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**Which Character Strengths Are Focused on the Well-Being of Others?
Development and Initial Validation of the Environmental Self-Efficacy Scale:
Assessing Confidence in Overcoming Barriers to Pro-environmental Behavior**

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Abstract: Character strengths are assumed to contribute not only to an individual's well-being but also to communal thriving, citizenship, and the well-being of others. In particular, they can be assumed to contribute to an individual's confidence in overcoming barriers to pro-environmental behavior. This confidence, environmental self-efficacy, has primarily been measured in the context of specific behaviors (e.g. recycling). In this study, we developed a broad measure of environmental self-efficacy: the Environmental Self-Efficacy Scale (ESE20) and a derivative short version (ESE10). Through an online survey, two convenience samples completed assessments of environmental self-efficacy, generalized self-efficacy, and character strengths (NC = 224) as well as environmental self-efficacy and psychological barriers to pro-environmental behavior (NV = 169). Both ESE20 and ESE10 demonstrated unidimensionality, reliably captured environmental self-efficacy, and put forward medium to large positive relationships with generalized self-efficacy. The scales further yielded small to medium negative relationships with the psychological barriers Change Unnecessary, Conflicting Goals and Aspirations, Lacking Knowledge, and Tokenism. The character strengths zest and leadership sustained the numerically strongest relationships with environmental self-efficacy (medium positive effects) and generalized self-efficacy (large positive effects). Kindness, humility, prudence, fairness, and forgiveness were only related to environmental self-efficacy (small to medium positive effects), but not to generalized self-efficacy. These five strengths can hence be assumed to be other-focused and to specifically contribute to the well-being of others.

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Abstract

Character strengths are assumed to contribute not only to an individual's well-being but also to communal thriving, citizenship, and the well-being of others. In particular, they can be assumed to contribute to an individual's confidence in overcoming barriers to pro-environmental behavior. This confidence, environmental self-efficacy, has only been measured in the context of specific behaviors (e.g. recycling). In this study, we developed a broad measure of environmental self-efficacy: the Environmental Self-Efficacy Scale (ESE20) and a derivative short version (ESE10). Through an online survey, two convenience samples completed assessments of environmental self-efficacy, generalized self-efficacy, and character strengths ($N_C = 224$) as well as environmental self-efficacy and psychological barriers to pro-environmental behavior ($N_V = 169$). Both ESE20 and ESE10 demonstrated unidimensionality, reliably captured environmental self-efficacy, and put forward medium to large positive relationships with generalized self-efficacy. The scales further yielded small to medium negative relationships with the psychological barriers Change Unnecessary, Conflicting Goals and Aspirations, Lacking Knowledge, and Tokenism. The character strengths zest and leadership sustained the numerically strongest relationships with environmental self-efficacy (medium positive effects) and generalized self-efficacy (large positive effects). Kindness, humility, prudence, fairness, and forgiveness were only related to environmental self-efficacy (small to medium positive effects), but not to generalized self-efficacy. These five strengths can hence be assumed to be other-focused and to specifically contribute to the well-being of others.

Keywords: positive psychology, character strengths, psychological barriers, pro-environmental behavior, environmental self-efficacy, scale construction

Introduction

Positive psychology has been defined as “the scientific study of optimal human functioning. It aims to discover and promote the factors that allow individuals and communities to thrive.” (Sheldon, Frederickson, Rathunde, Csikszentmihalyi, & Haidt, 2000, p. 1). These factors are civic virtues, individual traits, and institutions that cultivate valued subjective experiences and citizenship (Seligman & Csikszentmihalyi, 2000). Peterson and Seligman (2004) cataloged these civic virtues and individual traits in the VIA classification¹. These VIA traits are called character strengths and refer to stable yet malleable dispositions toward morally valued behavior. Several studies demonstrate that character strengths do indeed contribute to valued subjective experiences by improving life satisfaction, performance, and resilience (for an overview cf. Harzer, 2016; Niemiec, 2013). However, there is little research on character strengths’ contributions to citizenship or actions that enable communal thriving and the well-being of others (Ruch & Stahlmann, 2019).

The concept of communal thriving, considered on a large scale, can be assumed to entail environmental behavior. Because character strengths enable communal thriving, and communal thriving entails environmental behavior, we assume that character strengths may specifically enable environmental behavior. Environmental psychology has described a variety of psychological barriers that limit pro-environmental behavior (PEB) on the part of individuals who have the means to take action: For example, many individuals lack the necessary perspective to accurately assess the risks associated with climate change because these risks appear temporally and spatially remote (Gifford, 2011; Norgaard, 2009). Because character strengths may enable environmental behavior and contribute to actions that enable

¹ VIA originally referred to “Values in Action”; however, in 2007, the [VIA Institute on Character](#) redefined VIA as a word that stands on its own (Latin for the way/path) and disposed of the former meaning.

communal thriving and well-being, we propose that individuals who endorse them are able to more effectively overcome these barriers to PEB. In accordance with the previous example, the character strength of perspective is typically associated with individuals who “have a big picture on life” (Peterson & Seligman, 2004, p. 13). Thus, individuals who endorse perspective should be able to assess climate change risks more accurately.

The notion that character strengths contribute to PEB is supported by Corral-Verdugo (2012), who argues that PEB is built on positive dispositional factors, including character strengths. He further argues that PEB is sustained by positive psychological benefits including self-efficacy (intrinsic), social recognition (extrinsic), and overall well-being. Accordingly, he suggests that these benefits may be the result of endorsing character strengths—that endorsing character strengths may lead to self-efficacy. His model is coherent with that of Bandura (1997), who theorizes that self-efficacy for a given behavior is an important antecedent of that behavior, and conversely, that self-efficacy is sustained by experiencing a sense of “mastery” during the behavior.

Beyond environmental psychology, Ruch, Weber, Park, and Peterson (2014) found several strengths to have strong relationships with self-efficacy in youth (hope had the numerically highest partial correlation of $r = .54$, followed by zest, perspective, and creativity of $r = .52$ each; Range: $.10 \leq r \leq .54$). Furthermore, several behavioral theories have acknowledged self-efficacy as an antecedent of PEB. For example, Lindenberg and Steg’s goal framing theory (2007) unifies Schwartz’s norm-activation model (1977) and Ajzen’s theory of planned behavior (2002), both of which consider self-efficacy to be an important behavioral predictor. Two meta-analyses also found self-efficacy (and cognate concepts) to sustain medium positive relationships with PEB (Hines, Hungerford, & Tomera, 1987: $r = .37$; Bamberg & Möser, 2007: $r = .30$; 95% CI: $.21 \leq r \leq .38$). Hence, the literature suggests

that endorsing character strengths may lead to self-efficacy, and that self-efficacy leads to PEB, which can be considered an indicator of communal thriving and well-being.

Toward environmental self-efficacy

Beyond generalized self-efficacy (GSE; cf. Bandura, 1997), environmental psychologists have investigated domain-specific forms of self-efficacy, as they pertain to particular behaviors, such as recycling (Tabernero & Hernández, 2011: $r = .41$; Tang, Chen, & Luo, 2011: $\beta = .22$) and electricity saving intentions (Thøgersen & Grønhøj, 2010: $\beta = .39$). Bandura (2006) explains that these domain-specific measures of environmental self-efficacy (ESE) are preferable to GSE, which “usually has limited explanatory and predictive value because most of the items in an all-purpose test may have little or no relevance to the domain of functioning” (p. 307). This notion is supported by Hanss and Böhm (2010), who found that sustainable consumption behavior is related to sustainable development self-efficacy, but not to GSE. However, there has not yet been any research investigating ESE in a form more general than recycling, energy use, or sustainable consumption self-efficacy.

Aims of this study

Based on the previous literature, we assume that endorsing character strengths is related to building self-efficacy, especially ESE. We further assume ESE to be related to psychological barriers to pro-environmental behavior. However, prior studies only investigated ESE with a narrow focus, which has neglected the breadth of environmental behaviors and the barriers to those behaviors. Consequently, we want to investigate the relationship between character strengths and ESE by devising a new instrument to more broadly assess ESE. Accordingly, the aims of this study are twofold:

1. We will create a broad measure of ESE and examine its construct validity (reliability and factorial structure) and its convergent validity (correlation with GSE and psychological

barriers to PEB).

2. We will examine each VIA character strength's correlational pattern with ESE and GSE.

Method

Participants and procedure

This study rests on two convenience samples: a *construction sample* and a *validation sample*. In the construction sample, we administered the initial version of the ESE scale and assessed GSE and character strengths. In the validation sample, we administered the tentative final version of the ESE scale and assessed psychological barriers to PEB. Participants were required to be at least 18 years old and fluent in English. They were recruited through the web survey exchange platform SurveyCircle, and the first author's personal networks in the U.S.A., in particular at Dartmouth College (23.21% and 26.04% respectively were Dartmouth students). The survey was conducted online (www.sosicisurvey.de). The item order was randomized within each instrument to avoid sequencing effects. Participants were unaware of the research questions and stated that they responded seriously and to the best of their ability.

The construction sample comprised $N_C = 224$ participants (65.18% female, 34.38% male, 1.79% nonconforming/other; $M_{age} = 31.85$, $Min_{age} = 18$, $Max_{age} = 79$, $SD_{age} = 17.45$). 66.67% were white, 9.39% reported more than one ethnicity or "mixed" ethnicity, and the rest reported some other ethnicity. 97.77% of participants had started (or graduated from) college, 51.34% held a Bachelor's degree, and 29.02% held an advanced degree (Master's, PhD, etc.).

The validation sample comprised $N_V = 169$ participants (72.78% female, 27.22% male; $M_{age} = 31.25$, $Min_{age} = 18$, $Max_{age} = 82$, $SD_{age} = 14.93$). 63.91% were white, 7.10% reported more than one ethnicity or "mixed" ethnicity, and the rest reported some other

ethnicity. 90.53% of participants had started (or graduated from) college, 21.89% held a Bachelor's degree, and 39.64% held an advanced degree (Master's, PhD, etc.).

Construction of the Environmental Self-Efficacy Scale (ESE)

Based on Bandura's definition of GSE (Bandura, 1997, p. vii), we define ESE as "people's beliefs in their capabilities to produce desired effects in the environment by their own actions." Bandura's (2006) recommendations for creating measures of domain-specific self-efficacy guided our scale-construction: We used a rating system from zero ("cannot do at all") to ten ("highly certain can do") to achieve high data resolution. We also included items addressing specific types of ESE, and barriers of ESE. Finally, we aimed to vary the difficulty of the PEBs referenced in the items to avoid floor and ceiling effects. Initially, we devised 21 items. The items, the intended difficulty (easy, average, or difficult), and the intended generality (specific, barrier, or general) are depicted in Table 1. The items were crafted by the authors, who have backgrounds in environmental engineering and psychological assessment respectively. Items that addressed specific domains and barriers were chosen to cover the most important areas and aspects identified in the literature (cf. Gifford, 2014; Swim et al., 2009). A pilot group provided feedback on the scale's clarity before we distributed it to the actual participants.

Other instruments

The *Generalized Self-Efficacy Scale* (GSE; Schwarzer, Jerusalem, Weinman, Wright, & Johnston, 1995) assesses general self-efficacy with ten items (e.g., "I can usually handle whatever comes my way"). We applied the 11-point rating system from the ESE scale to parallelize the two measures. The GSE scale yielded good internal consistency ($\alpha = .87$ in the U.S.A. sample) and has been widely used and validated (cf. Scholz, Gutiérrez Doña, Sud, & Schwarzer, 2002; Schwarzer et al., 1995).

The *Character Strengths Rating Form* (CSRF; Ruch, Martínez-Martí, Proyer, & Harzer, 2014) assesses the 24 character strengths of the VIA classification with one item for each strength (e.g., Prudence: “Prudent people think about the consequences of their decisions before they act. They do not say or do things that they might later regret”) and is ranked on a scale from one (“very much unlike me”) to nine (“very much like me”). The CSRF showed good convergent validity with the thoroughly validated VIA Inventory of Strengths (VIA-IS) on which it is based (Ruch, Martínez-Martí, et al., 2014).

The *Dragons of Inaction Psychological Barriers* scale (DIPB; Lacroix, Gifford, & Chen, 2019) assesses five psychological barriers to PEB: Change Unnecessary, Conflicting Goals and Aspirations, Interpersonal Relations, Lacking Knowledge, and Tokenism. It uses 22 items (e.g., Tokenism: “My environmental actions already make enough of a difference”) and is ranked on a scale from one (“strongly disagree”) to seven (“strongly agree”). The DIPB put forward good internal consistency ($\alpha \geq .80$ across all barriers in a Canadian sample) and was validated across several domains of PEB with varying difficulty (e.g., high difficulty: driving less; low difficulty: recycling; Lacroix et al., 2019).

Results

We conducted the analyses within the R statistical computing environment (R Core team, 2019) and using the *psych* package (Revelle, 2018). Prior to evaluating the hypotheses, we screened the ESE scale’s items and the GSE, CSRF, and DIPB scores for plausibility, missing values, and outliers. Overall, $n_C = 12$ participants did not respond to the CSRF and were excluded from the correlation analysis. We set the probability estimate for outliers to $p \leq .001$ and evaluated z scores (univariate) and the minimum covariance determinant (multivariate; cf. Leys, Klein, Dominicy, & Ley, 2018). There were $n_V = 4$ univariate outliers in the DIPB. There were also $n_C = 33$ and $n_V = 34$ participants who would have qualified for

multivariate outliers. However, we did not exclude any outliers because omission did not change the correlational patterns. We evaluated correlation coefficients according to Cohen's guidelines (Cohen, 1988; small: $r = .10$; medium: $r = .30$; large: $r = .50$). Age yielded medium positive relationships (at 95% confidence) with GSE ($.23 \leq .35 \leq .46$) and 22 of the character strengths (Range: $.15 \leq r \leq .35$; the respective coefficients and the 95% confidence limits are available in the supplementary material), so it was partialled out in the analyses. Education level put forward medium positive relationships (at 95% confidence) with social intelligence ($.15 \leq .28 \leq .40$), so it was also partialled out.

Item selection and scale dimensionality

We began by investigating the tentative ESE scale's structure, item statistics, and connection with the GSE scale in the construction sample. Exploratory factor analyses using the minimum residual method clearly suggested unidimensionality: The first five eigenvalues were 9.67, 0.76, 0.47, 0.33, and 0.18. The respective factor loadings, corrected item-total correlations (CITCs), and further item statistics are depicted in Table 2. Unidimensionality was also indicated by a high internal consistency of $\alpha_{21} = .94$. However, item 19 had a markedly lower loading than the other items, was typically endorsed rather easily, and was the only item which, when omitted, would not decrease the internal consistency of the scale. Accordingly, we omitted item 19 and arrived at the final ESE20 scale, which yielded an excellent internal consistency of $\alpha_{20} = .94$.

We also developed a 10-item version for studies that require more brevity. For the ESE10, we omitted the items that had squared loadings below .40 and then omitted the remaining items that were among the least statistically difficult and that put forward relatively low loadings. The ESE10 also yielded an excellent internal consistency of $\alpha_{10} = .93$, and factor analysis again clearly suggested unidimensionality: The first five eigenvalues

were 5.63, 0.25, 0.10, 0.09, and 0.03. In comparison, the ESE20 is more comprehensive: it includes more items that are aimed at assessing specific types and barriers of ESE. In contrast, the ESE10 is shorter and contains items that were more statistically difficult. Both versions put forward medium to large correlations (at 95% confidence) with GSE: $.28 \leq .40 \leq .51$ (ESE20) and $.24 \leq .36 \leq .47$ (ESE10). The correlation between ESE20 and ESE10 was $r = .97$ when including overlapping items, and $r = .95$ when excluding them.

We reevaluated the ESE20 and ESE10's structure and item statistics in the validation sample. Exploratory factor analyses again clearly suggested unidimensionality: The first five eigenvalues were 5.78, 0.96, 0.57, 0.40, and 0.32 (ESE20) and 3.72, 0.40, 0.17, 0.08, and 0.04 (ESE10). The factor loadings, CITCs, and further item statistics are also depicted in Table 2. In contrast with the construction sample, the statistics are generally comparable, but the factor loadings and the CITCs were numerically lower while the item difficulties were numerically higher. Notably, item 07 yielded the numerically lowest loading and CITC and was among the easiest items. However, we assume that the pronounced ceiling effect in the validation sample accounted for the weak statistics and hence chose not to omit the item. Because this item performed well in the construction sample, we believe that it will also perform well in other less self-efficacious samples. Overall, both ESE20 and ESE10 again yielded high internal consistencies of $\alpha_{20} = .88$ and $\alpha_{10} = .85$. The scales and their instructions are available in the supplementary material.

Correlations with character strengths and psychological barriers to pro-environmental behavior

Next, we examined the correlational patterns of the GSE, ESE20, and ESE10 with each of the character strengths. The respective coefficients and the 95% confidence limits are presented in Table 3. Eighteen of the 24 character strengths put forward significant positive

relationships with GSE: zest and leadership (large effects); creativity, judgment, bravery, perseverance, honesty, social intelligence, self-regulation, gratitude, and hope (medium effects); curiosity, love of learning, perspective, love, appreciation of beauty, and humor (small to medium effects); and teamwork (small effect). Eleven of these 18 strengths also sustained significant positive relationships with both the ESE20 and ESE10: zest and leadership (medium effects), curiosity, bravery, perseverance, and gratitude (small to medium effects), love of learning, love, social intelligence, teamwork, and hope (small effects). Notably, five strengths yielded significant positive relationships only with the ESE20 and ESE10: kindness, fairness, humility, and prudence (small to medium effects); and forgiveness (small effect). Spirituality was the only strength that did not put forward any significant relationships.

Finally, we examined the correlational patterns of the ESE20 and ESE10 with psychological barriers to PEB. The respective coefficients and the 95% confidence limits are presented in Table 4. Four of the five barriers distinguished by the DIPB put forward significant negative relationships with both the ESE20 and ESE10: Conflicting Goals and Aspirations (medium effect); and Change Unnecessary, Lacking Knowledge, and Tokenism (small to medium effects). The barrier Interpersonal Relations did not yield any significant relationships.

Discussion

This study set out to create a broad measure of ESE, evaluate its psychometric properties, and investigate its relationships with character strengths and psychological barriers to PEB. Based on Bandura's (2006) scale construction guidelines, we devised two ESE measures: ESE20 and ESE10. Both scales demonstrated unidimensionality, yielded good item statistics, and sustained medium positive relationships with GSE. Because highly

domain-specific forms of ESE have been linked to their corresponding domains of PEB (Hanss & Böhm, 2010; Tabernero & Hernández, 2011; Tang et al., 2011; Thøgersen & Grønhøj, 2010), we assume that our broad measures of ESE will be linked to PEB in general and hence to the well-being of others. We also assume ESE to be connected with an individual's well-being due to Corral-Verdugo's (2012) assumption that PEB is maintained by positive psychological benefits, such as satisfaction and positive emotions.

ESE sustained the numerically strongest relationships with the character strengths of leadership and zest. Leadership entails "encouraging a group of which one is a member to get things done" (Peterson & Seligman, 2004, p. 30). This confidence in an individual's own capacity is inherent in the definition of GSE (cf. Bandura, 1997), and by extension also in ESE. Furthermore, individuals who frequently endorse leadership are sought after to take charge in emergencies and for help in solving complex problems (Peterson & Seligman, 2004). An individual's self-efficacy grows when others seek them out, expressing confidence in their capabilities (Bandura, 1997). These factors may explain the pronounced link between leadership and each measure of self-efficacy. Zest is defined as "approaching life with excitement and energy; not doing things halfway or halfheartedly" (Peterson & Seligman, 2004, p. 29). This definition combines aspects of perseverance and optimism and hence zest might contribute to an individual's beliefs about their own capabilities. The results also showed that the character strengths of perseverance and hope were related to ESE. However, the latter yielded surprisingly small effects. Accordingly, further investigation is required to better understand the relationship between zest and self-efficacy.

Kindness, humility, prudence, fairness, and forgiveness were the only strengths that yielded positive relationships with ESE but not with GSE. All of these character strengths, except for prudence, can be considered "other-focused": They are linked less strongly to

valued subjective experiences (e.g., life satisfaction) than many other strengths (cf. Harzer, 2016; Niemiec, 2013). Conversely, we assume that these strengths contribute to citizenship and the well-being of others and will lead to “experiences of mastery” (cf. Bandura, 1997) in other-focused domains of self-efficacy. Because PEB is other-focused, we assume that it is enabled by these other-focused strengths. Finally, prudence is “a form of practical reasoning and self-management that helps to achieve the individual’s long-term goals effectively” (Peterson & Seligman, 2004, p. 478). Because addressing environmental problems requires long-term planning, we assume that individuals who endorse prudence will behave more environmentally, and hence will demonstrate more ESE.

ESE put forward negative relationships with the psychological barriers of Change Unnecessary, Conflicting Goals and Aspirations, Lacking Knowledge, and Tokenism. Accordingly, individuals who describe themselves as environmentally self-efficacious also lean toward believing that they (a) need to act and that their actions make a difference, (b) are able to balance PEB with their other goals and aspirations, (c) know how (to learn more about how) to take action, and (d) are not doing enough and have to take more action. Previous studies have shown that these and similar beliefs can be connected with environmentally friendly intentions and PEB, such as climate-positive food-choice intentions (Gifford & Chen, 2017; Range: $-.15 \leq r \leq -.52$), self-reported energy conservation behavior (Lacroix & Gifford, 2018; Range: $-.17 \leq r \leq -.46$), and cooperation in an ocean fishing microworld commons dilemma (Chen & Gifford, 2015; Range: $-.22 \leq r \leq -.62$). Based on this study’s results, we may hence assume that character strengths will also be connected with such intentions and behavior, and that ESE and psychological barriers mediate this relationship.

Limitations and further research

Due to the properties of convenience sampling, the results have limited generalizability. The next step should be to further validate the ESE20 and ESE10 by examining its nomological network with similar concepts (e.g., locus of control), theoretically distinct traits (e.g., Big Five), and behaviorally-rooted criteria (e.g., PEB). Because we collected a convenience sample, it can be assumed that our participants have a higher average level of ESE than the general population. Accordingly, it would be useful to investigate the ESE20 and ESE10 in a more representative sample, including a more balanced sampling of gender, age, ethnicity, education, and political leaning. Although we randomized the item order within each instrument, we did not randomize or systematically counterbalance the order of the measures. This may have resulted in sequencing effects that mask the relationships between ESE, GSE, character strengths, and psychological barriers to PEB. The randomization of the item order might also impede the comparison with other studies' results that are based on the original item order of GSE, CSRF, and DIPB. Moreover, we cross-validated the ESE20 and ESE10's psychometric properties, but we did not administer the definitive ESE10 in a separate sample. Based on the strong connection between the items and the relationships with character strengths and psychological barriers to PEB, we believe that the ESE10 can be used on its own. However, this claim needs to be corroborated by further research.

As the results stand now, the connection between character strengths and ESE could be considered small, and the influence on overcoming barriers to PEB could be considered weak. However, given that each character strength was assessed by one item, it is promising that they still sustained small to medium relationships with ESE: We believe that the CSRF provided an initial picture of the correlational pattern, but that replication and extension of

the results using a more comprehensive VIA assessment suite (e.g., VIA-IS; cf. Peterson & Seligman, 2004) is needed. These issues could be tackled in an extensive correlational or longitudinal study linking character strengths to (trajectories of) ESE, psychological barriers to PEB, individual well-being, and PEB.

Conclusion

We present the ESE20 and ESE10, two internally consistent and preliminarily validated measures to assess environmental self-efficacy. The ESE scales allow for further elucidation of the link between character strengths and a commonly neglected indicator of well-being: pro-environmental behavior. Environmental self-efficacy was related to certain character strengths and psychological barriers to pro-environmental behavior, which suggests that these strengths contribute to building confidence in overcoming such barriers. Although these strengths usually do not put forward strong relationships with an individual's well-being, our research suggests that they might be antecedent to pro-environmental behavior and consequently to the well-being of others.

Compliance with ethical standards

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and 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.

Conflict of interest

The authors declare that they have no conflict of interest. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Table 1

The original 21 items of the Environmental Self-Efficacy Scale.

Item	Wording	Intend. Diff.	Intend. Gen.
	I can...		
01	...control my impact on the environment	A	G
02	...help mitigate environmental problems in my community, if they arise	A	G
03	...find several ways to be part of the solution when I am introduced to an environmental problem	A	G
04	...reduce the environmental problems that the next generation will need to face in the future	A	G
05	...have a significant positive impact on the environment	D	G
06	...be as environmentally friendly as most people in my community	A	G
07	...avoid being among the least environmentally friendly members of my community	E	G
08	...choose forms of transportation that cause fewer carbon emissions	A	S
09	...help preserve the quality of the water	A	S
10	...choose to be an environmentally friendly consumer	A	S
11	...reduce the negative impact I have on the planet	A	G
12	...support environmental policy through political activism	D	S
13	...do my part in solving the world's environmental problems	E	G
14	...be environmentally friendly even when the people with whom I have close relationships are not	A	B
15	...continue being environmentally friendly even when faced with financial burdens	A	B
16	...continue being environmentally friendly even when I'm having a bad day	A	B
17	...make environmentally eating choices	D	S
18	...set an example of environmentally friendly behavior, for others to follow	D	G
19	...motivate myself to pick up trash, if I see it on the ground	A	S
20	...learn more about new environmental issues as they become relevant	A	S
21	...continue to take steps towards solving large environmental problems, even when others are overwhelmed by the scale of these problems	A	B

Note. Intend. Diff. refers to the intended difficulty (E = Easy, A = Average, D = Difficult) and Intend. Gen. refers to the intended generality (S = Specific, B = Barrier, G = General) of the items.

Table 2

Item Statistics of the Environmental Self-Efficacy Scale.

Item / Scale	M		SD		Skewness		Kurtosis		Difficulty		CITC		Loading	
	C	V	C	V	C	V	C	V	C	V	C	V	C	V
01 ^a	7.52	8.04	2.14	2.21	-0.29	-0.21	-0.26	-0.85	65.16	70.36	.63	.61	.62	.61
02 ^{ab}	6.71	7.19	2.42	2.30	-0.19	-0.15	-0.49	-0.50	57.10	61.89	.76	.62	.76	.63
03 ^{ab}	7.27	7.79	2.23	2.05	-0.20	-0.20	-0.38	-0.50	62.66	67.87	.73	.67	.73	.68
04 ^{ab}	6.85	7.22	2.27	2.67	-0.01	-0.26	-0.51	-0.78	58.48	62.25	.67	.57	.67	.57
05 ^{ab}	6.64	6.75	2.39	2.62	0.00	-0.13	-0.56	-0.53	56.37	57.51	.64	.54	.64	.54
06 ^a	8.53	9.28	2.25	1.79	-0.94	-0.95	0.83	0.63	75.32	82.78	.68	.52	.67	.48
07 ^a	8.76	9.22	2.53	2.36	-1.13	-1.55	0.55	1.98	77.58	82.25	.56	.22	.56	.20
08 ^a	7.33	7.95	2.76	2.69	-0.37	-0.65	-0.79	-0.26	63.27	69.47	.53	.33	.52	.33
09 ^a	6.99	7.08	2.55	2.67	-0.07	-0.20	-0.66	-0.77	59.91	60.77	.54	.45	.53	.45
10 ^a	8.11	8.60	2.22	1.99	-0.47	-0.40	-0.33	-0.74	71.12	75.98	.75	.59	.74	.59
11 ^{ab}	8.25	8.90	2.22	1.81	-0.70	-0.61	0.35	-0.30	72.54	78.99	.80	.65	.80	.67
12 ^{ab}	6.39	7.00	2.87	5.82	-0.13	-0.24	-0.89	-0.84	53.90	60.00	.65	.34	.65	.32
13 ^{ab}	7.36	8.02	2.33	2.09	-0.31	-0.17	-0.29	-0.70	63.56	70.18	.79	.65	.79	.66
14 ^{ab}	8.28	8.98	2.28	2.04	-0.68	-0.98	0.08	0.65	72.76	79.82	.81	.56	.81	.54
15 ^a	6.78	6.59	2.43	2.60	-0.04	-0.05	-0.67	-0.72	57.85	55.92	.59	.50	.58	.50
16 ^a	8.15	8.35	2.25	2.28	-0.55	-0.65	-0.08	-0.13	71.52	73.49	.74	.52	.73	.50
17 ^a	7.68	8.27	2.52	2.26	-0.61	-0.35	-0.29	-0.72	66.79	72.66	.67	.46	.66	.45
18 ^{ab}	7.89	8.62	2.25	2.11	-0.47	-0.54	-0.03	-0.40	68.92	76.21	.77	.69	.77	.68
19	8.57		2.24		-0.71		-0.09		75.67		.41		.41	
20 ^a	8.63	9.22	2.02	1.83	-0.64	-0.71	0.12	-0.57	76.32	82.25	.65	.46	.65	.44
21 ^{ab}	6.96	7.92	2.46	2.28	-0.18	-0.45	-0.40	0.02	59.55	69.23	.79	.61	.78	.61
ESE20	7.55	8.05	1.65	1.25	-0.35	-0.09	0.51	-0.21						
ESE10	7.25	7.84	1.84	1.47	-0.20	-0.14	0.14	-0.33						

Note. C = Construction sample ($N_C = 224$; 21 items); V = Validation sample ($N_V = 169$; 20 items); ^a = Items included in the 10-item version of the Environmental Self-Efficacy Scale (ESE10); ^b = Items included in the 20-item version of the Environmental Self-Efficacy Scale (ESE20); CITC = Corrected item-total correlation. The statistics for the ESE10 are in the supplementary material.

Table 3

Character strengths' correlational patterns with generalized self-efficacy and environmental self-efficacy.

Character strength	GSE			ESE20			ESE10		
	Lower	r	Upper	Lower	r	Upper	Lower	r	Upper
Creativity	.14	.27	.39	-.05	.08	.21	-.06	.08	.21
Curiosity	.07	.20	.33	.05	.18	.31	.04	.17	.30
Judgment	.12	.25	.37	-.01	.13	.25	-.03	.10	.23
Love of learning	.10	.23	.35	.03	.16	.28	.01	.14	.26
Perspective	.10	.23	.35	.28	.07	.20	-.05	.09	.22
Bravery	.21	.34	.45	-.07	.18	.31	.05	.18	.31
Perseverance	.21	.33	.44	.05	.20	.32	.07	.20	.32
Honesty	.12	.25	.37	.07	.09	.22	-.04	.09	.22
Zest	.33	.44	.54	-.04	.26	.38	.14	.27	.39
Love	.07	.20	.33	.13	.16	.29	.02	.15	.28
Kindness	-.03	.10	.23	.03	.21	.33	.07	.20	.33
Social intelligence	.13	.26	.38	.08	.15	.27	.02	.15	.28
Teamwork	.01	.14	.27	.04	.17	.29	.02	.16	.28
Fairness	-.02	.11	.24	.05	.18	.30	.02	.15	.28
Leadership	.33	.44	.54	.15	.28	.39	.16	.29	.40
Forgiveness	-.06	.07	.20	.03	.16	.28	.01	.14	.27
Humility	-.09	.04	.17	.06	.19	.31	.04	.18	.30
Prudence	-.01	.12	.25	.05	.18	.31	.03	.16	.29
Self-regulation	.20	.33	.44	.00	.13	.26	-.01	.12	.25
Appr. of beauty	.05	.18	.31	.00	.13	.26	-.02	.11	.24
Gratitude	.13	.26	.38	.04	.17	.30	.02	.16	.28
Hope	.11	.24	.36	.03	.16	.29	.04	.17	.29
Humor	.06	.19	.31	-.10	.03	.16	-.08	.05	.18
Spirituality	-.12	.02	.15	-.17	-.04	.09	-.14	-.01	.12

Note. $N_C = 224$ (construction sample); Lower/Upper = Lower and upper bounds of 95% confidence interval.

GSE = Generalized Self-Efficacy Scale; ESE20 = Environmental Self-Efficacy Scale (20-item version); ESE10 = Environmental Self-Efficacy Scale (10-item version).

Table 4

Psychological barriers' correlational patterns with environmental self-efficacy.

Psychological Barrier	ESE20			ESE10		
	Lower	r	Upper	Lower	r	Upper
Change Unnecessary	-.37	-.23	-.08	-.35	-.21	-.06
Conflicting Goals and Aspirations	-.42	-.29	-.14	-.35	-.21	-.06
Interpersonal Relations	-.29	-.15	.01	-.28	-.14	.01
Lacking Knowledge	-.34	-.19	-.05	-.31	-.16	-.01
Tokenism	-.36	-.22	-.07	-.35	-.21	-.06

Note. $N_V = 169$ (validation sample); Lower/Upper = Lower and upper bounds of 95% confidence interval.
ESE20 = Environmental Self-Efficacy Scale (20-item version); ESE10 = Environmental Self-Efficacy Scale (10-item version).