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ORIGINAL PAPER

In Search of Sustainable Behaviour: The Role of Core Values and Personality Traits

Joel Marcus[1] · **Jason Roy**[2]

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Abstract Understanding the individual-level factors associated with sustainable behaviour in the workplace is important to advance corporate ethics and sustainability efforts. In two studies, we simultaneously assess the role of core values and personality traits in relation to a broad set of sustainability actions, both beneficial and harmful. Results from a student sample ($N = 411$) and then a national sample ($N = 639$) confirm that values and personality are distinct constructs that incrementally and differentially predict economic, social, and environmental outcomes. We successfully replicate previous findings pertaining to values and find that, controlling for values, the personality dimension of Honesty–Humility is the strongest negative predictor of harmful actions. Our analyses highlight the unique characteristics of values and personality and their distinct implications for ethical and sustainable management practice. By assessing values and personality together, we also contribute to more general efforts within psychology to develop an integrative view of the person.

Keywords Sustainability · Values · Personality · HEXACO

✉ Joel Marcus
marcus@yorku.ca

Jason Roy
jroy@wlu.ca

[1] School of Administrative Studies, Faculty of Liberal Arts and Professional Studies, York University, 4700 Keele St., Toronto M3J 1P3, Canada

[2] Department of Political Science, Wilfrid Laurier University, Waterloo, CA, 75 University Ave W, Waterloo, ON N2L 3C5, Canada

Abbreviations

FFM	Five-factor model
SSI	Survey sampling international

Introduction

Sustainability, typically understood as the simultaneous advancement of economic, social, and environmental well-being (UNGA 2005), is fast becoming a central goal for organizations of all types. But what differentiates people who pursue sustainability from those who do not? Being able to identify, recruit, retain, and promote those most likely to improve economic, social, and environmental outcomes has important managerial implications for organizations increasingly pressured to meaningfully advance a sustainability agenda (cf. Pfeffer 2010) through heightened standards of ethical business conduct (cf. Carroll and Buchholtz 2014; Crane and Matten 2016). Uncovering what differentiates the sustainability-promoting individual from their peers is an essential step towards this goal.

Recent efforts within psychology to develop an integrative view of the person suggest that values and personality traits might be especially important factors (Parks and Guay 2009; Parks-Leduc et al. 2015). Specific values and personality types have already been linked to various social and/or environmental actions (e.g. Hilbig and Zettler 2009; Markowitz et al. 2012; Poortinga et al. 2004). However, scholars have yet to examine values and personality characteristics together in relation to a broad set of sustainability actions. Important questions remain about the specific and distinctive role played by various values and personality types. It is not known, for example, whether personality traits help to explain variance in sustainability behaviour after controlling for an individual's core values.

Previous research has also tended to focus on a narrow, unidimensional criterion domain—typically pro-social or pro-environmental actions. Viewed through a sustainability lens (e.g. Marcus et al. 2010; UNGA 2005), this has significant limitations. For example, the finding that a particular personality dimension positively predicts pro-environmental behaviour tells us nothing about how that dimension relates to social or economic outcomes. It is possible that individual differences linked to positive outcomes in one domain are associated with negative outcomes in other domains.

Finally, related studies have generally assessed beneficial actions with relatively less consideration of detrimental actions. However, these are distinct constructs (Campbell 2007), which people and organizations can engage in simultaneously (Strike e al. 2006). It is possible that the values or personality dimensions associated with beneficial actions might be quite different from those associated with harmful actions. Because sustainability depends first on the minimization of harmful actions and second on the promotion of beneficial actions, we believe it is necessary to account for both positive and negative actions to achieve a more complete understanding of the individual-level drivers of sustainable behaviour.

We address these issues in two studies conducted with independent samples that examine how values and personality characteristics combine to influence sustainability actions. To assess a comprehensive set of sustainability actions, we employ a measure of behavioural propensity as opposed to actual behaviour, and test our hypotheses first with a university student sample and then a national sample.

Our work makes a number of contributions that inform the micro-behavioural roots of sustainability actions. First, we show that beyond demographic characteristics, values and personality traits are independent and significant predictors of the propensity to engage in a wide range of sustainable and unsustainable corporate actions. The unique characteristics of these constructs have distinct implications for management practice, which we outline in our discussion below. Second, we demonstrate the importance of accounting for a broad set of economic, social, and environmental actions, both beneficial and harmful, when assessing individual-level predictors of sustainability behaviour. Third, our findings indicate that the HEXACO model of personality is particularly relevant to understanding behavioural sustainability phenomena. Finally, this study advances recent theoretical work within psychology to develop a holistic and integrative view of the person (Parks-Leduc et al. 2015) and provides an empirical test of this model within the applied context of corporate ethics and sustainability.

In the following sections we describe the key variables analysed in this study (values, personality traits, and corporate sustainability actions) and then develop our hypotheses. Next, for each study we describe the sample and methods used to collect and analyse data, followed by a report of our findings. We conclude with a discussion of the theoretical and managerial implications of this work, and outline limitations and opportunities for future research.

Predictor Variables: Values and Personality Traits

In this research, we adopt an individual-level focus to assess internal factors (values and personality) that motivate sustainability-relevant actions. Although researchers have typically examined values and personality traits independently, recent meta-analytic work by Parks-Leduc and colleagues (Parks and Guay 2009; Parks-Leduc et al. 2015) has clarified the distinctive nature of these constructs. They posit that, at a basic level, values are motivational whereas personality traits are descriptive, and both must be accounted for to develop an integrative view of the person (e.g. Sheldon 2004).

Values

Defined as deeply seated beliefs about desirable life goals and the means to attaining those goals (Rokeach 1979; Schwartz and Bilsky 1987), values are amongst the most important and widely studied constructs across the social sciences (Meglino and Ravlin 1998). Values theorists posit that individuals hold common sets of values arranged in values hierarchies, and vary in the strength with which particular values are held (Rokeach 1973).

With respect to sustainability criteria, environmental scholars have shown that specific values affect a range of behavioural domains from household energy use (Poortinga et al. 2004) to consumption patterns (Thøgersen and Ölander 2002) and managerial environmental initiatives (Fryxell and Lo 2003). Social issues scholars have likewise found that values play an important role in promoting ethical business conduct (Fritzsche and Oz 2007) and establishing an ethical organizational climate (Grojean et al. 2004). Sully de Luque et al. (2008) have reported that stakeholder values positively impact firm performance via perceptions of leadership, as compared to economic values.

Building from this distinction between stakeholder and economic values and general models of sustainability (Elkington 1998; UNGA 2005), Marcus and colleagues (2012; 2015) proposed a tripartite classification of economic, social, and environmental values as more relevant for sustainability research. Economic values pertain to

deeply held beliefs regarding the desirability of financial outcomes, whereas social and environmental values pertain to outcomes associated with human and ecological well-being, respectively. Their findings support the distinctiveness of environmental and social values and show that each of the three value types predicts distinct forms of sustainability action.

Personality

Whereas values represent a psychologically embedded construct within the motivational complex, personality refers to innate traits or dispositional patterns that individuals exhibit (Parks and Guay 2009). Since the early 1990s, personality research has coalesced around what is commonly referred to as the Big-Five personality model (McCrae and John 1992). This model, which derives from lexical studies that factor-analyse adjectives used to describe people in common language, has been transformative for organizational scholars with implications for job performance (Barrick et al. 2003), job satisfaction (Judge et al. 2002), and leadership behaviours (Bono and Judge 2004) amongst others.

Despite the prominence of the five-factor model (FFM), a more recent series of lexical studies has found considerable support for a six-dimensional model of personality (Ashton and Lee 2001; Ashton et al. 2004) that may be particularly relevant in the context of ethics and sustainability. Referred to as the HEXACO model, the major distinction of this six-factor model is the recovery of a previously overlooked factor that Ashton and Lee (2008) have coined Honesty–Humility. Three of the remaining factors (Extraversion, Conscientiousness, Openness to Experience) correspond closely to their counterparts in the FFM, and the final two (Emotionality and Agreeableness) are roughly rotated variants of the Big-Five dimensions (see Ashton and Lee 2005, 2007; Ashton et al. 2014 for details on differences between Big-Five and HEXACO frameworks and measures). For clarity, we use FFM-Emotionality and FFM-Agreeableness to refer to FFM variants throughout the remainder of the paper.

As with values, personality has been examined in varying degrees with respect to the environmental and social domains of sustainability. On the environmental side, Openness to Experience has been found to significantly predict environmental attitudes and behaviour, with some indication that traits of FFM-Agreeableness, Conscientiousness, and FFM-Emotionality/Neuroticism also play a role (Hirsh 2010; Markowitz et al. 2012; Milfont and Sibley 2012). The majority of these studies employ the FFM, but at least four recent studies have employed the HEXACO framework to predict environmental outcomes, and these reveal mixed findings as to the role played by Honesty–Humility (Brick and Lewis 2016; Hilbig et al. 2013; Lee et al. 2015; Markowitz et al. 2012). However, it is notable that previous efforts have only assessed Honesty–Humility in relation to pro-environmental behaviour without considering how it might affect harmful behaviour, an omission we address here.

The social impacts of personality have also been studied extensively, with considerable evidence that multiple personality factors play an important role in directing the ethical behaviour of both regular individuals and those in leadership positions (Kalshoven et al. 2011; Lee et al. 2008). In another research stream, Chiaburu et al. (2011) meta-analysed 87 independent samples examining the effects of personality on organizational citizenship behaviours, which represent a form of social action where employees go beyond set role requirements. However, once again we note the relative absence of research examining personality in relation to economic, social, and environmental factors simultaneously, and the dominance of the FFM in this research. As we explain below, and building on the work of Hilbig et al. (2013), we believe the Honesty–Humility personality dimension as specified within the HEXACO framework may be particularly relevant to the study of sustainability actions.

Outcome Variables: Sustainability Actions

In previous work, Marcus (2012) developed and empirically validated a six-type classification of corporate actions reflecting various sustainability impact domains. Following earlier conceptualizations of sustainability (cf. Elkington 1998; UNGA 2005), corporate actions are first classified as economic, social, or environmental in nature based on the primary or first-order impact associated with a given action. A second dimension considers the valence of the impact and whether the action is consistent with positive or negative outcomes in a given domain. We refer to these dimensions as benefit and harm actions, respectively, noting that benefit actions would generally be considered ethically appropriate, whereas harm actions are at best ethically questionable and in more serious cases highly unethical. The composite schema then accounts for the six sustainability action types of (1) economic benefit, (2) economic harm, (3) social benefit, (4) social harm, (5) environmental benefit, and (6) environmental harm. Though comprehensive, we note that this framework does not account for cross-domain effects that may stem from a given action and that it is difficult to determine whether any given behaviour is, in fact, sustainable. Instead, we take the position that, on the whole, sustainability is advanced to the extent that harm actions are reduced and benefit actions are increased across all three domains. As

such, this multi-type framework allows us to assess a broad range of sustainability actions and impacts that individuals within corporations engage in.

Hypotheses

Marcus et al. (2015) found that economic values are a strong positive predictor of economic benefit actions, whereas social values negatively predict all three harm action types and positively predict social benefit actions. Similarly, environmental values have been shown to positively and negatively predict environmental benefit and environmental harm actions, respectively. Finally, individuals with stronger economic values have demonstrated lower propensity to engage in social and environmental benefit actions, and a higher propensity to engage in all harm action types, including economic harm, as compared to individuals holding relatively stronger social and/or environmental values. As a baseline assessment, we expected these findings would be replicated in the current research.

Building from this, we consider how accounting for personality might further inform our understanding of sustainable behaviour. Like values, personality traits have general effects on behaviour across contexts and are more likely to predict broad classes of action (e.g. pro-environmental behaviour) as opposed to very specific activities (e.g. a charitable donation to Greenpeace) (Parks and Guay 2009). And yet, their distinctive origins and features suggest they have independent—if sometimes related—effects on behaviour.

Personality, for example, has a higher degree of heritability and individuals are predisposed by birth to exhibit certain innate trait characteristics (Jang et al. 1996). These also tend to be very stable over a person's lifetime (McCrae and Costa 1994). Values are less biologically rooted and develop more through social learning and personal experience (Rokeach 1973). Although they too exhibit a high degree of stability, values are more susceptible to change through exposure to new sociocultural contexts (Rokeach 1985).

Values and personality also differ in the extent to which they are held cognitively. Values are a wholly cognitive construct that include an evaluative component pertaining to ends and means that are considered desirable. Personality is not evaluative in nature and is also less centred in cognition. Personality combines psychological, emotional, and behavioural elements that influence how individuals tend to interact with the social and physical environment around them (Olver and Mooradian 2003). They are subsequently more readily observed than values, which are often unconscious and difficult to access (Rokeach 1985).

At a basic level, personality traits are descriptive and pertain to natural tendencies that people exhibit as they move through the world, whereas values are a motivational force stemming from deep seated beliefs about what is important in life (Parks-Leduc et al. 2015). Based on the theoretical distinctiveness of these constructs, we believe values and personality independently influence sustainability behaviours and that a more complete view of the sustainable person must account for both factors. We therefore propose the following:

H1 Personality traits will incrementally predict corporate sustainability actions independent of personal values.

Amongst the major dimensions of personality, findings to date indicate that FFM-Agreeableness and Openness to Experience are important predictors of social and environmental behaviours. These relationships are generally explained by a correspondence between the characteristics of the underlying trait dimension and the behavioural domain of interest.

For example, FFM-Agreeableness is associated with adjectives including appreciative, forgiving, generous, and kind (McCrae and John 1992), and pertains to getting along with others and maintaining social harmony. Research has linked FFM-Agreeableness to pro-sociality across time (Caprara et al. 2012), to helping behaviours (Gonzalez-Mulé et al. 2014), and ethical leadership (Kalshoven et al. 2011). The trait of Openness to Experience involves engaging in new experiences and intellectual pursuits and is associated with being artistic, curious, imaginative, and insightful (McCrae and John 1992). Scholars have found Openness to be amongst the strongest predictors of environmental outcomes (Brick and Lewis 2016; Markowitz et al. 2012). Notwithstanding the high degree of variability in research orientation, methods, and measures, surveying across these studies suggests a tentative pattern where FFM-Agreeableness is the most prominent predictor of social criteria and Openness is the predictor that most often emerges in relation to environmental criteria.

However, it is worth considering how personality might relate to a more comprehensive set of sustainability actions. We were particularly interested in the Honesty–Humility trait within the HEXACO framework and the prospect that it might have stronger cross-domain effects than other personality dimensions. We base our expectations on the theoretical interpretation of the HEXACO factors laid out by Ashton and Lee (2001; 2007). These authors propose a first-order distinction of personality types between those that reflect engagement in different types of important life endeavours and those that reflect different forms of altruism. The first category is comprised of Extraversion, Conscientiousness, and Openness to

Experience, which relate to engagement in social, task-related, and idea-related endeavours, respectively.

Ashton and Lee (2007) explain the remaining three traits using the biological concepts of kin and reciprocal altruism, where altruism involves both helping actions to benefit others and the avoidance of harm-causing behaviour. They posit that Emotionality, which involves empathy and attachment to others, can be understood in terms of kin altruism (actions designed to benefit one's family and close personal relations). By comparison, Agreeableness and Honesty–Humility are associated with reciprocal altruism (cooperative arrangements over time that provide mutual benefit to both parties involved). Agreeable individuals express reciprocal altruism through tolerance and are not inclined to retaliate even when mistreated. They are slow to anger and quick to forgive. Honesty–Humility represents the other side of reciprocal altruism—the tendency to not take advantage even when others are vulnerable. The underlying principle is one of fairness.

It is this innate propensity for fair treatment that we suspect might broadly influence sustainability actions. At a conceptual level, principles of equity and justice are endemic to ethical conduct (Schwartz 2005) and sustainability concerns. Sustainability is considered by many to rest on the cornerstones of economic justice (equitable distribution of financial and material means), social justice (equal opportunity and human rights), and environmental justice (fair distribution of environmental costs and benefits) (Agyeman 2003; Schneider et al. 2010). Furthermore, inequality has been systematically linked to a great number of economic, social, and ecological ills that undermine societal sustainability (Wilkinson and Pickett 2009). It seems reasonable then that individuals whose natural disposition promotes fair outcomes would also, as a matter of course, tend to advance sustainability goals.

More concretely, we can assess the particular characteristics subsumed within Honesty–Humility and how they might relate to multi-form sustainability behaviours. Individuals high on this pole are described as modest, unassuming, and fair-minded, whereas those on the other end of the spectrum are defined in part by displays of entitlement, greed, and insincerity (Ashton and Lee 2007; Ashton et al. 2014). Honest/humble individuals do not feel deserving of special treatment, status, or material wealth, and do not take advantage of others for personal benefit. An important implication of these attributes is that those high in Honesty–Humility should be less prone to unethical and harm-inducing behaviours across all sustainability spheres. In the economic domain, for example, honesty/humility should preclude cheating behaviour and misdealing to advance one's financial position. In the social realm, we would expect it to safeguard against mistreating others and against violations of human rights. Finally, the tendency to be unassuming and unentitled appears at odds with the technocentric view that humans occupy a privileged position in nature and have an unlimited right to exploit natural resources as they wish (Gladwin et al. 1995). Honest/humble individuals should subsequently be less inclined to inflict environmental harm.

We reason that a predisposition for fair treatment may also promote beneficial social and environmental actions. The defining adjectives associated with Honesty–Humility (sincere, honest, faithful/loyal, modest/unassuming; Ashton and Lee 2007) are hallmarks of pro-social interpersonal relations and ethical behaviour (Schwartz 2005). Because honest/humble individuals are trustworthy, non-manipulative, and do not perceive themselves as superior to others, they are likely to maintain high standards of ethical conduct and may actively work against social injustices they confront. In an era of vast ecological degradation and species extinction resulting from human activities, fair-mindedness and humility should also align with pro-environmental actions that preserve biospheric and ecological integrity for both non-human species and future generations.

As compared to social and environmental actions, it is less clear how Honesty–Humility will influence economic benefit actions. While we might expect trustworthy and unassuming individuals to advance firm financial goals, the pursuit of profit motives also aligns with individual self-interest as per standard economic theory. Low Honesty–Humility individuals, who are characterized by greed and a concern with material affluence, should also be inclined to maximize profit outcomes. Notably, their pursuit of monetary ends may be considerably more extreme than their honest/humble counterparts, to the point that they will advance personal financial goals at the expense of long-term financial health.

In sum, we predict that amongst the major dimensions of personality, Honesty–Humility will have the greatest relevance for sustainability behaviour overall. Harm minimization is a first-order condition for sustainability and the dispositional tendencies associated with Honesty–Humility appear uniquely aligned with limiting all forms of unethical and harmful action. An altruistic orientation rooted in a principle of fair treatment is deeply entwined with a sustainability ethos, and to a much greater extent than the theoretical interpretations of the remaining HEXACO dimensions. Although conceptual links can be seen between a number of personality types and particular dimensions of sustainability action, we believe that none will have the broad, cross-domain effects of Honesty–Humility. More formally, we expect:

H2a Honesty–Humility will negatively predict economic, social, and environmental harms actions.

H2b Honesty–Humility will positively predict social and environmental benefit actions.

H2c Relative to all other major personality dimensions, Honesty–Humility will predict a greater number of corporate sustainability action types.

Study One: University Student Sample

Procedure, Setting, Sample, and Measures

To test our hypotheses, our first study employed an online survey with a student sample. We invited the entire student body of a mid-size Canadian university to participate via a single email invitation. As incentive to participate, students were offered the option of including their email address upon completion of the study for a chance of winning one of three cash prizes of $150 CDN. The survey took 21 min to complete, on average, and all data were collected anonymously after participants offered informed consent.

After data cleaning, described below, we retained a final sample of 411 individuals. Mean age of respondents was 21.7 years, and 65.8% of the sample was female. Approximately 90% of the sample was undergraduate students. The programme offerings of the sampling institution were proportionally well represented with business students accounting for 27% of the sample, followed by arts (20%), psychology (10%), science (9%), economics (5%), and all other programmes (29%). Reported mean part- and full-time work experience was 3.5 and 1.8 years, respectively.

Values We used the measure developed and validated by Marcus (2012) to assess respondents' economic, social, and environmental values. This measure employs a policy-capturing procedure to uncover values implicitly based on an organizational rating task. Each participant provided overall performance ratings for a randomly ordered series of 30 organizations after reading a brief organizational scenario containing cues for each firm's economic, social, and environmental performance. We used three cue levels specifying "Poor", "Average" or "Excellent" performance. This measure is based on a fully crossed design (every potential combination of cue ratings is represented in the full set of scenarios) allowing for clear interpretation of how participants combine and weight the various cues when formulating their global judgements (Karren and Barringer 2002). Using within-person regressions, respondents' values are derived from standardized beta-coefficients representing the extent to which the economic, social, and environmental cues informed overall judgements during the rating task. We then normalize these values to fit between 0 and 1.

Personality To measure the six dimensions of personality, we employed the 24-item Brief HEXACO Inventory recently validated by de Vries (2013). This inventory contains four items per domain and items are rated on a 5-point Likert-type scale. A sample item from the Honesty–Humility domain is "I find it difficult to lie". All items were randomly ordered.

Corporate Sustainability Actions An 18-item measure (three items per sub-scale) was used to assess respondents' propensity to engage in each of the six sustainability action types outlined above (Marcus et al. 2015). Participants were asked to rate the extent to which they agreed with statements describing their willingness to participate in specific corporate actions on an 11-point scale (0%—Completely Disagree to 100%—Completely Agree). A sample item from the economic harm sub-scale is "I would support salary and benefit increases for myself even if the financial viability of the company was uncertain". A sample item from environmental benefit sub-scale is "I can imagine pushing for strong pollution prevention programs within my company". This measure is similar to that used by Chen and Tang (2006) to gauge individuals' propensity to engage in unethical behaviour. Previous research has found that behavioural self-predictions of this kind are significantly related to actual behaviour and outperform measures of behavioural intent (Warshaw and Davis 1985a, b). Once again, all items were randomly ordered.

Control Variables Given the significant gender effects found in previous related work (Marcus et al. 2015), we include gender as a control variable. We also control for participant age.

Analysis and Results

Data Cleaning and Scale Reliabilities After receiving our email invitation, 512 respondents completed our survey (i.e. reached the final screen) of 1021 who started (i.e. provided informed consent), for a completion rate of 50.1%. Those who failed to complete the survey were younger (0.8 years, $p < 0.05$), more likely to be female (10 points, $p < 0.01$), and had completed fewer years of study (-0.19, $p < 0.05$) relative to those who completed the study.

Because web-based surveys are known to elicit a significant proportion of careless response sets, we employed multiple criteria to clean our data. Following established recommendations (Meade and Craig 2012), we used a 5th percentile on survey completion time to identify the fastest responders. In addition, five careless response items were embedded within the survey (cf. Marjanovic et al. 2014). In total, we had six checks to identify careless responders and retained respondents who passed any five of those checks. We subsequently were left with a final sample of 411 valid

response sets, representing 80.3% of those who completed the survey. The completion rate for all critical variables (values, personality, and sustainability actions) was no less than 98% for respondents in our final sample. While the response rate may warrant some consideration, we were satisfied that a reasonably large sample was retained following the elimination of careless and incomplete responses given the length of our online survey and the attention required to complete it in a meaningful way. No statistically significant socio-demographic differences were found between the full sample that completed the study and the sample retained following removal for failure to pass the careless response checks.

The policy-capturing values measure contains three repeat items, which we used to calculate intraclass correlations. We obtained a mean correlation of .74 indicating a relatively high level of agreement across repeat measures. We also took the mean R^2 of the within-person policy-capturing regressions ($M = .74$), which revealed that the economic, social, and environmental cues did a good job accounting for respondents' overall judgments of the organizational scenarios. Variable scores for the personality and sustainability actions measures were calculated by sum totalling all variable–item scores and then normalized to achieve a value between 0 and 1. Table 1 provides the means, standard deviations, Cronbach's alpha, and zero-order correlations for our study variables.

We recognize that the low alpha scores on the personality dimensions do not conform to conventional standards, but are consistent with those reported by de Vries (2013) who initially validated the Brief HEXACO Inventory. It is important to note that this measure was not validated on the basis of internal consistency, which on its own has limited value as a measure of reliability (Sijtsma 2008), but rather on the bases of retest reliability (McCrae et al. 2011), self-other agreement, and convergent validity with established measures. Further, our observed effect sizes for environmental benefit are consistent with those reported in the four studies we are familiar with examining HEXACO—pro-environmental behaviour relationships (Brick and Lewis 2016; Hilbig et al. 2013; Lee et al. 2015; Markowitz et al. 2012).

Statistical Tests We conducted a series of hierarchical multiple regressions predicting sustainability actions as a function of values and personality factors. In all cases, control variables enter the regression first, followed by values, and then personality factors. Sample sizes vary across models according to the number of respondents who had a value on each of the variables included in the third block of each of the models (i.e. the full model).

In regard to replicating earlier findings (Marcus et al. 2015), Step 2 in Table 2 shows that economic values are a significant positive predictor of economic benefit ($b = .28$, $p < .01$), social harm ($b = .12$, $p < .01$), and environmental harm ($b = .15$, $p < .01$). By contrast, economic values negatively predict environmental benefit actions ($b = -.22$, $p < .01$). The pattern for social and environmental values is markedly different. Social values significantly and negatively predict each of the harm action dimensions and positively predict both social benefit ($b = .19$, $p < .01$) and environmental benefit ($b = .15$, $p < .01$) actions. Environmental values show strong within-domain effects positively predicting environmental benefit ($b = .20$, $p < .01$) and negatively predicting environmental harm ($b = -.20$, $p < .01$). As both a validation of previous work and support for current expectations, the results presented in Table 2 offer evidence of the importance values play in determining sustainability actions. The very close correspondence of our results here to those reported previously speaks to the robustness of the findings and measures.

We theorized that personality variables would independently predict sustainability actions accounting for values. The results pertaining to these tests are presented in Table 2, Step 3. It is notable that even with the addition of personality traits, values remain significant predicators of sustainability actions. It is also noteworthy that the addition of the personality measures significantly improved the model fit in all six cases (ΔR^2, $p < .05$ for economic benefit, $p < .01$ for all others), providing strong support for Hypothesis 1.[1]

Hypothesis 2a finds partial support, with Honesty–Humility positively predicting environmental benefit actions ($b = .10$, $p < .05$), but falling short of conventional significance values in the social benefit model ($b = .10$, $p = .06$). In line with Hypothesis 2b, Honesty–Humility is strongly correlated with all harm actions at the $p < .01$ level and across models also predicts the greatest number of sustainability action domains (Hypothesis 2c). Overall, our expectations regarding the distinctive role of Honesty–Humility are largely confirmed. Finding general support for our hypotheses, we conducted a follow-up study to assess the robustness of these results with a more representative sample.

Study Two: National Sample

Procedure, Setting, Sample, and Measures

For our national sample, we drew upon Survey Sampling International's (SSI) proprietary panel to supply a representative sample of English-speaking Canadians. The

[1] We recognize that even our full models leave a sizeable amount of variance unexplained, though this is to be expected since values and personality are theoretically distal predictors of behaviour.

Table 1 Means, standard deviations, zero-order correlations, and scale reliabilities of main study variables—student sample

Variables	*M*	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Economic values	0.53	0.17															
2. Social values	0.70	0.16	−.03														
3. Environment values	0.66	0.14	−.17**	.40**													
4. Honesty	0.73	0.13	−.12*	.17**	.13**	**.48**											
5. Emotionality	0.61	0.15	−.11*	.01	−.02	.14**	**.56**										
6. Extraversion	0.74	0.12	−.04	.06	.03	.07	−.15**	**.53**									
7. Agreeableness	0.58	0.13	.00	.06	.03	.10*	−.16**	.12*	**.49**								
8. Conscientiousness	0.69	0.12	.09	.01	−.08	.17**	−.15**	.08	−.00	**.44**							
9. Openness	0.72	0.12	−.13**	.11*	.11*	.10*	−.06	.19**	.14**	.06	**.43**						
10. Economic benefit	0.75	0.16	.30**	.05	−.05	−.03	−.16**	.06	.02	.06	.13**	**.77**					
11. Economic harm	0.43	0.20	.11*	−.18**	−.12*	−.33**	−.01	−.09	.02	−.15**	−.07	.09	**.74**				
12. Social benefit	0.82	0.16	−.17**	.23**	.15**	.25**	.14**	.15**	.09	.03	.21**	.17**	−.17**	**.77**			
13. Social harm	0.30	0.19	.21**	−.28**	−.25**	−.42**	−.16**	−.14**	−.02	−.06	−.08	.04	.54**	−.33**	**.75**		
14. Environment benefit	0.79	0.18	−.29**	.24**	.31**	.23**	.04	.21**	.09	.00	.35**	.25**	−.20**	.55**	−.34**	**.81**	
15. Environment harm	0.32	0.19	.27**	−.25**	−.32**	−.29**	−.08	−.21**	−.03	−.03	−.18**	.05	.52**	−.32**	.69**	−.48**	**.84**

Scale alpha coefficients appear on the diagonal

* $p < .05$; ** $p < .01$

Table 2 Hierarchical multiple regressions predicting sustainability actions propensity—student sample

Predictors	Criterion variable																	
	Economic benefit			Economic harm			Social benefit			Social harm			Environment benefit			Environment harm		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Controls																		
Age	−.02	.00	−.02	−.10*	−.09	−.01	.11*	.10*	.05	−.17**	−.15**	−.07	.12*	.09*	.03	−.21**	−.19**	−.14**
Female	−.18**	−.13**	−.10	−.16**	−.13**	−.06	.29**	.26**	.19**	−.32**	−.27**	−.15**	.15**	.07	.02	−.26**	−.19**	−.14**
Values																		
Economic values		.28**	.29**		.06	.06		−.08	−.06		.12**	.12**		−.22**	−.19**		.15**	.14**
Social values		.08	.06		−.15**	−.12*		.19**	.16**		−.22**	−.18**		.15**	.11*		−.15**	−.12**
Environmentvalues		−.02	−.03		−.03	−.02		.04	.03		−.11*	−.11*		.20**	.18**		−.20**	−.19**
Personality																		
Honesty			.03			−.25**			.10			−.27**			.10*			−.11*
Emotionality			−.09			.07			.07			−.05			.02			.01
Extraversion			.02			−.05			.09			−.10			.15**			−.14**
Agreeableness			−.01			.07			.03			.02			.01			.01
Conscientious			.02			−.10*			.02			−.03			.01			−.00
Openness			.15**			.01			.12*			.03			.25**			−.07
Model statistics																		
ΔR^2	.03**	.08**	.04*	.03**	.03**	.08**	.09**	.05**	.04**	.12**	.10**	.07**	.03**	.14**	.11**	.10**	.12**	.04**
F	6.39*	10.07**	6.12**	6.22**	5.00**	5.40**	18.76**	11.96**	7.23**	25.29**	20.51**	13.26**	6.30**	16.16**	13.28**	20.30**	20.31**	11.26**
Adjusted R^2	.03	.11	.13	.03	.05	.11	.08	.13	.15	.11	.21	.26	.03	.16	.26	.09	.20	.23
Standard error	.16	.16	.15	.19	.19	.18	.16	.15	.15	.18	.17	.16	.17	.16	.15	.18	.17	.16
N	382	382	382	380	380	380	380	380	380	379	379	379	384	384	384	382	382	382

Cells report standardized beta-coefficients

* $p < .05$; ** $p < .01$

sample included only respondents 18 years of age and older and was representative of the Canadian population according to age, sex, province of residence (excluding Quebec), education, and income. We retained a final sample of 639 respondents with mean age of 46.4 years, mean work experience of 19.1 years, and 54% of whom were female. Amongst those currently or previously working (73.6%), a wide range of occupational categories are represented including management (10%), professional (19%), technical (5.8%), administrative (13.5%), sales (8.5%), services (4.9%), and manufacturing (4.5%). The average time to complete the study was 25 min, and all data were collected anonymously following participant consent. To incentivize participation, respondents received points under SSI's reward programme that could be used for prizes and were also entered into a quarterly prize draw.

A significant advantage of the national sample is that it allowed us to account for a much broader range of potentially relevant demographic characteristics at the population level. We ultimately retained only those that had a significant effect in our models, including age, gender, income level, education level, and religiosity. The latter is a dummy variable, indicating that the respondent attends their place of worship at least once per week.

Our national survey also included a three-item self-report measure of pro-environmental work behaviour, which allowed us to assess congruence between our propensity measure and real work behaviour. A sample item is "I have done more for the environment at work than I was expected to do" (Bissing-Olson et al. 2013). We regressed this variable on the six sustainability action types and found environmental benefit to be the unique significant predictor ($b = .33$, $p < .001$). We thus have some indication of convergent validity with real work behaviours. In all other respects, the surveying procedure and measures were identical to those used for the student sample.

Analysis and Results

Data Cleaning and Scale Reliabilities A total of 1109 individuals started the survey, and 1009 respondents reached the end (completion rate = 91.0%). Following the same data cleaning procedure outlined above, our final sample was reduced to 639 valid response sets.[2] Similar to the student sample, the completion rate for all critical variables was no less than 98% for the retained respondents. Intraclass coefficients for the three repeat policy-capturing scenarios ($M = .73$) again revealed a respectable level of agreement across repeat measures. Average R^2 of the within-person regression models, though somewhat lower in this sample ($M = .64$), still indicates the scenario cues do a reasonable job accounting for individual's overall decisions. Means, standard deviations, bivariate correlations, and scale alphas are reported in Table 3.

Statistical Tests Our analyses for the national sample parallel those performed in Study 1 and are presented in Table 4. Once again we find strong differential effects in how the three value types relate to work-related sustainability actions. While these largely mirror findings from Study 1, the impact of economic and environmental values is somewhat more pronounced in this sample. In particular, economic values positively predict all three harm dimensions, including economic harm ($b = .09$, $p < .05$), while negatively predicting social benefit ($b = -.15$, $p < .01$) and environmental benefit ($b = -.20$, $p < .01$) actions. By contrast, environmental values have the complete opposite effect on all criterion dimensions except for economic benefit, for which no relationship is found. It is also important to note that in almost all cases values retain their significance levels even after personality variables are added to the model.

We again observe a significant improvement in model fit with the addition of personality variables ($p < .01$ in all cases), confirming Hypothesis 1. As in the student sample, Honesty–Humility is a strong negative predictor of all harm dimensions (Hypothesis 2a). However, our expectation regarding social and environmental benefit actions was not confirmed (Hypothesis 2b). With respect to Hypothesis 2c, we again find Honesty–Humility has strong cross-domain effects for all harm action types. Unexpectedly, however, Extraversion has similarly strong cross-domain impacts, but in relation to benefit actions. Therefore, Hypothesis 2c is only partially supported.

Discussion

Our search for sustainable behaviour sought to identify individual-level markers that could distinguish those most likely to advance sustainability goals from those who might undermine sustainable outcomes. Working within an integrative theoretical framework (Parks and Guay 2009; Parks-Leduc et al. 2015), we show that values and personality traits independently and incrementally predict economic, social, and environmental work-related behaviours. These findings have theoretical implications for

[2] Our final sample did not differ significantly from the full sample in regards to age, sex, province of residence, or education. The final sample did have a slightly higher average income than the full sample (0.20 points on a seven-point scale, $p<0.05$). However, we have no reason to assume that this small difference in income would have changed the overall conclusions drawn from the smaller sample retained following our assessment of the careless response questions.

Table 3 Means, standard deviations, zero-order correlations, and scale reliabilities of main study variables—national sample

Study variables	*M*	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Economic values	0.46	0.17															
2. Social values	0.71	0.17	.18**														
3. Environment values	0.63	0.14	.14**	.50**													
4. Honesty	0.79	0.12	–.04	.14**	.06	**.47**											
5. Emotionality	0.59	0.13	–.03	–.00	–.01	.06	**.43**										
6. Extraversion	0.73	0.15	–.09*	.01	–.03	.17**	–.25**	**.72**									
7. Agreeableness	0.58	0.11	–.05	.10*	.02	.16**	–.06	.20**	**.35**								
8. Conscientiousness	0.71	0.12	–.04	.02	–.03	.26**	–.20**	.28**	.03	**.55**							
9. Openness	0.71	0.13	–.03	.08*	.14**	–.07	–.10*	.14**	.09*	.09*	**.58**						
10. Economic benefit	0.73	0.18	.16**	–.01	.02	.00	–.18**	.17**	.04	.16**	.06	**.80**					
11. Economic harm	0.41	0.22	.07	–.13**	–.13**	–.32**	–.02	–.11**	–.10*	–.05	–.01	.05	**.79**				
12. Social benefit	0.78	0.19	–.11**	.21**	.21**	.16**	.06	.21**	.14**	.13**	.21**	.28**	–.14**	**.79**			
13. Social harm	0.25	0.19	.07	–.22**	–.16**	–.35**	–.02	–.14**	–.03	–.13**	–.05	.05	.47**	–.26**	**.69**		
14. Environment benefit	0.78	0.17	–.15**	.19**	.29**	.11**	–.06	.23**	.08	.19**	.29**	.34**	–.06	.64**	–.19**	**.76**	
15. Environment harm	0.27	0.19	.08*	–.28**	–.31**	–.32**	–.01	–.09*	–.02	–.11**	–.15**	.02	.51**	–.31**	.68**	–.34**	**.80**

Scale alpha coefficients appear on the diagonal

* $p < .05$; ** $p < .01$

Table 4 Hierarchical multiple regressions predicting sustainability actions propensity—national sample

Predictors	Criterion variable																	
	Economic benefit			Economic harm			Social benefit			Social harm			Environment benefit			Environment harm		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Controls																		
Age	.05	.07	.04	−.09*	−.07	.04	.09*	.06	.02	−.19**	−.17**	−.07	.09*	.06	.02	−.13**	−.10**	−.02
Female	−.09*	−.08	−.05	−.13**	−.11**	−.04	.14**	.11**	.04	−.19**	−.16**	−.09*	.04	.01	−.03	−.16**	−.13**	−.06
Education level	.01	.01	−.01	−.00	.00	.01	.05	.04	.02	−.04	−.03	−.02	.11**	.10**	.07	−.04	−.03	−.01
Income	.01	.01	−.00	−.02	−.01	−.00	−.02	−.02	−.04	−.02	−.01	.00	−.05	−.06	−.07	.06	.06	.07
Religious	.00	.01	−.00	.01	−.01	−.00	−.01	.02	.01	.08*	.06	.05	.00	.03	.04	.13**	.10**	.08*
Values																		
Economic values		.16**	.18**		.09*	.08*		−.15**	−.12**		.08*	.07		−.20**	−.16**		.13**	.11**
Social values		−.05	−.06		−.10*	−.06		.15**	.12**		−.20**	−.17**		.08	.06		−.17**	−.15**
Environmentvalues		.05	.04		−.11*	−.11*		.16**	.15**		−.09*	−.09*		.30**	.28**		−.24**	−.22**
Personality																		
Honesty			−.05			−.32**			.05			−.26**			.01			−.28**
Emotionality			−.09*			.01			.12**			.00			.04			.01
Extraversion			.12**			−.05			.16**			−.07			.16**			−.03
Agreeableness			.02			−.03			.08*			.04			−.01			.07
Conscientious			.12**			.04			.06			.01			.11**			−.00
Openness			.06			.02			.16**			−.01			.24**			−.11**
Model statistics																		
ΔR^2	.00	.03**	.06**	.02*	.04**	.09**	.02*	.08**	.08**	.06**	.06**	.06**	.02*	.14**	.11**	.05**	.13**	.08**
F	1.49	3.04**	4.51**	2.24*	4.16**	6.96**	2.76*	8.21**	9.00**	7.31**	10.06**	9.35**	2.21*	13.10**	14.42**	6.44**	16.11**	14.15**
Adjusted R^2	.00	.03	.08	.01	.04	.12	.02	.09	.16	.05	.11	.17	.01	.14	.24	.04	.17	.24
Standard error	.18	.17	.17	.22	.22	.21	.19	.18	.17	.18	.18	.17	.17	.16	.15	.19	.18	.17
N	583	583	583	584	584	584	583	583	583	586	586	586	583	583	583	586	586	586

Cells report standardized beta-coefficients

* $p < .05$; ** $p < .01$

individual-level sustainability research as well as managerial implications for organizational practice.

Theoretical Implications

At the outset, we argued it is necessary to account for both beneficial and harmful actions in each of the sustainability spheres to truly assess the role of individual differences. The case of economic values is instructive in this regard. As a unidimensional assessment, we find that stronger economic values promote economically beneficial outcomes at the firm level. While this finding appears desirable in view of the profit-seeking orientation of business enterprise, inspection of the other five corporate actions types suggests a very different interpretation. Not only do individuals with stronger economic values appear disinclined to advance pro-social and pro-environmental goals, they are also more likely to engage in a broad spectrum of harmful behaviours (see Tables 2, 4). By contrast, the cultivation of social and environmental values within the organization may safeguard against harm-causing actions, while increasing prospects for socially and environmentally desirable outcomes.

As anticipated, we also find that each of the six corporate action types is better explained when personality traits are accounted for. To our knowledge, this study is the first to demonstrate that both values and personality factors incrementally predict sustainability behaviour in meaningful ways. Parks and Guay (2009) comment on the rarity of research assessing values and personality traits together, noting that our understanding of relationships between these constructs and our understanding of how they jointly impact behaviour is limited. Thus, our findings here pertaining to sustainability behaviour also contribute to more general efforts in psychology and organizational behaviour to develop a holistic and integrative understanding of the person (Parks-Leduc et al. 2015).

Indeed, our data reveal that, controlling for values, the personality dimensions promoting pro-sustainability actions across the six criterion domains are somewhat distinct from those that relate to harm-causing actions. Amongst our key findings is that Honesty–Humility appears the strongest safeguard against unethical and harmful behaviours. Although we expected that Honesty–Humility would also predict social and environmental benefit actions, this was only true in our student sample. Accounting for both beneficial and harmful actions thus begins to shed some light on mixed findings in earlier research (Hilbig et al. 2013). It appears that Honesty–Humility may have more to do with the harm-reducing aspect of sustainability than with the benefit-promoting aspect, something that would have been missed had we not considered both positive and negative sustainability actions.

Although we did not specify hypotheses regarding the major dimensions of personality beyond Honesty–Humility, we can comment on how our findings relate to previous research. It is notable that Openness to Experience had systematic positive effects on benefit actions in our studies, and in particular on social and environmental benefit actions. This is consistent with earlier research (Nga and Shamuganathan 2010; Markowitz et al. 2012). However, our results diverge from others in that Agreeableness was found to have very limited impact on work-related sustainability actions. We suspect this may be due to differences between FFM-Agreeableness typically used in previous research and the HEXACO measure of Agreeableness used here. Ashton and Lee (2005) have reported strong correlations between FFM-Agreeableness and HEXACO Honesty–Humility, primarily due to the presence of facet scales for Straightforwardness and Modesty within FFM-Agreeableness. It is entirely plausible that these facet dimensions, which are associated with Honesty–Humility rather than Agreeableness in the HEXACO personality inventory, are responsible for the significant relationships between FFM-Agreeableness and social and environmental criteria in previous work.

An unexpected finding from our national sample was the emergence of Extraversion as the strongest positive predictor of all benefit action types. Although this does align with some existing research on pro-social outcomes (Gonzalez-Mulé et al. 2014; Morse et al. 2015), future research is needed to better explain these findings. Overall, however, it seems clear that the mechanisms by which personality affects positive sustainability behaviours are distinct from that which produces negative behaviours, even after accounting for core values.

Managerial Implications

The prospect of being able to identify markers of sustainable behaviour propensity has immediate relevance for management practice. We suggested earlier that sustainability depends first on minimizing harmful actions. In an era marked by all too frequent instances of egregious corporate misbehaviour, curtailing unethical business conduct not only protects vital societal and environmental interests, but also the interests of individual firms that suffer considerable reputational and financial costs when malfeasance is exposed (e.g. Ewing 2017). Alongside efforts to holistically integrate ethics and sustainability education for improved business practice (Setó-Pamies and Papaoikonomou 2016), our findings suggest it is possible to differentiate those least likely to engage in corporate wrongdoing in the first place. In particular, individuals with high Honesty–Humility appear inoculated against unethical behaviour, which is consistent with honesty being a core

ethical principle (Schwartz 2005) and a foundational requirement for personal integrity (Becker 1998). Previous research has already linked Honesty–Humility to higher levels of integrity and ethical decision-making (Lee et al. 2008), and we extend this to show a decreased propensity for broader forms of unethical action across the economic, social, and environmental domains. Subsequently, managerial efforts to build an honest/humble workforce may provide a strategic defence against all manner of corporate abuses, and early diagnoses of low Honesty–Humility within an organization might allow preventative measures to be taken before a firm becomes embroiled in a deeply damaging ethical scandal.

Beyond limiting corporate harms and wrongdoing, the defining characteristics that distinguish values from personality traits point to differences in how this knowledge might be employed to advance sustainability in the workplace. For example, because values develop through personal and social learning, it may be possible to direct employee values towards sustainability over time through education, training, and development initiatives. Understanding employee value profiles both individually and collectively could provide managers a baseline metric for planned interventions to establish and maintain a culture of sustainability within the organization. By contrast, the relatively non-conditional and immutable nature of personality traits suggests that efforts to reshape personality are likely to meet with little success, even if employees were amenable. Recall that personality is an expression of how people naturally act, not necessarily how they wish to act. Instead, personality markers are likely to have greatest value in selection processes at organizational entry or during the formation of teams tasked with advancing sustainability goals.

The ease and low cost with which personality inventories can be administered, and the fact that they are already widely used in organizational settings for selection and promotion purposes (Diekmann and Knig 2015; Rothstein and Goffin 2006) makes this particularly attractive. A 2011 survey conducted by the Society for Human Resource Management of its members found that 18% of 495 randomly sampled organizations made use of personality tests (SHRM 2011). Of those, 56% used personality measures when hiring mid-level managers and 45% did so in executive-level searches. While it is true that most organizations are not currently using personality measures, indications are that usage rates are rising rapidly (Dattner 2013).

We recognize there are legitimate concerns regarding the validity of personality tests for selection purposes given the potential for socially desirable responding and faking (Morgenson et al. 2007; Ones et al. 1996), and that this might be especially problematic with a trait such as Honesty–Humility. However, research by Lee and colleagues (2008) provides some evidence that the HEXACO measure has applicability in high-stakes settings. In particular, they were able to recover the six-factor structure and found that the Honesty–Humility was clearly differentiated from other personality dimensions within a sample of 1105 job applicants for a fire-fighting position. In some circumstances, such as promotion or when selecting sustainability team participants, it may also be possible to alleviate response biases by using observer reports from an employee's colleagues given that other ratings generally correlate highly with self-rated personality scores (Lee et al. 2008).

Limitations, Future Research, and Conclusion

Our use of a cross-sectional survey design clearly limits our ability to assess how individual differences affect sustainability actions over time. While we have some indication of temporal change in our predictor variables (for example, economic values are negatively related to age in our national sample), we see considerable opportunity for future experimental and longitudinal research to clarify what these changes imply for sustainability behaviour.

A cross-sectional survey methodology also raises the potential for common methods effects. We took steps to minimize any such effects by randomly ordering the presentation of scales and all items within scales in our online survey. We also note that the quasi-behavioural policy-capturing value measure is based on an organizational rating task that is highly dissimilar from the other measures in our study.

Our reliance on measures of behavioural propensity, which allowed us to sample across a broader array of actions than those typically confronted by any given employee, is in some ways less ideal than measures of actual behaviour engaged in. As described earlier, our finding that environmental benefit propensity uniquely predicted a self-report measure of pro-environmental behaviour helps support the validity of our measures. However, although individuals are known to be able to make reasonably accurate self-predictions of their future behaviour (Osberg and Shrauger 1986), it is desirable for future research to test our findings with more concrete measures of personal sustainability actions. This might be done, for example, by obtaining peer or supervisor ratings of employee behaviour.

Our research design and the length of our online survey also constrained us to using the Brief HEXACO Inventory to assess personality traits. Sampling time permitting, it is possible to obtain more conventional scale alpha coefficients by employing the full HEXACO Personality

Inventory (Lee and Ashton 2004) or the HEXACO-60 (Ashton and Lee 2009). Well validated observer reports are also available for measuring HEXACO personality dimensions (Lee and Ashton 2013) and could be used to complement other ratings of sustainability behaviour in future research.

Finally, the relatively low R^2 values obtained here, though consistent with related research, indicate that numerous factors beyond values and personality combine to influence sustainability actions. An integrative model of sustainability behaviour can be further developed by incorporating additional individual-level motivational and attitudinal constructs, such as those outlined by Locke (1991). Accounting for greater variance in sustainability behaviour would also benefit from multi-level analyses that assess interactions and relative influence of contextual- and individual-level factors.

Notwithstanding the many opportunities to extend this research, our findings highlight the value of bringing a micro-lens to the study of sustainability phenomena in organizations. As society continues to struggle with a steady stream of unethical business activities that erode economic, social, and environmental value, it is intriguing to consider that something as simple as a personality assessment might have real potential for helping managers select, develop, and promote employees predisposed towards sustainability-enhancing behaviour. While caution is required until future research can confirm the utility of such a practice, we hope our efforts here will encourage further investigation into the behavioural factors and mechanisms consistent with a sustainable future.

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Compliance with Ethical Standards

Conflict of interest The author(s) declare no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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