

Cornell Lab of Ornithology Evaluation Research

clo-evaluation_research@cornell.edu

Last Updated October, 2017

Technical Brief: Self-Efficacy for Environmental Action **(SEEA, Custom)**

Description:

Self-efficacy, or a person's beliefs about his/her capabilities to learn specific content and perform particular behaviors (Bandura 1997) is associated with choice, effort, and persistence in the pursuit of those behaviors (Bandura 1982; 2000; Schunk 1991). Individuals who feel efficacious put more effort into their activities and persist at them longer than those who doubt their abilities. Self-efficacy is sometimes referred to as "perceived competence" (in Self Determination Theory) and "perceived behavioral control" (Ajzen's Theory of Planned Behavior 1991). Berkowitz et al. (2005) treat self-efficacy as an essential component in environmental citizenship (along with motivation and awareness), which is dependent on an individual's belief that they have sufficient skills, knowledge, and opportunity to bring about positive change in their personal lives or community. In the context of citizen science, self-efficacy is the extent to which a learner has confidence in his or her ability to participate in a science or environmental activity. Crall et al. (2011) determined that self-efficacy is not only important in carrying out the principal activities of the project but also in the potential for individuals to carry out future activities related to environmental stewardship.

Intended Use/Audience: Adults

The Self-Efficacy for Environmental Action scale measures an individual's confidence in their ability to effectively address environmental concerns and is geared toward adult audiences. It contains 8 items and can be administered online, by telephone, or via paper. It should take about 10 minutes to complete and can be administered as a pretest and/or posttest. (Please contact us if you would like to administer a retrospective pre-post version of this scale.). This scale was developed and tested in the context of informal science learning environments (primarily with participants of citizen science projects).

Evidence Reliability/Structure:

The SEEA is a customized version of the SEEA 8-item generic scale (range 1-5) that underwent a series of validity tests with citizen scientists in the Great Backyard Bird Count (GBBC, an annual bird count hosted by the Cornell Lab of Ornithology) and various water quality monitoring projects. In-person focus groups, online feedback, and expert review were initially conducted with small groups of citizen science participants (8-50) to establish face and content validity. Field tests (N=503) included tests to assess Cronbach's alpha coefficients; the alpha coefficient of the generic SEEA was 0.89, indicating high internal consistency. The two-week test-retest reliabilities for the total averaged items were $r > .49$, all p 's $< .001$, indicating moderately stable responses from a single sample over time. Lastly, an exploratory factor analysis of the generic version of the scale was conducted and showed unidimensionality with all factor loadings above 0.70.

Tips for modifying the questionnaire

- 1.) *View the example scale* – We provide an example of a modified scale using water quality monitoring as the topic. The examples are used as placeholder text in the editable fields of the scale.
- 2.) *Decide on the most useful level of specificity and choose one phrase to describe the activity* – Project activities can be called out individually in the scale. Using water quality monitoring as an example, you might want to measure participant confidence in selecting appropriate test sites, collecting water samples, or analyzing samples. However, the scale is intended to measure confidence in learning about and doing just one thing. If you are interested in multiple activities, you will need to create a separate scale for each activity. For this reason, we encourage you to choose a more general concept that encompasses the complete group of activities within your project (e.g. “monitoring water quality”). Then, include this one phrase in each of the items of the scale.
- 3.) *Proofread carefully* – Changing particular words within each statement may require making small changes to the rest of the statement so that it reads well to project participants. You should make as few changes to each statement as possible while also making sure the modified statement is easy to understand. It’s best to let one or two other people read through the modified scale for clarity and ease of reading before administering it to your project participants. We encourage you to contact us with any questions you have or if you would like feedback on your modifications. Please email questions to: <clo-evaluation_research@cornell.edu>

How to Score:

Cleaning your data

Some project participants will not respond to this scale as carefully as you might hope. It is important to clean your data to account for this. Once you have entered the data into a spreadsheet such as Microsoft Excel or a statistical package such as SPSS or R, keep an original version of the master data set, and make a copy from which to work. Do the following simple checks:

- 1) Look across each row or case (i.e., set of responses from individual participants). If more than 25% of responses are missing from any row, exclude that row (participant) from your analysis.
- 2) Look across each row again, checking for rows in which all responses are the same. In general, seeing the same response for all items in a row is an indication that the respondent was not reading the items carefully. In particular, items 6 and 8 are “reverse coded,” which means they are worded in such a way that they should receive opposite answers from other questions if respondents are answering all questions in a consistent

manner. We recommend excluding from your analysis cases where all answers are the same unless they are all threes, as many respondents legitimately provide midpoint responses to all questions.

Scoring instructions

Once you have implemented the Self-Efficacy for Environmental Action scale and have cleaned your data, calculate the self-efficacy score as follows:

- 1.) Reverse the responses to questions 6 and 8 such that 1's become 5's, 2's become 4's, 3's stay 3's, 4's become 2's, and 5's become 1's.
- 2.) Average together the scores for all of the items for each participant.
- 1) You can then average together the overall scores from all of your participants for an overall all group score.
- 4.) Scores below 3 indicate low levels of confidence to effectively address environmental concerns.

Note: If you are administering the scale before and after program participation and comparing the two sets of scores as part of a pre-post participation evaluation, you might want to consider grouping your participants into those who started out relatively low in self-efficacy and those who started out relatively high. While expecting an increase in self efficacy among participants who started out relatively low is reasonable, you should not expect to see much, if any, increase in those who started out already quite confident in their abilities. You should consider merely maintaining that high level as a positive outcome.

Analytic Options: After your data have been cleaned, the scores can be treated as either ordinal or continuous variables and used in a multitude of analytical options such as t-tests, ANOVA, and regressions.

References:

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/http://dx.doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/http://dx.doi.org/10.1016/0749-5978(91)90020-T).
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37(2), 122–147. <https://doi.org/10.1037/0003-066X.37.2.122>.
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control* (1st edition). New York: Worth Publishers.
- Bandura, A. (2000). Exercise of Human Agency Through Collective Efficacy. *Current Directions in Psychological Science*, 9(3), 75–78. <https://doi.org/10.1111/1467-8721.00064>.
- Berkowitz, A. R., Ford, M. E., and Brewer, C. A. (2005). A framework for integrating ecological literacy, civics literacy, and environmental citizenship in environmental education. In E.

- A. Johnson and M. J. Mappin (Eds.), *Environmental Education and Advocacy: Changing Perspectives of Ecology and Education* (pp. 227–266). Cambridge University Press.
- Crall, A. W., Newman, G. J., Stohlgren, T. J., Holfelder, K. A., Graham, J., and Waller, D. M. (2011). Assessing citizen science data quality: an invasive species case study: Assessing citizen science data quality. *Conservation Letters*, 4(6), 433–442. <https://doi.org/10.1111/j.1755-263X.2011.00196.x>.
- Schunk, D. H. (1991). Self-Efficacy and Academic Motivation. *Educational Psychologist*, 26(3-4), 207–231. <https://doi.org/10.1080/00461520.1991.9653133>

How to Cite: Porticella, N., Phillips, T., Bonney, R. (2017) Self-Efficacy for Environmental Action Scale (SEEA, Custom). Technical Brief Series. Cornell Lab of Ornithology, Ithaca NY.

On the following page, please find the Self-Efficacy for Environmental Action (SEEA, Custom) scale. There is a form field above the scale so that you may enter your own title for your survey and fields to fill in custom content for each of the items within the scale.

This work is supported by the National Science Foundation under grant No. 1010744: DEVISE (Developing, Validating, and Implementing Situated Evaluation Instruments). Any opinions, findings, and conclusions or recommendations expressed in these materials are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Please indicate how much you **DISAGREE** or **AGREE** with each of the following statements by circling the number in the appropriate column. Please respond as you really feel, rather than how you think “most people” feel.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I feel confident in my ability to help protect	1	2	3	4	5
2. I am capable of making a positive impact on	1	2	3	4	5
3. I am able to help take care of	1	2	3	4	5
4. I believe I can contribute to solutions to problems by my actions.	1	2	3	4	5
5. Compared to other people, I think I can make a positive impact on	1	2	3	4	5
6. I don't think I can make any difference in solving problems.	1	2	3	4	5
7. I believe that I personally, working with others, can help solve issues.	1	2	3	4	5
8. It's hard for me to imagine myself helping to protect	1	2	3	4	5