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Structural confirmation of the 24-item Environmental Attitude Inventory

Running head: EAI-24 STRUCTURAL CONFIRMATION

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Abstract: Despite an ever-increasing use of the Environmental Attitude Inventory (EAI), few studies have aimed at checking the dimensional structure of its 24-item version and particularly the structure of the subdimensions and its two main dimensions: utilization and preservation of the environment. Structural analyses confirmed the strength of the structure suggested by Milfont and Duckitt (2010) particularly well. Pro-environmental behaviors can be predicted by this scale, mainly through the dimension of preservation. Lastly, two of the ideological and emotional subdimensions of preservation appeared not to be highly specific in the French context of our study: environmental movement activism and ecocentrism, which cover ecological behavior and the support for interventionist conservation policies. If the objective of the scale is not to study those two dimensions, we suggest a shorter version of the EAI, more balanced, coherent and structured into 20 items comprising 10 clearly distinct subdimensions.

Keywords: environmental attitudes; environmental attitudes inventory; validity; reliability; structural dimension

The New Environmental Paradigm (NEP) Scale (Dunlap, Van Liere, Mertig, & Jones, 2000; Dunlap & Van Liere, 1978) has been the most-used environmental attitude scale in research for more than four decades. The aim of the NEP is to evaluate the occurrence of a favorable and symbiotic relationship with the environment, as opposed to the classical paradigm of social dominance which prevailed during the 1970s (Pirages & Ehrlich, 1974). This unidimensional perspective refers to the idea that an individual has a relationship with the environment on a continuum which ranges from a pro-environmental attitude (i.e. high NEP score) to a counter-environmental attitude (i.e. low NEP score), with one orientation excluding the other. In many studies, pro-environmental attitude is measured through short scales, built to be one-dimensional, with the aim of revealing the complex but interesting links between attitude and pro-environmental behaviors (e.g. Moreno, Amérigo, & García, 2016; Martín, Hernández, & Alonso, 2017). In doing so the authors neglect to take into account the wealth of sub-dimensions envisaged to predict behaviors (Amerigo, Aragonés, & García, 2012). Individuals indeed have a complex relationship with the environment and to respond this complexity, Milfont and Duckitt (2010) proposed a multidimensional scale: the Environmental Attitude Inventory.

1. The EAI: a multidimensional environmental attitude

Even though there is currently a wide range of work on environmental attitudes (Dunlap & Jones, 2002), some models attempted to lend certain coherence to this set. Based on a research corpus, Bogner & Wiseman (2006) proposed a first metric tool: the model of ecological values with two orthogonal dimensions, which are preservation and utilization of the environment (2-MEV, Model of Ecological Values). It is possible to have high scores on both these dimensions, demonstrating a strong desire to preserve the environment while simultaneously maintaining an

attitude which encourages human beings to use this environment. Several studies have since invalidated the orthogonal character of these two attitudinal dimensions in favor of a strong negative correlation (Le Hebel, Montpied, & Fontanieu, 2014; Milfont & Duckitt, 2010).

Drawing on the work carried out by Bogner and Wiseman (2006), Milfont and Duckitt (2010) proposed the Environmental Attitude Inventory. This scale of 120 items makes it possible to evaluate the multidimensional aspect of environmental attitude in terms of utilization and environmental preservation illustrating twelve subdimensions.

Preservation of the environment was defined by Milfont & Duckitt (2010) as “the general belief that priority should be given to preserving nature and the diversity of natural species in its original natural state, and protecting it from human use and alteration” (p. 81). It is evaluated by the following subdimensions: Enjoyment of nature, Support for interventionist conservation policies, Environmental movement activism, Environmental threat, Personal conservation behavior, Ecocentric concern, Support for population growth policies.

Utilization of the environment was defined as “the general belief that it is right, appropriate and necessary for nature and all natural phenomena and species to be used and altered for human objectives” (Milfont & Duckitt, 2010; p. 81). Environment utilization is assessed using the following sub-scales: Conservation motivated by anthropocentric concern, Confidence in science and technology, Altering nature, Human dominance over nature, Human utilization of nature (see appendix A for details).

Milfont and Duckitt (2010) proposed different versions of the EAI: an abridged version with 72 items and a short 24-item version. We must point out that the short version has never been subjected to structural validation contrary to the 120 and 72-item versions.

2. The variables associated with preservation and utilization of the environment

The two higher-order dimensions of the EAI are linked to behaviors, personality traits, and values. First of all, Bogner, Brengelmann and Wiseman (2000) observed that environmental preservation is associated with caution and risk control, while utilization of the environment is associated, among other things, with risk behavior. Wiseman and Bogner (2003) associated the higher order dimensions of environmental attitude with Eysenck's personality factors of Psychoticism and Neuroticism (tendency towards anxiety, anger, guilt, and depression).

Kaiser and Scheuthle (2003) associated environmental preservation with an altruistic conception of values and utilization of the environment with a utilitarian conception. Milfont and Duckitt (2010) also demonstrated that the environmental preservation dimension is associated with the relationship with nature, social desirability, ecological behavior, a favorable relationship with sustainable development, the belief that economic growth cannot be everlasting, a pro-democratic attitude and transcendence. On the other hand, utilization of the environment is associated with social dominance, authoritarianism, economic liberalism, and religious observance. Wiseman, Wilson and Bogner (2012) observed similar results regarding authoritarianism on the '*2-MEV Scale*', which is positively correlated with utilization of the environment and negatively with preservation. Social dominance orientation (Pratto, Sidanius, Stallworth, & Malle, 1994) refers to a preference for hierarchical and dominant relationships with lower social classes. It was associated with a strong tendency to utilize the environment (Milfont, Richter, Sibley, Wilson, & Fischer, 2013). This is particularly the case when the utilization made it possible to establish even further the dominant status of the individual or their group (Milfont & Sibley, 2014; Pansu, Tarquinio, & Gilibert, 2005). Lastly, Munoz, Bogner,

Clement, and Carvalho (2009) observed that environmental preservation is relatively stable among different countries, while the utilization of the environment is a source of considerable disparity from one country to another, due mainly to current economic policy.

3. Validation of the EAI-24

Last negotiations between USA and Europe, and particularly France, concerned the difference of consideration given to the ecological question (Butler, 2017). Nevertheless, no measure comparable to the EAI-24 was proposed in French version that could compare the opinions of the citizens of these different countries, particularly with regard to the different dimensions of the pro-environmental attitude. For the moment, the only scale of pro-environmental attitude available in French is the revised 15-item NEP (Schleyer-Lindenmann, Dauvier, Ittner, Piolat, 2014), which original version has been the subject of much criticism, including on its structure (Hawcroft & Milfont, 2010).

On another aspect, even though the EAI-24 version proposed by Milfont and Duckitt was not subject to a detailed structural validation, contrary to the 72- and 120-item versions of the scale, several authors have started to use it (Janigo, 2015; Milfont & Sibley, 2011; Suk, Jung, & Sato, 2009; Tate, Stewart, & Daly, 2014). It is therefore important to be sure that the answers to the EAI-24 actually refer to the dimensions as they were validated in previous versions.

4. Method

The validation procedure used was similar to the procedure recommended by Apostolidis and Fieulaine (2004). The objective was to validate the contents and dimensional construct of the scale in its 24-item version. The validation procedure was carried out in three stages. Firstly, the

24 items of the scale were translated and adapted in French from the original version of Milfont & Duckitt (2010). Secondly, the French version of the EAI-24 was pre-tested. Thirdly, the scale was validated on undergraduate students.

4.1. French translation and pre-test of the EAI-24

The 24 items of the scale were those preselected by Milfont and Duckitt (2010) by selecting in the 12 dimensions, the balanced items with the higher corrected mean-item total correlations. Those 24 items were translated by a bilingual colleague. The translator's instructions were to offer several suggestions for items whose translation was ambiguous. The complete scale was subjected to a commented pre-test on a sample of 10 people. For ambiguous items, those taking part in the pre-test had to choose the translated version of the items which seemed the most clear and coherent to them, and to justify their choice. Finally, the version of the item where consensus was reached was retained. Lastly, the EAI-24 in French (see appendix B) was submitted to a wider sample to validate its structure.

4.2. Participants

481 psychology undergraduate students (average age = 20.0; $SD = 2.9$) took part in the study: 83 men (average age = 20.8; $SD = 5.1$) and 398 women (average age = 19.8; $SD = 2.2$). The participants earned a research credit for answering the questionnaire.

4.3. Procedure

The questionnaire was made available online, on the Qualtrics© platform. The participants first answered the EAI-24 before filling in a questionnaire on self-reported ecological behavior (Whitmarsh & O'Neill, 2010) and lastly gave their name, and gender.

The participants answered all 24 items on a 7-point Likert scale, ranging from 1: 'Strongly disagree' to 7: 'Strongly agree'. The presentation of the 24 items was random and the Cronbach alpha was satisfactory ($\alpha = .83$).

In order to test the predictive character of the EAI-24 on ecological behavior, the participants were required to answer a scale of pro-environmental behaviors frequencies, translated and adapted from Whitmarsh & O'Neill (2010; see appendix C). This showed how often they had engaged in 17 pro-environmental behaviors from 1: "never" to 7 "always" (e.g. turning off lights when not in use; sorting waste; having shorter showers, etc.). The Cronbach alpha was satisfactory ($\alpha = .77$).

5. Results

5.1. Descriptive analysis

The psychometrics of the EAI-24, by dimension and subdimensions, are shown in Table 1.

INSERT TABLE 1 HERE

5.2. Factor analyses

The two negatively correlated ($r = -.50$, $p < .001$) higher-order dimensions, i.e., utilization and preservation, were the subject of two successive factor analyses with Varimax rotation. A

first 5-factor analysis on the environmental utilization's items was asked. A second 7-factor analysis was asked for the environmental preservation's items.

5.2.1. The Utilization Dimension

The factor analysis provided a five-factor solution, explaining 84.37 % of the total variance. The Kaiser-Meyer-Olkin index was satisfactory (KMO = .57). All the items had a contribution higher than .80. These results allowed to conclude that the 'Utilization of the environment' dimension clearly demonstrated a structure in five dimensions consistent with the initial construction of the scale (Milfont & Duckitt, 2010).

INSERT TABLE 2 HERE

5.2.2. The Preservation Dimension

Continuing Milfont and Duckitt's research, we carried out a primary factor analysis in 7 factors which comprised subdimensions 1, 2, 3, 6, 8, 11, and 12 explaining 66.32 % of the total variance. The Kaiser-Meyer-Olkin index was satisfactory (KMO = .73). The items of dimensions 3 and 11 (respectively, pro-environmental activism and ecocentric concern) contributed non-specifically to several factors. These items were excluded before conducting a second analysis comprising 5 dimensions for preservation.

This 5-factor solution (dimensions 1, 2, 6, 8, 12) explained 77.68 % of the total variance. The Kaiser-Meyer-Olkin index was satisfactory (KMO = .59). The saturation loadings of the items were then systematically higher than .70. Table 3 shows the factorial contributions of all the items according to the theoretical solution in 7 dimensions and in 5 dimensions (in brackets).

INSERT TABLE 3 HERE

The items were actually grouped two at a time, in factors referring to the original dimensions. Cronbach's alpha for the general dimension of environmental preservation was subsequently .77 in 7 dimensions. It remained satisfactory for the 20-item EAI ($\alpha = .66$). In order to conduct these analyses, we used the same methodology to test two models in 7 and 5 dimensions. The same two models were used for the subsequent confirmatory analyses. In accordance with Milfont & Duckitt's initial construction (2010), we first tested the horizontal structuration of the EAI with two confirmatory analyses and two more analyses were performed for the vertical structure.

5.3. Confirmatory factor analysis of the EAI dimensions

For the horizontal structure, we first tested the hypothesis of a factorial model where twenty-four items were distributed, two at a time, in the twelve subdimensions of the EAI (model 1 in 24 items). In a second time, we excluded the 'Pro-environmental activism' (d3) and 'Ecocentric concern' (d11) subdimensions that did not present a clear factorial saturation. Thus, we tested the hypothesis of a distribution of the 20 remaining items, two at a time, in the ten associated subdimensions (model 2 in 20 items).

For the vertical structure, we first tested the hypothesis of twelve subdimensions distributed in two higher-order dimensions (model 3 in 12 subdimensions). In a second time, we excluded subdimensions d3 and d11 to test the distribution of the ten remaining dimensions in the two higher-order dimensions (model 4 in 10 subdimensions).

All these analyses were conducted on the Statistica© SEPATH model with the hypothesis of correlated factors in accordance with Milfont & Duckitt's 2010 validation. The analyses gave

five iterations of estimates of the least squares followed by maximum likelihood estimates. The aim of these analyses was to measure the fit of the empirical data to the different theoretical models proposed.

The goodness of fit of the data to the theoretical models of the subdimensions and of the two higher order dimensions was estimated by taking five indices intrinsic to Structural Equation Modelling. To report on the overall goodness of fit of the model to the data, we used the relative chi-square (χ^2/df) for which a low value indicated a fitted model. Its value is considered as satisfactory up to 2 (Ullman, 2001), or up to 5 (Schumacker and Lomax, 2004). The root mean square error of approximation (RMSEA) was used to describe the error of approximation to the data of the model. A score of less than .05 indicates an excellent goodness of fit of the data and a value between .05 and .08 indicates a reasonable fit error (Browne & Cudeck, 1992). The standardized root mean square residual (SRMR) indicates a weak difference between the correlations observed and the correlations predicted by the model if its value is lower than or equal to .08 (Hu & Bentler, 1999). The comparative fit index (CFI) estimate the difference between the χ^2 of the tested model and the theoretical one; a value higher than .90 indicate a good fit (Hu & Bentler, 1999). In the same way, the non-normed fit index (NNFI) compare the tested model to the null model. The score is considered as reasonable when it is higher than .90 (Awang, 2012) or .95 (Hu & Bentler, 1999). The Aikake information criterion (AIC, Akaike, 1987), whose low score shows a better parsimony of data, finally enabled us to compare the models.

5.3.1. Horizontal structuration of the EAI

The first factorial model hypothesis tested the distribution of the twenty four items, two at a time, in the subdimensions of the EAI (model 1 in 24 items). The indicators showed a goodness of fit to the data with the 12 subdimensions of the EAI ($\chi^2 = 268.81$; $df = 163$; $\chi^2/df = 1.65$; RMSEA = .038, 90%CI = [.030, .046]; SRMR = .030; CFI = .970; NNFI = .953; $p < .0001$). Model 2 in 20 items also showed goodness of fit to data with the 10 subdimensions of the EAI ($\chi^2 = 179.00$; $df = 106$; $\chi^2/df = 1.69$; RMSEA = .037, 90%CI [.029, .048]; SRMR = .029; CFI = .973; NNFI = .956; $p < .0001$). With the exception of item 18, which did not present a satisfactory goodness of fit to model 1 ($t = .35$, ns.) and model 2 ($t = -.20$, ns.), all items showed an excellent goodness of fit score for model 1 ($t > 2.575$, $p < .01$) and model 2 ($t > 5.806$, $p < .001$).

Even though both models presented satisfactory fits, comparison between the two models allowed us to observe a significant difference ($\Delta\chi^2(\Delta df) = 89.81$ (57); $p < .01$) in favor of model 2 in 20 items whose AIC parsimony and goodness of fit index (AIC = .072) was lower than that of the 24-item model 1 (AIC = 1.03). Model 1 in 24 items and model 2 in 20 items showed a very satisfactory goodness of fit to the data, even though comparison between the two models showed a significant advantage for model 2 in 20 items.

INSERT TABLE 4 HERE

5.3.2. *Vertical structuration of the EAI*

In order to conduct the confirmatory factor analysis of the two higher-order dimensions, the items of each of the 12 subdimensions were averaged. The results shown below are based on a model with two correlated factors which showed the best fit in Milfont & Duckitt's 2010 validation.

The confirmatory factor analysis (model 3 in 12 subdimensions) enabled us to observe that the structure of the 24-item EAI fully reflected the two dimensions of utilization and preservation of the environment ($\chi^2 = 146.11$; $df = 53$; $\chi^2/df = 2.76$; RMSEA = .062, 90%CI = [.050, -.074]; SRMR = .050; CFI = .884; NNFI = .855; $p < .0001$). Dimension 5 (i.e. confidence in science and technology) is the only dimension which did not present a significant goodness of fit to the dimension of utilization of the environment ($t = 1.71$, *ns.*). The other dimensions were fitted to the model ($t > 2.575$, $p < .01$).

Model 4 in 20 items enabled us to observe better goodness of fit scores to the two dimensions of utilization and preservation of the environment than model 3 ($\chi^2 = 87.49$; $df = 34$; $\chi^2/df = 2.57$; RMSEA = .059, 90%CI = [.044, -.074]; SRMR = .048; CFI = .877; NNFI = .837; $p < .0001$). The difference between the models was considerable ($\Delta\chi^2(\Delta df) = 58.62$ (19); $p < .0001$), with a better AIC parsimony and goodness of fit index of model 4 in 20 items (AIC = .270) than model 3 in 24 items (AIC = .409).

INSERT TABLE 5 HERE

The results of the confirmatory factor analyses of the EAI showed an overall goodness of fit of the items to the subdimensions and of these subdimensions to the two higher-order dimensions. The vertical and horizontal structures of the pro-environmental attitude were also found here, whether it was measured in 24 items or in 20 items, as postulated by Milfont and Duckitt. Comparison between the two models nevertheless showed an advantage for the French version in 20 items.

5.4. Predictive power of the EAI on pro-environmental behaviors

To understand the predictive power of the EAI in 24 items and in 20 items on pro-environmental behaviors, a series of linear regressions was computed using the overall score of the EAI and its two higher-order dimensions, i.e. utilization and preservation of the environment as predictors. In order to calculate the overall score of the EAI, utilization's items were reversed and the average score was computed on the 24 and 20 items of the scale. All the results are given in Table 6. To make the results easier to read, the utilization of the environment scores have been reversed.

INSERT TABLE 6 HERE

The 24-item version of the EAI predicted ecological behavior with 28% of explained variance. The 20-item version showed an explained variance of 23%. Logically, multiple regressions showed that the dimension of preservation of the environment, more than the utilization one, predicted pro-environmental behaviors. Following on from the results provided by Milfont & Duckitt (2010), addressing the utilization dimension did not lead to any significant gain of explained variance of behaviors.

Even though the 20-item EAI appeared to be consistent with previous analyses, it must be noted that the two eliminated dimensions of environmental movement activism and ecocentric concern contributed to the prediction of pro-environmental behaviors (respectively $R^2=.20$ and $R^2=.16$). The 'Preservation of the environment' dimension in 14 items therefore showed a better explained variance of ecological behavior ($R^2 = .32$) than the version in 10 items ($R^2 = .26$).

6. Discussion

This study had a dual objective. First of all, we had to validate the complete structuration of the EAI-24. Subsequently, the objective was to be sure of the discriminant power of the scale

with regards to the variable with which it is most frequently associated, the declared frequency of pro-environmental behaviors.

Firstly, the results allowed us to conclude that the structuration of the EAI is satisfactory, for the higher-order dimensions of utilization and preservation of the environment, and also for the constitutive subdimensions. However, the factor analysis showed a lack of fit on subdimensions 3 (environmental movement activism) and 11 (ecocentric concern). In terms of structuration, the 20-item scale showed a better adjustment without dimensions 3 and 11, making it possible to simultaneously balance the items between the two higher-order dimensions (10 and 10 items for the EAI-20, against 14 and 10 in the EAI-24). We must nevertheless point out that even though the difference in fit was in favor of the EAI-20, the adjustment of the EAI-24 remained particularly satisfactory. We can suppose that pro-environmental activism currently corresponds more to a faint political stance, partly because it has been taken by most French political parties. The same goes for the topic of deforestation, which has been widely reported in the media. From our point of view, these dimensions of activism and ecocentrism in French context, seem to be so consensual they do not discriminate anymore. These points should be investigated in future research. Those dimensions are nevertheless good indicators of the reported ecological behavior. In order to better predict pro-environmental behaviors with future scales, one could operationalize more activism and ecocentrism items.

As expected, the scores of the EAI predicted the frequency of pro-environmental behaviors in a satisfactory manner. When the scale is used with the sole objective of predicting ecological behaviors, the results would suggest that it is preferable to use the 24-item version, by including the two dimensions simultaneously in a multiple regression. When working on pro-

environmental behaviors with the need for a short survey, the dimensions of preservation of the environment (14 items), used on its own, makes it possible to predict these behaviors just as well. The EAI-20 score nevertheless remains a satisfactory predictor of behaviors, but predicts 6% less variance in our study.

Limitations and perspectives

Even though the dimension of utilization of the environment presents a highly satisfactory structure, it is not highly relevant for predicting pro-environmental behaviors. Nevertheless, it is still very important to consider the relationship of this dimension with ecology, particularly its relationship with economic liberalism which implies an exploitation of natural resources (Milfont and Duckitt, 2010) and social dominance orientation (Milfont, Richter, Sibley, Wilson, & Fischer, 2013). Otherwise, contrary to the first scale validation of Milfont & Duckit (2010), we have not related the EAI-24 with several constructs such as social dominance, political stances, attitude toward economic growth or social desirability. It seems important to us to explore those links in future research, in order to evaluate more closely the discriminant validity of the scale. In a recent study, it appeared to us that utilization of the environment is less sensitive to the social desirability bias to be found in the answers than the preservation of the environment dimension (Ajdukovic, 2015).

Another limit of our study concerns the sample of participants. Indeed, some aspects need to be pointed out: the sample is fully composed of undergraduate psychology students, with only few men and the survey was not anonymous. Several studies showed that those aspects (track, gender, and anonymity) can sometimes influence pro-environmental attitude (see Gifford & Nilsson, 2014), thus our results need to be treated cautiously.

Conclusion and recommendations

On the basis of all the results observed in this study, we must encourage the use of this translation of the EAI, either in its 20-item or in its 24-item version. These two versions demonstrate not only a satisfactory predictive power of ecological behavior, but also make it possible to evaluate between ten and twelve distinct subdimensions, and two higher-order dimensions of the relationship to the environment.

Even though the factor analyses and the confirmatory analysis show a psychometric advantage for the EAI-20 version of the scale, the predictive power of the scale for declared ecological behavior is higher in its EAI-24 version. We therefore encourage a contextualized use of the scale. Nevertheless, if the scale is designed to study the general relationship with the environment, we believe the use of the EAI-20 version to be preferable, because it is not only shorter, but will also offer better psychometric consistency. The EAI in 20 items also presents 10 particularly distinct subdimensions which are consistent with the two main dimensions of utilization (including Altering nature, Human dominance over nature, Conservation motivated by anthropocentric concern, Utilization of nature, Confidence in science, and technology) and preservation (including Enjoyment of nature, Support for interventionist conservation policies, Personal ecocentric behavior, Environmental threat, Support for population growth policies). The specific nature of these subdimensions will allow us to explore each of them with no conceptual overlap, in subsequent predictive validation studies.

Bibliography

- Ajdukovic (2015). Appropriation et valorisation sociale de l'orientation pro-environnementale (Appropriation and social valorization of eco-friendly orientation), *doctoral thesis*. University of Burgundy.
- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52(3), 317-332.
- Amerigo, M., Aragonés, J. I., & García, J. A. (2012). Exploring the dimensions of environmental concern. An integrative proposal. *Psychology*, 3(3), 353-365
- Apostolidis, T., & Fioulaine, N. (2004). Validation française de l'échelle de temporalité. [French validation of the time-scale] *Revue Europeene de Psychologie Appliquee*, 54(3), 207–217. doi:10.1016/j.erap.2004.03.001
- Awang, Z. (2012). *Structural equation modeling using AMOS graphic*. Penerbit Universiti Teknologi MARA.
- Bogner, F. X., Brengelmann, J. C., & Wiseman, M. (2000). Risk-taking and environmental perception. *The Environmentalist*, 20(1), 49-62. doi: 10.1023/A:1006656011403
- Bogner, F. X., Johnson, B., Buxner, S., & Felix, L. (2015). The 2-MEV model: Constancy of adolescent environmental values within an 8-year time frame. *International Journal of Science Education*, 37(12), 1938–1952. doi: 10.1080/09500693.2015.1058988
- Bogner, F. X., & Wiseman, M. (2006). Adolescents' attitudes towards nature and environment: Quantifying the 2-MEV model. *Environmentalist*, 26(4), 247–254. doi:10.1007/s10669-006-8660-9
- Browne, M. W., & Cudeck, R. (1992). Alternative Ways of Assessing Model Fit. *Sociological Methods & Research*, 21(2), 230–258. doi:10.1177/0049124192021002005
- Butler, D. (2017). Climate scientists flock to France's call. *Nature News*, 547(7663), 269. doi:10.1038/nature.2017.22318
- Dunlap, R. E., & Jones, R. E. (2002). Environmental Concern: Conceptual and Measurement Issues. In *Handbook of Environmental Sociology* (pp. 482–524).
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring Endorsement of the New Ecological Paradigm : A Revised NEP Scale. *Journal of Social Issues*, 56(3), 425–442. doi:10.1111/0022-4537.00176
- Dunlap, R. E., & Van Liere, K. D. (1978). The “new environmental paradigm.” *The Journal of Environmental Education*, 9(4), 10–19. doi: [10.1080/00958964.1978.10801875](https://doi.org/10.1080/00958964.1978.10801875)
- Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, 49(3), 141-157. doi: 10.1002/ijop.12034
- Hawcroft, L. J., & Milfont, T. L. (2010). The use (and abuse) of the new environmental paradigm scale over the last 30 years: A meta-analysis. *Journal of Environmental Psychology*, 30(2), 143–158. doi:10.1016/j.jenvp.2009.10.003
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. doi:10.1080/10705519909540118
- Janigo, K. A., & Wu, J. (2015). Collaborative redesign of used clothes as a sustainable fashion solution and potential business opportunity. *Fashion Practice*, 7(1), 75-97. doi: [10.2752/175693815X14182200335736](https://doi.org/10.2752/175693815X14182200335736)

- Kaiser, F. G., & Scheuthle, H. (2003). Two challenges to a moral extension of the theory of planned behavior: moral norms and just world beliefs in conservationism. *Personality and Individual Differences*, 35(5), 1033-1048. doi:[10.1016/S0191-8869\(02\)00316-1](https://doi.org/10.1016/S0191-8869(02)00316-1)
- Le Hebel, F., Montpied, P., & Fontanieu, V. (2014). What can influence students' environmental attitudes? Results from a study of 15-year-old students in France. *International Journal of Environmental & Science Education*, 9, 329-345. doi: 10.12973/ijese.2014.218a
- Martín, A. M., Hernández, B., & Alonso, I. (2017). Pro-environmental motivation and regulation to respect environmental laws as predictors of illegal anti-environmental behaviour/La motivación pro-ambiental y la motivación para respetar las leyes medioambientales como predictoras de la conducta anti-ecológica ilegal. *Psychology*, 8(1), 33-74.
- Milfont, T. L., & Duckitt, J. (2010). The environmental attitudes inventory : A valid and reliable measure to assess the structure of environmental attitudes. *Journal of environmental Psychology*, 30, 80-94. doi : [10.1016/j.jenvp.2009.09.001](https://doi.org/10.1016/j.jenvp.2009.09.001)
- Milfont, T. L., Richter, I., Sibley, C. G., Wilson, M. S., & Fischer, R. (2013). Environmental consequences of the desire to dominate and be superior. *Personality & Social Psychology Bulletin*, 39(9), 1127-38. doi: 10.1177/0146167213490805
- Milfont, T. L., & Sibley, C. G. (2011). Exploring the concept of environmental generativity. *International Journal of Hispanic Psychology*, 4(1), 21.
- Milfont, T. L., & Sibley, C. G. (2014). The hierarchy enforcement hypothesis of environmental exploitation: A social dominance perspective. *Journal of Experimental Social Psychology*, 55, 188-193. doi: 10.1016/j.jesp.2014.07.006
- Moreno, I., Amérigo, M., & García, J. A. (2016). Design and application of an environmental attitudes scale in primary education/Diseño y aplicación de una escala de actitudes hacia el medio ambiente en educación primaria. *Psychology*, 7, 64-88. doi: [10.1080/21711976.2015.1114217](https://doi.org/10.1080/21711976.2015.1114217)
- Munoz, F., Bogner, F., Clement, P., & Carvalho, G. S. (2009). Teachers' conceptions of nature and environment in 16 countries. *Journal of Environmental Psychology*, 29(4), 407-413. doi:[10.1016/j.jenvp.2009.05.007](https://doi.org/10.1016/j.jenvp.2009.05.007)
- Pansu, P., Tarquinio, C., & Gilibert, D. (2005). Internal attributions in an intergroup business setting. *Le travail humain*, 68, 55-72. doi: 10.3917/th.681.0055
- Pirages D. C., Ehrlich, P. R. (1974) *Ark II: Social response to environmental imperatives*. Freeman, San Francisco.
- Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology*, 67(4), 741-763. doi:[10.1037/0022-3514.67.4.741](https://doi.org/10.1037/0022-3514.67.4.741)
- Schleyer-Lindenmann, A., Dauvier, B., Ittner, H., & Piolat, M. (2014). Mesure des attitudes environnementales: analyse structurale d'une version française de la NEPS [Measuring environmental attitudes: A structural analysis of a French version of the NEP Scale] (Dunlap et al., 2000). *Psychologie Française*. 61(2), 83-102. doi: [10.1016/j.psfr.2014.07.002](https://doi.org/10.1016/j.psfr.2014.07.002)
- Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*. Psychology Press.
- Suk, H. J., Jung, H., & Sato, T. (2009). How Environmental Attitude Affects the Consumers' Tolerance of Paper Colors. In *The 3rd IASDR Conference, Seoul Korea, CD-ROM, not paged* (2009, 10).

- Tate, K., Stewart, A. J., & Daly, M. (2014). Influencing green behavior through environmental goal priming: The mediating role of automatic evaluation. *Journal of Environmental Psychology*, 38, 225-232. doi: [10.1016/j.jenvp.2014.02.004](https://doi.org/10.1016/j.jenvp.2014.02.004)
- Ullman, J. B. (2001). Structural equation modeling. In B. G. Tabachnick & L. S. Fidell (2001). *Using Multivariate Statistics* (4th ed; pp 653- 771). Needham Heights, MA: Allyn & Bacon
- Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviors. *Journal of Environmental Psychology*, 30(3), 305-314. doi:10.1016/j.jenvp.2010.01.003
- Wiseman, M., Wilson, G., & Bogner, F. X. (2012). Environmental Values and Authoritarianism. *Psychology Research*, 2, 25–31.
- Wiseman, M., & Bogner, F. X. (2003). A higher-order model of ecological values and its relationship to personality. *Personality and Individual Differences*, 34(5), 783–794. doi:10.1016/S0191-8869(02)00071-5

Appendix A. Subdimensions referring to EAI preservation or utilization.

Preservation of the environment

1. Enjoyment of nature
2. Support for interventionist conservation policies
3. Environmental movement activism
6. Environmental threat
8. Personal conservation behavior
11. Ecocentric concern
12. Support for population growth policies

Utilization of the environment

4. Conservation motivated by anthropocentric concern
5. Confidence in science and technology
7. Altering nature
9. Human dominance over nature
10. Human utilization of nature

Appendix B. French translation of the Environmental Attitude Inventory (24 items) from Milfont & Duckitt, 2010.

Items preceded by (U) refer to utilization of the environment.

Items preceded by (P) refer to preservation of the environment.

Items followed by (R) are items whose scores have been reversed.

Items followed by (24) need to be included to obtain the 24-item scale.

The figure in brackets refers to the corresponding subdimension.

1. (1) (P) I really like going on trips into the countryside, for example to forests or fields. / *J'aime beaucoup aller me promener à la campagne, par exemple dans la forêt ou dans les champs.*
2. (P) (1) I think spending time in nature is boring / *Je trouve que passer du temps dans la nature est ennuyeux.* (R)
3. (P) (2) Governments should control the rate at which raw materials are used to ensure that they last as long as possible. / *Le gouvernement devrait contrôler la quantité de matières premières qui est utilisée pour s'assurer qu'elles durent le plus longtemps possible.*
4. (P) (2) I am opposed to governments controlling and regulating the way raw materials are used in order to try and make them last longer. / *Je suis opposé au contrôle et à la régulation gouvernementale de l'utilisation des matières premières pour essayer de les faire perdurer.* (R)
5. (P) (3) I would like to join and actively participate in an environmentalist group.* / *Je voudrais rejoindre et participer activement à un groupe écologiste.* (24)
6. (P) (3) I would NOT get involved in an environmentalist organization. / *Je ne m'impliquerais PAS dans une organisation écologiste.* (R) (24)
7. (U) (4) One of the most important reasons to keep lakes and rivers clean is so that people have a place to enjoy water sports. / *L'une des principales raisons de garder les lacs et les rivières propres est de proposer des lieux où les gens puissent pratiquer des sports aquatiques.*
8. (U) (4) We need to keep rivers and lakes clean in order to protect the environment, and NOT as places for people to enjoy water sports. / *Nous devons garder les rivières et les lacs propres afin de protéger l'environnement, et NON pour que les gens y pratiquent des sports aquatiques.* (R)
9. (U) (5) Modern science will NOT be able to solve our environmental problems. / *La science moderne ne sera PAS en mesure de résoudre nos problèmes environnementaux.* (R)
10. (U) (5) Modern science will solve our environmental problems. / *La science moderne va résoudre nos problèmes environnementaux.*
11. (P) (6) Humans are severely abusing the environment. / *Les êtres humains abusent gravement de l'environnement.*
12. (P) (6) I do not believe that the environment has been severely abused by humans. / *Je ne crois pas que l'environnement ait été gravement malmené par les humains.* (R)
13. (U) (7) I'd prefer a garden that is wild and natural to a well-groomed and ordered one. / *Je préfère un jardin à l'état sauvage et naturel qu'un jardin soigné et ordonné.* (R)
14. (U) (7) I'd much prefer a garden that is well groomed and ordered to a wild and natural one. / *Je préfère de loin un jardin qui est bien soigné et ordonné à un jardin à l'état sauvage et naturel.*
15. (P) (8) I am NOT the kind of person who makes efforts to conserve natural resources. / *Je ne suis PAS le genre de personne qui fait des efforts pour préserver les ressources naturelles.* (R)
16. (P) (8) Whenever possible, I try to save natural resources. / *A chaque fois que c'est possible, j'essaie d'économiser les ressources naturelles.*

EAI-24 STRUCTURAL CONFIRMATION

17. (U) (9) Human beings were created or evolved to dominate the rest of nature. / *Les êtres humains ont évolué ou ont été créés pour dominer le reste de la nature.*
18. (U) (9) I DO NOT believe humans were created or evolved to dominate the rest of nature. / *Je ne crois PAS que les êtres humains aient évolué ou aient été créés pour dominer le reste de la nature.* (R)
19. (U) (10) Protecting peoples' jobs is more important than protecting the environment. / *Protéger les emplois est plus important que protéger l'environnement.*
20. (U) (10) Protecting the environment is more important than protecting peoples' jobs. / *Protéger l'environnement est plus important que de protéger les emplois.* (R)
21. (P) (11) It makes me sad to see forests cleared for agriculture. / *Le défrichage des forêts pour l'agriculture me rend triste.* (24)
22. (P) (11) It does NOT make me sad to see natural environments destroyed. / *Cela ne me rend PAS triste de voir des environnements naturels détruits.* (R) (24)
23. (P) (12) Families should be encouraged to limit themselves to two children or less. / *Les familles devraient être encouragées à se limiter à deux enfants ou moins.*
24. (P) (12) A married couple should have as many children as they wish, as long as they can adequately provide for them. / *Un couple marié doit avoir autant d'enfants qu'il le souhaite, tant qu'il peut subvenir à leurs besoins.* (R)

Appendix C. French translation and adaptation of the scale of frequency of pro-environmental behavior (Whitmarsh & O'Neill, 2010)

Please indicate how often you do the following.

(Min:1 = 'Never; Max:5 = 'Always)

1. Switch off lights when you are not using them. / *Eteindre les lumières inutilisées.*
2. Drive economically (e.g.: accelerating and braking smoothly). / *Conduire de façon économique (ex: accélérer et freiner doucement).*
3. Walk, use a bicycle or use public transport for small distances (under 5 kilometers). / *Marcher, utiliser un vélo ou prendre les transports en commun pour les petits déplacements (moins de 5 kilomètres).*
4. Use alternatives to traveling (e.g. shopping on-line). / *Utiliser des alternatives aux déplacements (ex: shopping sur internet).*
5. Carpooling. / *Faire du covoiturage.*
6. Decrease the number of plane trips. / *Diminuer le nombre de voyages en avion.*
7. Buy products which respect the environment (e.g.: ecolabels). / *Acheter des produits respectueux de l'environnement (ex: ecolabels).*
8. Eat organic, local or seasonal food. / *Manger de la nourriture bio, locale ou de saison.*
9. Avoid eating meat. / *Eviter de manger de la viande.*
10. Buy products with less packaging. / *Privilégier des achats de produits avec moins d'emballage.*
11. Sort your waste. / *Trier les déchets.*
12. Re-use or repair an object rather than throw it away. / *Réutiliser ou réparer un objet plutôt que de le jeter.*
13. Compost your food waste. / *Composter vos déchets de cuisine.*
14. Save water by having shorter showers. / *Economiser de l'eau en prenant des douches plus courtes.*
15. Turn off the water when you brush your teeth. / *Couper l'eau pendant que vous vous brossez les dents.*
16. Write to a political representative about an environmental problem. / *Ecrire à un membre politique à propos d'un problème environnemental.*
17. Take part in a demonstration for the environmental cause. / *Prendre part à une manifestation pour la cause environnementale.*