generosity ($\alpha = 0.74$) were developed for this study using exploratory factor analyses (see Kasser, in press).

Subjective well-being (SWB). Participants answered the question “How would you say you are feeling these days?” on a 5-point scale (“very unhappy” to “very happy”).

Ecologically responsible behavior (ERB). The frequency of ten positive environmental behaviors (e.g., turning off lights in unoccupied rooms; reusing paper and plastic bags) over the last few months was reported on a 5-point scale (“never or almost never” to “always or almost always”; $\alpha = 0.67$). These items were excerpted from the longer scale used in Study 2 and adapted slightly for an adolescent population.

RESULTS AND DISCUSSION

In support of our first hypothesis, SWB and ERB were positively correlated, $r = 0.17$, $p < 0.02$, suggesting that happy adolescents also live in more ecologically sustainable ways. In support of our second hypothesis, materialism was associated with both lower SWB and ERB ($r_s = -0.22$ and -0.21 , respectively, both $p_s < 0.01$) whereas generosity was associated with higher SWB and ERB ($r_s = 0.22$ and 0.23 , respectively, both $p_s < 0.01$).

If materialism and generosity are important for explaining the SWB–ERB relation, as specified in our third hypothesis, then the correlation between SWB and ERB should become non-significant after controlling for the two value variables in multiple regression. Indeed, this was the case: SWB–ERB $\beta = 0.10$, $pr = 0.10$, $p > 0.05$. In this model, both generosity and materialism were significantly related to ERB, $\beta = 0.15$, $p < 0.05$ and $\beta = -0.17$, $p < 0.05$, respectively. In order to determine whether the drop in the SWB–ERB relation after controlling for the two values variables was significant, we used two methods recently recommended by MacKinnon et al. (2002).¹

In the first method, the product of the two regression coefficients involved in the indirect, or mediated, effect (mediator regressed on the independent variable, and dependent variable regressed on both the independent variable and mediator) is divided by the regression coefficient \times standard error product from both regression models. This value, termed z' , is then compared to critical values from this term's empirical sampling distribution.² The coefficients and standard errors used in this test were obtained from two regression analyses for each values variable, one in which each values mediator was separately regressed on the independent variable (SWB), and the other in which the dependent variable (ERB) was regressed on both values variables, with the SWB independent variable included in the equation. A significant indirect effect is equivalent to showing that the direct effect is significantly reduced when the mediator is included in the equation. Analyses using this method found that both materialism and generosity were significant mediators of the SWB–ERB relation ($z' = 1.86$, $p < 0.01$ and $z' = 1.67$, $p < 0.01$, respectively).

In MacKinnon et al.'s (2002) second recommended method, each regression coefficient involved in the indirect, or mediated effect is converted to z scores by dividing the regression coefficient by its standard error, then multiplying the z s together, and comparing the resulting value (labeled a P statistic) to critical values in the theoretical sampling distribution of the product of two normal random variables (obtained from Springer and Thompson, 1966). The same coefficients used in the first method were used here. The mediational results obtained using this second method were also significant ($P = 7.149$, $p < 0.01$ for materialism; $P = 6.179$, $p < 0.01$ for generosity).

Study 1 provided initial support for our three hypotheses. First, SWB and ERB were positively, although modestly, correlated. Second, higher levels of both SWB and ERB were associated with more intrinsic and less extrinsic values, supporting past research showing that intrinsically oriented people are happier and act in more ecologically responsible ways than do extrinsically oriented individuals (Richins and Dawson, 1992). Third, partial correlations and mediational tests showed that the relation between SWB and ERB was explained by individuals' relative focus on intrinsic rather than extrinsic values. Study 1 was limited in several respects, including its sampling of adolescents, its rather narrow assessment of SWB and ERB, and its failure to examine the other factors of interest to this research – mindfulness and lifestyle – as promoters of SWB and ERB. For these reasons, a second, more extensive study was conducted to test our hypotheses.

STUDY 2

Method

Participants

Self-identified voluntary simplifiers ($n = 286$) were recruited to participate through invitations in VS newsletters and magazines and on relevant Internet web sites and discussion lists. Of those expressing an initial interest in the study, 240 (83.9%) returned the mailed survey. A sample of “mainstream” (MS) individuals was then obtained from a list brokerage firm that matched the VS participants 1:1 on gender, age, and geographic location (zip code). Of the 776 surveys mailed to these individuals (including mailings to new “matches” after no response from the initial survey recipient), 223 (28.7%) were returned. Of these, 23 surveys had substantial missing data; these participants, and their 23 matches in the VS sample, were excluded from analyses. Another 17 unmatched VS participants were excluded, leaving final n s of 200 in each sample. All mailed survey packets included a self-addressed, stamped envelope for return of the completed survey, a \$1 honorarium, and the offer to receive a free summary of the study findings.

Table I (top portion) displays demographic characteristics of the VS and MS groups, along with p values derived from χ^2 tests and

independent groups *t*-tests. The groups were comparable in gender, age, and ethnicity. Participants in each sample were drawn from 42 US states and the District of Columbia.

Because our distinction between the VS and MS groups was based on self-identification by the VS sample, we undertook analyses to demonstrate that the distinction was valid. Although VS does not as yet have commonly agreed-upon “diagnostic criteria” which clearly sets this lifestyle apart from those of mainstream North American society, two characteristics frequently appear in the academic and popular VS literature: (a) a voluntary reduction in income (Schor, 1998), and (b) a voluntary reduction in monetary spending (Dominguez and Robin, 1992). As reported in Table I, more VS than MS participants in this study reported voluntary reductions both in personal spending and in personal income. Further, the VS group reported a lower personal annual income than did the MS sample, despite the fact that the VS group’s earning capacity, as measured by educational attainment, was higher. These results suggest that VS participants’ self-categorization as voluntary simplifiers was a valid operationalization of the construct.

Measures

Values. On the Aspiration Index (AI; Kasser and Ryan, 1996) participants used a five-point scale to rate the personal importance of 30 aspirations tapping intrinsic (personal growth, relationships, and community feeling) and extrinsic (financial success, popularity, and image) values. To assess the relative centrality of these values, a summary “intrinsic value orientation” score was computed by subtracting the ratings of the extrinsic values from those of the intrinsic values (see Kasser and Ryan, 1996; Sheldon and McGregor, 2000). Higher scores indicate a stronger intrinsic than extrinsic value orientation.

To create multiple measured variables underlying a latent intrinsic value orientation construct for structural equation modeling (SEM; see MacCallum and Austin, 2000), two groups of variables within each mean-corrected intrinsic and each extrinsic item set were formed by randomly placing items into parcels (cf., Kishton and Widaman, 1994).³ Kishton and Widaman (1994) suggest that for parcels of randomly selected items, internal consistency coefficients of 0.60 and higher are acceptable. In the present study, the average internal

TABLE I
Demographic, psychological and ecological behavior characteristics by group (Study 2)

Variable	VS		MS		<i>P</i> _{diff}
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>Demographic characteristics</i>					
Gender (% female)			65.50		1.0
Age (years)	43.47	11.99		13.23	0.67
Ethnicity (% Caucasian)			92.96		0.29
Education					0.001
High school			4.00		
Some college			19.00		
College degree			39.50		
Postgraduate degree			37.50		
Personal income/year	26222.14	23204.35		41653.40	0.0001
Voluntary personal income reduction (% yes)			65.82	31106.74	0.001
Voluntary spending reduction (% yes)			87.88	27.41	0.001
<i>Psychological and ecological behavior characteristics</i>					
Mindfulness	4.16	0.61		0.63	0.29
Relative intrinsic values	6.97	2.06		2.13	0.0001
Affect balance	2.05	1.82		2.20	0.03
Life satisfaction	4.47	1.08		1.12	0.03
Ecological footprint	8.49	3.15		3.90	0.0001
Environmental behavior	0.57	0.15		0.12	0.0001

Note: *n* = 200 per group; VS = voluntary simplicity group; MS = mainstream group.

consistency for the extrinsic item parcels was 0.64 (range across samples = 0.58–0.68). For the intrinsic item parcels, the average internal consistency across samples was 0.55 (range = 0.54–0.56).

Mindfulness. The 15-item Mindful Attention Awareness Scale (MAAS; Brown and Ryan, 2003) assessed receptive attention to and awareness of ongoing internal and external events and experience ($\alpha_{VS} = 0.87$, $\alpha_{MS} = 0.86$). Higher scores indicate greater mindfulness. For SEM purposes, measured variables of the MAAS construct were created by forming three parcels of five randomly selected items each. Each parcel showed acceptable internal consistency (all α s > 0.60 within each sample).

Subjective well-being. Three variables typically identified as constituting SWB (Diener, 1984) were assessed. Pleasant and unpleasant affect valence were measured using the Diener and Emmons (1985) 9-item scale. An affect balance score was computed by subtracting unpleasant affect ($\alpha_{VS} = 0.90$, $\alpha_{MS} = 0.91$) from pleasant affect ($\alpha_{VS} = 0.83$, $\alpha_{MS} = 0.86$) scores. The 15-item Temporal Satisfaction with Life Scale (Pavot et al., 1998) assessed past, present, and expected future life satisfaction, ratings on which were averaged to form an overall score ($\alpha_{VS} = 0.91$, $\alpha_{MS} = 0.92$).

Ecologically responsible behavior. The Ecological Footprint Questionnaire (EFQ; Dholakia and Wackernagel, 1999) asked twelve questions about diet, transportation, and housing towards providing an estimate of the number of hectares of natural resource required to support the individual's current level of consumption (Wackernagel and Rees, 1996). Diet, transportation, and housing choices are typically identified as the most ecologically consequential human activities (Brower and Leon, 1999). For example, meat eaters who drive many miles per week and live in large houses have larger ecological footprints than do vegetarians who use public transportation and live in small homes. Unlike the well-known $I = PAT$ (Impact = Population size \times Affluence \times Technology) ratio-level metric of ecological impact (Ehrlich and Holdren, 1971), the EF measure can assess impact at the individual level, and thus was better suited to our purposes.

In addition to EF, a questionnaire inspired by Green-Demers et al. (1997) asked participants to rate on a 5-point scale the proportion of time they engaged in 54 positive environmental behaviors (e.g., reusing paper, buying second-hand rather than new; $\alpha_{VS} = 0.93$, $\alpha_{MS} = 0.90$).

RESULTS AND DISCUSSION

Table I (lower portion) displays descriptive statistics on the psychological and ecological behavior characteristics for the VS and MS groups, along with p values derived from independent groups t -tests. Notably, the VS group reported more intrinsic values, greater SWB, smaller EFs and more frequent positive environmental behaviors than did the MS group.⁴ Table II displays the intercorrelations between these measures for the entire sample. Mindfulness was related to more intrinsic values, and both variables were related to SWB and ERB. Both life satisfaction and more positive affect were related to smaller ecological footprints and more environmental behavior.

To formally test our first hypothesis concerning the compatibility of SWB and ERB, we constructed an SEM model using AMOS 4.0 (Arbuckle and Wothke, 1999) and maximum likelihood estimation to measure the SWB-ERB relation, using life satisfaction and affect balance to represent a latent SWB construct, and using EF and environmental behavior to represent ERB. The model showed a satisfactory fit ($\chi^2(1, N = 400) = 0.03$, $p = 0.87$, GFI = 1.0, CFI = 1.0, NFI = 1.0, RMSEA = 0.00) and, as predicted, SWB and ERB were positively associated ($\beta = 0.44$, $t = 4.01$, $p < 0.001$). Thus, once again, happier individuals were more likely to report behavior supportive of ecological health.

To test our second hypothesis that higher levels of SWB and ERB would be related to a relative intrinsic value orientation, greater mindfulness, and a VS lifestyle, another SEM model was constructed to test the combined influence of the person-level factors of interest – values, mindfulness, and lifestyle – on both SWB and ERB (see Figure 1). The model fit satisfactorily, $\chi^2(44, N = 400) = 104.04$, $p < 0.0001$, GFI = 0.96, CFI = 0.99, NFI = 0.97, RMSEA = 0.058. As predicted, intrinsic values and

mindfulness were each associated with higher SWB and ERB (all p s < 0.001). The VS lifestyle was related to higher ERB (p < 0.001) but was not related to SWB (p > 0.05).

The SEM model in Figure I also presents information relevant to our third hypothesis – that the associations between SWB and ERB could be explained by the three person-level factors under investigation here. As shown, the covariance between SWB and ERB is non-significant in this model (p > 0.05), unlike the first model (described above) testing only the SWB–ERB relation. Exploratory analyses were undertaken to determine which factors accounted for the decrease in the magnitude of the SWB–ERB relation.

To this end, the three person-level factors were added to the structural model separately, then all pairwise factor combinations were tested. Each factor alone failed to account for the covariance between SWB and ERB, as did both of the pairwise combinations involving group (i.e., VS or MS). However, with the mindfulness and values factors in the model, the SWB–ERB covariance dropped to $\beta = 0.17$, $t = 1.78$, $p > 0.05$ in a satisfactorily fitting model, $\chi^2(36, N = 400) = 89.11$, $p < 0.0001$, GFI = 0.96, CFI = 0.99, NFI = 0.98, RMSEA = 0.061. As Figure 1 shows, the SWB–ERB covariance in the full model with all three factors was almost identical ($\beta = 0.20$).^{5,6}

These analyses support our propositions that happy people live in more ecologically responsible ways because such individuals hold intrinsically oriented values and are more mindful of their inner experience and behavior. However, contrary to prediction, the voluntary simplicity lifestyle did not demonstrate an ability to explain the association between SWB and ERB.

GENERAL DISCUSSION

In a sample of adolescents and again in matched, demographically diverse national samples of adults differing in lifestyle, the present studies found that personal well-being and ecologically responsible behavior were complementary. That is, happier people were living in more ecologically sustainable ways. Further, we identified two factors – intrinsic value orientation (Studies 1 and 2) and mindfulness (Study 2) – that promoted both happiness and ecologically responsible behavior, and that helped to explain the positive association between SWB and ERB. These results weigh against the oft-stated belief that

TABLE II

Intercorrelations of psychological and ecological behavior characteristics (Study 2)

Measure	1	2	3	4	5	6
1. Mindfulness	–	0.20*	0.46*	0.32*	0.20*	0.13**
2. Relative intrinsic values		–	0.31*	0.37*	0.31*	0.43*
3. Affect balance			–	0.56*	0.19*	0.23*
4. Life satisfaction				–	0.20*	0.23*
5. Ecological footprint					–	0.40*
6. Environmental behavior						–

Note: $n = 400$. * $p < 0.0001$; ** $p < 0.01$.

personal well-being and ecologically supportive behavior are necessarily in conflict, and instead suggest that a trade-off between the two is not a *fait accompli*. Instead, a mindful consideration of one's inner states and behavior along with a set of values oriented more towards intrinsic than extrinsic aims appear to simultaneously benefit both individual and ecological well-being.

Past research has found both mindfulness (e.g., Brown and Ryan, 2003) and intrinsic values (e.g., Kasser and Ryan, 1996) to be associated with SWB. Why were these person-level variables also related to ERB? Intrinsic values are, by their very nature, not dependent on material goods for their fulfillment; thus, energy invested in intrinsic pursuits may mean less energy devoted to some of the consumption-based activities reflected in the ecological footprint analysis and certain of the environmentally friendly behaviors assessed here. For example, people holding more intrinsic values are unlikely to be very interested in large "trophy" homes or gas-guzzling vehicles that often reflect ostentatious displays of wealth or image enhancement. Further, the focus on community that is a component of an intrinsic value orientation (Kasser and Ryan, 1996) might lead individuals try to decrease the ecological impacts of their behavior so as to benefit future human generations as well as other species.

Regarding mindfulness, this quality of consciousness may promote reflection on one's consumption activity and greater choicefulness in the marketplace (e.g., Rosenberg, 2004), as already noted. Indeed,

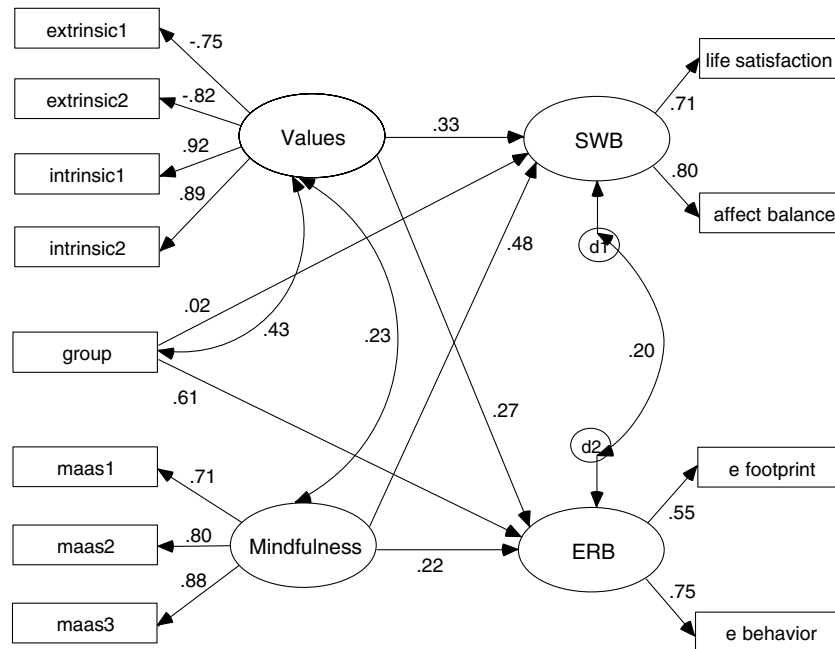


Figure 1. Structural equation model of factors associated with subjective well-being and ecologically responsible behavior. Values indicate standardized regression weights. All structural and covariance paths are significant at $p < 0.001$ except paths between group and SWB, and between SWB and ERB. Error terms are not shown. Values were measured with the Aspiration Index (AI); mindfulness was measured with the Mindful Attention Awareness Scale (MAAS); SWB = subjective well-being; ERB = ecologically responsible behavior; e footprint = ecological footprint; e behavior = environmental behavior.

research has found that mindfulness is associated with lower materialism, a tendency toward less consumption (monetary spending) activity over time (Brown et al., 2004), and higher reported choicefulness in day-to-day life (Brown and Ryan, 2003). However, empirical research is needed to specifically examine the processes responsible for the values-ERB and mindfulness-ERB relations.

Study 2 found that although those living a VS lifestyle reported higher levels of SWB than did the mainstream sample, this group difference became non-significant when placed in the context of mindfulness and values. However, the SEM analyses showed that VS individuals were more likely to have the intrinsic value orientation that supported both SWB and ERB; indeed, the cultivation of intrinsic values may be related to the adoption of a VS lifestyle (e.g.,

Princen, 1997). As such, this lifestyle warrants research examining how the development of intrinsic values may be fostered.

Also notable is the fact that VS had independent effects on ERB after controlling for mindfulness and values. This points to another reason to conduct more research on VS. In the past, much empirical work examining the psychology of environmental behavior has been focused on the prediction of single actions, or a small cluster of actions, such as recycling or energy conservation. However, scholars and researchers have recently argued that ecological sustainability demands behavior change, particularly in reducing material consumption, that is so “across-the-board” as to result in significant lifestyle change (e.g., Corson, 1995; Wackernagel and Rees, 1996), a perspective also apparently shared by a majority of the American public (e.g., Merck Family Fund, 1995). VS appears to represent such a lifestyle change, and the present results on the VS-ERB relation suggest that this lifestyle may represent a model to study consumption patterns that support progress toward sustainability. At the same time, it is important to note that even though people in our VS sample were, on average, using fewer natural resources (EF $M = 8.49$ hectares) than those in the mainstream sample (EF $M = 11.01$), the VS group was using more resources than is considered sustainable (1.9 hectares; Wackernagel and Rees, 1996). As such, other ERB-supportive factors must be identified if humanity is to reach this goal.

Limitations

Several limitations of the present research must be noted. The cross-sectional nature of these studies precludes conclusions about causal roles for mindfulness and values in well-being and ecological behavior, and future research could examine how these psychological features predict changes in SWB and ERB over time. We also did not take into account the possibility that social desirability biases could explain the relations reported here, although past research has shown that self-reported environmental behavior is not susceptible to social desirability (Kaiser, 1998), and that the social desirability construct does not explain the associations between intrinsic value orientation and SWB (Kasser and Ryan, 1996) or between mindfulness and SWB (Brown and Ryan, 2003). Nonetheless future research may examine

whether this and other “third variables” help to explain the results reported herein.

In Study 2, item parcels were formed to create latent values orientation and mindfulness variables. The use of item parceling in SEM offers a number of advantages, but parceling has potential drawbacks, especially when dimensionality and construct validity are not formally tested (Hagtvet and Nasser, 2004).⁷ Also, the intrinsic value orientation item parcels had lower internal consistencies than has been considered acceptable (Kishton and Widaman, 1994). For these reasons, replication of the present results is in order. Finally, all of our measures were based on self-report methods. Although such methods are difficult to avoid in this type of research, future studies could request reports over a limited time frame (e.g., the past week), or use diary-based reports of ecological behavior and well-being to help circumvent potential biases due to retrospective reporting.

CONCLUSION

With material consumption levels on the rise worldwide, human quality of life may be at risk (Abramovitz, 2003). A scholarly and popular consensus is emerging that achieving sustainable societies will mean scaling back on our material lives (Winter, 1996; Brower and Leon, 1999). Yet convincing people to live in more ecologically sustainable ways will be challenging if people believe that their personal happiness will consequently suffer. The present findings are hopeful in pointing to a mutually beneficial relation between personal and planetary well-being, especially given that such supportive factors as mindfulness and intrinsic values can be cultivated (Grube et al., 1994; Baer, 2003).

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NOTES

¹ Using Monte Carlo statistical simulations and analyses, MacKinnon et al. (2002) compared the accuracy of Type 1 error rates and statistical power of 14 different methods – including causal steps, difference in coefficients, and product of coefficients approaches – for establishing the statistical significance of intervening (mediator) variable effects. Analyses showed that many of the methods, including Baron and Kenny's (1986) well-known modified Sobel test of significance, had low statistical power and/or inaccurate Type 1 error rates. Two approaches with the highest statistical power and the most accurate Type I error rates were recommended by MacKinnon et al. (2002) and are used here.

² The z' notation is used instead of the standard z because the test has a different sampling distribution than does the standard normal distribution, and the critical values of z' are smaller than those of the z test. The table of critical values for z' was obtained from MacKinnon et al.'s Web site: www.public.asu.edu/~davidpm/ripl/mediate.htm.

³ Typically, mean-corrected AI subscale scores are used, but because mean correction involves subtracting total AI scores from each raw subscale score, inclusion of all subscales under a latent variable in SEM results in a non-positive definite covariance matrix.

⁴ EFQ scores were log transformed for this and subsequent analyses to correct a skewed distribution.

⁵ It is notable that with the three independent variables in this model, the SWB-ERB $\beta = 0.20$ is nonsignificant, while in Study 1, the simple bivariate relation between these same constructs was significant with $r = 0.17$. There are likely several reasons for this difference in significance of effects, including the fact that different measures were used in the two studies, and that Study 1 used a regression approach whereas Study 2 used SEM, which better accounts for measurement error.

⁶ SEM was also conducted using groups split on the variable most clearly differentiating the VS and MS groups; namely, a voluntary spending reduction ($n_{\text{yes}} = 227$; $n_{\text{no}} = 168$; $n = 5$ unreported). Results were very similar to those presented here.

⁷ We thank an anonymous reviewer for pointing out this issue.

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