Why Knowing and Caring Are Not Enough: Green Self-Efficacy as the Capability Mechanism Bridging Environmental Cognition and Action

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ABSTRACT: Environmental education often assumes that people who know more about environmental problems and care more about them will act accordingly. Yet the persistent knowledge–action gap suggests that cognition and concern are necessary but insufficient conditions for responsible environmental behavior. Drawing on Social Cognitive Theory and environmental-education research on empowerment, this study examines green self-efficacy as the capability mechanism connecting perceived environmental knowledge and environmental concern with responsible environmental behavior. The analysis uses an adult-only sample of 283 respondents aged 18 years or older, surveyed at and around a repurposed environmental facility in Chiayi County, Taiwan. The present study narrows the empirical question to a four-construct cognition–capability–action model. Parallel regression and bootstrap mediation analyses show that perceived environmental knowledge and environmental concern are both positively associated with green self-efficacy, which is in turn positively associated with responsible environmental behavior. Bootstrap estimates further indicate significant indirect effects of both perceived environmental knowledge and environmental concern through green self-efficacy. The findings suggest that environmental programs should be evaluated not only by what participants learn or how strongly they care, but also by whether they leave believing that environmental action is feasible. The study reframes the knowledge–action gap as, in part, a capability gap and identifies green self-efficacy as a theoretically meaningful bridge between environmental cognition and action.

KEYWORDS: Perceived environmental knowledge; environmental concern; green self-efficacy; responsible environmental behavior; knowledge–action gap; environmental education

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1. INTRODUCTION

Environmental education has long invested in two intuitively compelling goals: helping people understand environmental problems and encouraging them to care about those problems. Both matter. Neither, however, guarantees action. People may understand recycling, carbon reduction, resource conservation, or climate risk and still fail to change their behavior. They may also express strong concern about environmental degradation while remaining uncertain about what they personally can accomplish. This discontinuity is central to the long-standing knowledge–action gap in environmental research [1], [2], [3].

The theoretical problem is therefore not simply whether knowledge and concern predict environmental behavior. A more consequential question is what allows knowing and caring to become actionable. Social Cognitive Theory provides a direct answer through self-efficacy: the belief that one can organize and execute the actions required to achieve a desired outcome [4], [5], [6]. In the environmental domain, green self-efficacy captures confidence in one's capability to undertake environmentally beneficial actions [7]. It is conceptually closer to behavior than general awareness because it addresses feasibility: not only "Do I understand?" or "Do I care?" but "Can I do this?"

This capability perspective is especially relevant in environmental-education settings. Information can clarify problems and concern can increase their personal importance, yet individuals may still face inconvenience, uncertainty, competing routines, or doubts about whether their actions matter. Environmental education that raises awareness without strengthening perceived capability may therefore produce informed and concerned participants without producing sustained behavioral engagement. Classic work on responsible environmental behavior anticipated this problem by emphasizing empowerment, action skills, and perceived control rather than knowledge alone [1], [2].

The present study develops this argument through a deliberately focused four-construct model. Perceived environmental knowledge and environmental concern are treated as two complementary antecedents of green self-efficacy. Green self-efficacy is then positioned as the proximal capability belief associated with responsible environmental behavior and as an indirect pathway through which both forms of environmental cognition are connected to action. The field site provides the setting in which environmental learning occurred; it is not itself the theoretical outcome of the study.

The study makes three contributions. First, it distinguishes knowledge from concern rather than treating environmental cognition as a single undifferentiated orientation. Second, it reframes the knowledge–action gap as partly a capability gap and tests green self-efficacy as the mechanism connecting cognition with behavior. Third, it translates this mechanism into an applied implication for environmental education: learning outcomes should include perceived action capability, not only knowledge acquisition or attitudinal concern.

2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1 From Environmental Cognition to Action Capability

Perceived environmental knowledge refers to individuals' subjective judgments of how well they understand environmental issues and available responses. Subjective knowledge is not equivalent to objectively tested knowledge, but it remains behaviorally consequential because individuals make decisions partly on the basis of what they believe they know [8]. When people believe they understand the causes of environmental problems, the consequences of different choices, and the practical options available to them, environmental action becomes less ambiguous.

Social Cognitive Theory suggests that reduced ambiguity should matter for efficacy beliefs. Self-efficacy is shaped by information about one's ability to perform a task and by experiences that make action appear manageable [4], [6]. In environmental contexts, knowledge about sorting, conservation, low-carbon practices, or community participation can clarify what action requires. Perceived environmental knowledge should therefore provide a cognitive foundation for believing that one can act effectively.

H1. Perceived environmental knowledge is positively associated with green self-efficacy.

Environmental concern represents a different psychological resource. Whereas perceived knowledge concerns what individuals believe they understand, environmental concern captures the importance they assign to environmental problems and their consequences. Concern makes environmental outcomes personally meaningful and can motivate attention, persistence, and repeated engagement. These experiences may create opportunities to practice environmental behaviors and accumulate confidence in one's ability to perform them.

Concern alone is not capability. An individual may care deeply about climate change or resource depletion while still feeling unable to alter established routines. Nevertheless, stronger concern should increase the motivational conditions under which capability beliefs are developed and exercised. Environmental concern is therefore expected to be positively associated with green self-efficacy.

H2. Environmental concern is positively associated with green self-efficacy.

2.2 Green Self-Efficacy and Responsible Environmental Behavior

Green self-efficacy extends Bandura's self-efficacy construct to environmentally beneficial action. It reflects confidence that one can carry out behaviors that contribute to environmental improvement [7]. This belief is theoretically proximal to behavior because it concerns the perceived feasibility of action under real constraints. Individuals who believe they can conserve resources, reduce waste, participate in community environmental activities, or encourage others are more likely to initiate and sustain such practices.

This expectation is consistent with environmental-education research emphasizing empowerment and action competence. Hines et al. [1] and Hungerford and Volk [2] showed that environmental behavior depends on more than awareness; action skills, locus of control, and empowerment-related conditions are central to behavioral engagement. Green self-efficacy captures this capability logic in a form directly compatible with Social Cognitive Theory.

H3. Green self-efficacy is positively associated with responsible environmental behavior.

2.3 Green Self-Efficacy as a Capability Mechanism

The central proposition of this study is not merely that knowledge, concern, efficacy, and behavior are positively related. It is that efficacy helps explain why environmental cognition can become behaviorally consequential. Perceived knowledge can tell individuals what actions are possible, but efficacy addresses whether they believe they can perform those actions. Concern can make environmental outcomes important, but efficacy addresses whether motivated individuals see themselves as capable of responding. Green self-efficacy therefore provides a theoretically coherent bridge between environmental cognition and responsible action.

This mechanism also clarifies why information-heavy interventions can underperform. If participants leave an educational program better informed but still uncertain about their own capacity to act, the intervention may improve cognition without changing behavior. Likewise, concern-oriented communication can increase urgency without providing a sense of agency. A capability mechanism predicts that knowledge and concern should be connected to behavior partly through green self-efficacy.

H4. Green self-efficacy mediates the positive relationship between perceived environmental knowledge and responsible environmental behavior.

H5. Green self-efficacy mediates the positive relationship between environmental concern and responsible environmental behavior.

3. METHOD

3.1 Research Context and Adult Sample

Data were drawn from an adult-only field survey conducted from September to December 2025 at and around Hebaoyu Green Sustainable Park in Chiayi County, Taiwan, formerly the Lucao Municipal Waste Incineration Plant. The site now incorporates environmental education, resource circulation, ecological learning, and public-participation functions. Its environmental-education role is institutionally recognized through certification by Taiwan's Ministry of Environment under the name Machouhou Environmental Education Center.

Eligibility was restricted to respondents aged 18 years or older, and this restriction was applied at the point of recruitment rather than through post hoc exclusion. The survey yielded an analytical sample of N = 283 adult respondents. The age distribution comprised 7 respondents aged 18–24, 43 aged 25–34, 59 aged 35–44, 73 aged 45–54, 70 aged 55–64, and 31 aged 65 or older.

Convenience sampling was used, and respondents had varying degrees of contact with the site through environmental-education activities or the surrounding area. The study purpose, anonymity, voluntary participation, and the right to stop at any time were explained to each respondent before participation, and no identifying information was collected. No separate Institutional Review Board (IRB) review was sought at the time of data collection, and this manuscript does not claim IRB approval. Because eligibility was limited to adults at recruitment, no data from respondents younger than 18 years were collected for, or are used in, this study.

3.2 Research Transparency and Analytical Differentiation

The present study is deliberately scoped to a focused four-construct cognition–capability–action model. It examines the knowledge–action gap and tests green self-efficacy as a capability mechanism linking perceived environmental knowledge and environmental concern with responsible environmental behavior. The instrument and hypothesis tests were built around these four constructs, keeping the contribution of the study centered on this cognition–capability–action mechanism.

3.3 Measures

All constructs were measured using six-point Likert-type items ranging from 1 (strongly disagree) to 6 (strongly agree). Scale wording was adapted to the research setting. Translation and back-translation were conducted, followed by review by three experts with backgrounds in environmental education and psychology.

Perceived environmental knowledge drew on Ellen [8], Mohr et al. [9], Mostafa [10], and Liu et al. [11]. Environmental concern drew on Ellen [8], Schlegelmilch et al. [12], and Niu et al. [13]. Green self-efficacy was adapted from Chen et al. [7] to daily-life and community environmental contexts. Responsible environmental behavior drew primarily on Tarrant and Green [14] and Vaske and Kobrin [15]. Consistent with the refined measurement structure established for the survey instrument, three indicators per construct were used to form the analytical composites.

3.4 Analytical Strategy

The analysis was designed around the mechanism proposed in H1–H5 rather than around a full latent structural model of all measured variables. Composite scores were calculated from the retained indicators for perceived environmental knowledge, environmental concern, green self-efficacy, and responsible environmental behavior. First, descriptive statistics and bivariate correlations were examined. Second, green self-efficacy was regressed simultaneously on perceived environmental knowledge and environmental concern to test H1 and H2. Third, responsible environmental behavior was regressed on green self-efficacy, perceived environmental knowledge, and environmental concern to test the proximal efficacy–behavior relationship in H3 while retaining the two cognition variables in the outcome equation. Finally, indirect effects were estimated using 5,000 bootstrap resamples. H4 and H5 were supported when the 95% bootstrap confidence interval for the corresponding indirect effect excluded zero. Because the distributions showed substantial ceiling tendencies and non-normality, bootstrap confidence intervals were emphasized for mediation inference.

4. RESULTS

4.1 Descriptive Relationships

The adult-only sample showed high mean levels on all four constructs, consistent with the environmentally engaged context of recruitment. Perceived environmental knowledge averaged 5.74 (SD = 0.64), environmental concern 5.84 (SD = 0.50), green self-efficacy 5.81 (SD = 0.53), and responsible environmental behavior 5.78 (SD = 0.57). Correlations were positive and substantial: perceived environmental knowledge correlated .80 with green self-efficacy and .80 with responsible environmental behavior; environmental concern correlated .85 with green self-efficacy and .84 with responsible environmental behavior; and green self-efficacy correlated. 88 with responsible environmental behavior. These strong associations warrant cautious

interpretation because of the restricted upper-range distributions, but they are consistent with the proposed cognition–capability–action framework.

Table -1: Descriptive Statistics and Bivariate Correlations

Construct	M	SD	1	2	3
1. Perceived environmental knowledge	5.74	0.64	—		
2. Environmental concern	5.84	0.50	.72	—	
3. Green self-efficacy	5.81	0.53	.80	.85	—
4. Responsible environmental behavior	5.78	0.57	.80	.84	.88

4.2 Hypothesis Tests

When green self-efficacy was regressed simultaneously on perceived environmental knowledge and environmental concern, the model explained 79.6% of the variance in green self-efficacy ($R^2 = .796$, adjusted $R^2 = .795$, $F(2, 280) = 546.6$, $p < .001$). Perceived environmental knowledge was positively associated with green self-efficacy ($B = .317$, $SE = .032$, standardized $\beta = .378$, $p < .001$), supporting H1. Environmental concern was also positively associated with green self-efficacy ($B = .616$, $SE = .041$, standardized $\beta = .581$, $p < .001$), supporting H2.

The outcome equation explained 82.4% of the variance in responsible environmental behavior ($R^2 = .824$, adjusted $R^2 = .822$, $F(3, 279) = 435.1$, $p < .001$). Green self-efficacy remained positively associated with responsible environmental behavior after perceived environmental knowledge and environmental concern were included in the same equation ($B = .469$, $SE = .059$, standardized $\beta = .440$, $p < .001$), supporting H3. Perceived environmental knowledge (standardized $\beta = .242$, $p < .001$) and environmental concern (standardized $\beta = .289$, $p < .001$) also retained positive direct associations with responsible environmental behavior, indicating partial rather than complete mediation.

Bootstrap mediation analysis with 5,000 resamples supported both proposed indirect effects. The indirect effect of perceived environmental knowledge on responsible environmental behavior through green self-efficacy was .146, with a 95% bootstrap confidence interval of [.058, .253], supporting H4. The indirect effect of environmental concern through green self-efficacy was .282, with a 95% bootstrap confidence interval of [.112, .478], supporting H5. Because neither interval included zero, green self-efficacy functioned as a statistically supported capability pathway for both forms of environmental cognition.

Table -2: Summary of Hypothesis Tests

Hypothesis	Relationship	Estimate	Result
H1	Perceived environmental knowledge → Green self-efficacy	$\beta = .378$, $p < .001$	Supported
H2	Environmental concern → Green self-efficacy	$\beta = .581$, $p < .001$	Supported
H3	Green self-efficacy → Responsible environmental behavior	$\beta = .440$, $p < .001$	Supported
H4	Knowledge → Green self-efficacy → Behavior (indirect)	Indirect = .146, CI [.058, .253]	Supported
H5	Concern → Green self-efficacy → Behavior (indirect)	Indirect = .282, CI [.112, .478]	Supported

5. DISCUSSION

This study began with a simple but consequential problem: people can know about environmental problems and care about them without acting. The results support a capability-based explanation for this discontinuity. Both perceived environmental knowledge and environmental concern were positively associated with green self-efficacy, and green self-efficacy was in turn strongly associated with responsible environmental behavior. More importantly, bootstrap analyses showed that efficacy carried significant indirect effects from both forms of environmental cognition to behavior.

The first contribution is conceptual separation. Knowledge and concern are often treated as neighboring indicators of environmental orientation, but they represent different psychological functions. Perceived knowledge reduces uncertainty about what environmental action involves. Concern gives environmental outcomes motivational weight. The present results show that both matter for efficacy, but environmental concern exhibited the stronger standardized association with green self-efficacy in the simultaneous model. This does not mean that concern is universally more important than knowledge; rather, within this adult, environmentally exposed sample, caring about environmental outcomes was particularly closely tied to feeling capable of acting.

The second contribution is the repositioning of green self-efficacy. Instead of treating efficacy as another predictor in a crowded environmental-behavior model, this study assigns it a specific theoretical job: translating cognition into perceived action capability. This is consistent with Social Cognitive Theory, where efficacy influences whether people initiate behavior, invest effort, and persist when action becomes difficult [4], [6]. It also reconnects contemporary green-behavior research with earlier environmental-education work emphasizing empowerment and action competence [1], [2].

The mediation results sharpen this argument. Significant indirect effects were observed for both perceived environmental knowledge and environmental concern, while direct effects remained significant. The pattern therefore supports partial mediation. Knowledge and concern may be associated with responsible behavior through several routes, but one meaningful route operates through the belief that environmental action is personally feasible. The knowledge–action gap can thus be understood, at least in part, as a capability gap.

This framing also disciplines what can be claimed from the field context. Here, the repurposed facility functions as an environmental-learning context in which the cognition–capability–action mechanism can be examined; claims are limited to that mechanism rather than extended to broader questions about the site itself.

6. PRACTICAL IMPLICATIONS

The practical implication is that environmental education should not stop at “know more” or “care more.” Programs should also ask whether participants leave believing that they can perform specific environmental actions. This requires moving from information delivery toward capability-building experiences.

For example, resource-circulation demonstrations can be paired with concrete household sorting tasks; low-carbon communication can be paired with achievable energy-saving routines; and community environmental activities can provide opportunities for participants to complete visible, bounded actions. These experiences matter because efficacy is strengthened when people encounter manageable tasks, successful performance, credible peer examples, and constructive feedback [6].

Evaluation should therefore include capability indicators alongside knowledge and attitude measures. Attendance, satisfaction, knowledge gain, and concern remain useful outcomes, but they do not show whether participants feel able to act. A program that raises concern without strengthening efficacy may even leave participants more aware of environmental problems while still feeling powerless. The practical objective is to make environmental action understandable, important, and feasible.

7. LIMITATIONS AND FUTURE RESEARCH

Several limitations require caution. First, the adult-only sample was drawn through convenience sampling from respondents who had contact with an environmental-education setting. The very high construct means and ceiling tendencies suggest self-selection and restricted variance. The findings should not be generalized to adults with low environmental involvement or to the general population without replication.

Second, the study is cross-sectional. Although the mediation model is theoretically ordered, temporal precedence is not established. Responsible environmental behavior may itself strengthen green self-efficacy through mastery experience. Longitudinal, cross-lagged, and intervention designs are needed to test directionality more rigorously.

Third, perceived environmental knowledge is subjective rather than objectively tested. Its association with green self-efficacy may partly reflect a shared self-assessment tendency. Future studies should combine objective knowledge tests with perceived knowledge measures and examine whether the two operate differently through efficacy.

Fourth, the present analysis uses composite scores and bootstrap regression to test a focused mediation mechanism. Future research should replicate the adult-only model with an independent sample using latent-variable SEM, explicitly model measurement error, and test alternative causal orderings. Multi-source or time-separated measurement would also reduce common-method concerns.

Finally, the present model is limited to the four cognition–capability–action constructs examined here. Future research could examine what contextual variables strengthen or weaken this mechanism, while preserving a clear distinction between explaining environmental action and explaining broader social responses to environmental infrastructure.

8. CONCLUSION

Knowing and caring are important, but they are not the same as being able to act. This study identifies green self-efficacy as a capability mechanism connecting perceived environmental knowledge and environmental concern with responsible environmental behavior. In an adult-only sample, both knowledge and concern were positively associated with efficacy, efficacy was positively associated with behavior, and both cognition variables showed significant indirect effects through efficacy. The central implication is therefore not that environmental education needs more information or stronger concern alone. It needs to help people convert understanding and concern into a credible belief that action is within their reach.

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