

Framing the Cost of Going Green: Differential Drivers of Financially vs. Effort Costly Pro-Environmental Behaviors

Eunbi Kang, Sungkyunkwan University¹
Hyesun Hwang, Sungkyunkwan University²

In the escalating climate crisis, fostering sustainable individual practices has become an urgent agenda. Sustainable consumer behavior should not be confined to altruistic acts for the environment; rather, it enhances consumers' awareness, competence, and well-being (Jain et al., 2022; Machin et al., 2025; García-Rodríguez et al., 2025). Pro-environmental behavior (PEB) generates collective benefits over the long run but imposes individual short-term costs, which makes the investigation of mechanisms that activate pro-environmental motivations both theoretically and practically significant.

Among the criteria for classifying PEB, the present study focuses on consumer costs that function as barriers to action. Following Davies et al. (2002), these costs are conceptualized along two dimensions: additional economic expenses and extra time or effort. A parallel distinction is offered by Moore & Boldero (2017), who differentiate material costs—defined as additional economic expenses—from immaterial efforts, which encompass psychological and physical exertion. By distinguishing financial costs, such as higher expenditures, from effort costs, such as time or labor, the study clarifies how consumers weigh immediate sacrifices against long-term benefits. Building on cost–benefit frameworks (Ratchford, 1982), this study examines four cognitive factors that are central to consumer PEB: perceived benefit, perceived effectiveness, delayed trap, and perceived burden. Whereas prior work has typically framed behavior as the outcome of a deliberative cost–benefit evaluation, the present study additionally foregrounds agency as a mechanism through which such evaluations are translated into behavioral intention.

A substantial body of prior PEB research has emphasized normative appeals as the principal lever for behavioral change (White & Simpson, 2013; Saracevic et al., 2022; Schorn, 2024; Jiang et al., 2024), focusing on how consumers conform to social or moral expectations. While valuable, this perspective tends to underestimate the role of human agency in shaping enduring behavioral change. PEBs are not merely altruistic; they carry direct implications for consumer empowerment, decision-making, and ultimately well-being. Following D'Italia and Okulicz-Kozaryn (2025), agency is examined here in two dimensions: personal (I-frame) and interpersonal (we-frame). The personal frame positions the consumer as an autonomous decision-maker, whereas the interpersonal frame foregrounds collective choice. Despite the growing theoretical interest in agency, few empirical studies have applied agency framing to PEB, leaving open the question of whether such framing moderates the influence of cognitive factors on behavioral intention. Addressing this gap, the present study tests whether the I-frame versus the we-frame conditions the relationship between cognitive antecedents and PEB intention across the two cost domains, and, more specifically, whether the same cognitive factors—perceived benefit, perceived effectiveness, delayed trap, and perceived burden—operate differently depending on cost type and agency framing.

Drawing on the foregoing literature, the following hypotheses are advanced:

H1a–b: Perceived effectiveness will be positively associated with (a) financially-costly and (b) effort-costly PEB intention.

H2a–b: Delayed trap will be negatively associated with (a) financially-costly and (b) effort-costly PEB intention.

H3a–b: Perceived benefit will be positively associated with (a) financially-costly and (b) effort-costly PEB intention.

H4a–b: Perceived burden will be negatively associated with (a) financially-costly and (b) effort-costly PEB intention.

H5: The positive effect of perceived benefit on effort-costly PEB intention will be stronger under the we-frame than the I-frame.

¹ Eunbi Kang (silverain2@skku.edu), PhD Candidate, Department of Consumer Science, Convergence Program for Social Innovation

² Hyesun Hwang (h.hwang@skku.edu), Professor, Department of Consumer Science, Convergence Program for Social Innovation

H6: The negative effect of delayed trap on financially-costly PEB intention will be weaker under the I-frame than under the we-frame.

By empirically testing these hypotheses, the study aims to provide evidence for message strategies that sustain PEB and to elaborate the theoretical role of agency in consumer contexts.

Because concern for future generations is closely related to generativity in middle adulthood, and parenthood has been linked to pro-environmental behavior (Erikson, 1963; Davidson & Freudenburg, 1996), this study targeted Korean parents in their 40s. An online survey was conducted with 210 participants, randomly assigned to either the I-frame or the we-frame condition (105 each). Gender was balanced (105 men, 105 women), and the average age was 44.49. More than half (51.9%) reported monthly household income under 6 million KRW, and 9.5% had a high school education or lower (Table 1). Respondents read scenarios depicting PEBs and rated them on perceived effectiveness, delayed trap, perceived benefits, and perceived burden using an 11-point Likert scale. They were then given a framing condition. In the I-frame, participants wrote a message to themselves: "Write down what you would like to leave to yourself." In the we-frame, they wrote to their community and future generations: "Write down what you would like to leave to our community and future generations." The dependent variable, PEB intention, was measured in two forms. Financial-cost intention was assessed by asking whether respondents were willing to switch to an electricity plan reducing carbon emissions by 35% but costing 15% more, on a 7-point Likert scale. Effort-cost intention was measured by willingness to join an environmental campaign, also on a 7-point scale. Analyses were conducted using Stata SE 19.5. Multiple regression analyses tested the hypotheses. To avoid multicollinearity, each regression included only one interaction term between agency and cognitive factors.

To test H1–H4, multiple regression analyses examined the effects of psychological factors on the two PEB intentions. As shown in Table 2, perceived benefit consistently predicted both financial-cost ($\beta = 0.38, p < .001$) and effort-cost ($\beta = 0.22, p < .01$) intentions. For effort-cost PEB, perceived effectiveness was also significant ($\beta = 0.22, p < .01$). Thus, H1b, H3a, and H3b were supported. H5 was tested by adding the interaction between perceived benefit and agency condition. Table 3 shows a marginally significant interaction for effort-cost PEB ($\beta = -0.45, p < .10$). Fig 1 illustrates that perceived benefit had a stronger effect under the we-frame than the I-frame. No significant interaction emerged for financial-cost PEB. Thus, H5 was supported. H6 examined the interaction between delayed trap and agency, with results in Table 4. There was a marginally significant interaction for financial-cost PEB ($\beta = 0.35, p < .10$). As Fig 2 shows, delayed trap positively influenced financial-cost PEB under I-frame but negatively under we-frame. Thus, H6 was supported.

The present study demonstrates that the cognitive antecedents of pro-environmental behavior (PEB) operate differently across cost domains and that agency framing meaningfully moderates these effects. For effort-cost PEB, perceived benefit exerted a stronger positive effect when consumers were exposed to we-frame messages, indicating that the salience of communal responsibility amplifies the motivational weight of expected benefits. For financial-cost PEB, the delayed trap interacted with agency framing in the opposite direction: the I-frame strengthened consumers' recognition of long-term outcomes, whereas the we-frame attenuated this recognition. Taken together, these results suggest that no single message strategy uniformly facilitates PEB; rather, behavioral intention is shaped by the alignment between the type of cost a behavior imposes and the dimension of agency invoked in its communication.

These findings carry important theoretical implications. By incorporating agency framing, the study extends the conversation about PEB beyond the calculus of short-term costs and benefits toward the broader constructs of consumer empowerment and well-being. Voluntary engagement in PEB is not merely an altruistic sacrifice; it constitutes empowerment enacted through autonomous choices that consumers align with their ethical commitments. In this respect, consumers who exercise such agency enhance their quality of life as environmentally competent citizens. The findings further indicate that the key to durable PEB is not the imposition of normative sacrifice, but the creation of conditions under which consumers can act in concert with their own values. Sustainability, in this sense, ultimately rests on continuous, self-determined behaviors, and the present study underscores the pivotal role of agency as a foundation for empowering consumers in the face of environmental challenges.

The study also offers a set of practical implications that span complementary domains. At the level of practice management, organizations and educators should design communication strategies that deliberately align cost type with the corresponding agency frame. Interpersonal agency (we-framing) is more effective for promoting effort-cost PEB, since collective framing amplifies the motivational role of

perceived benefits, whereas financial-cost PEB warrants personal agency (I-framing) to reinforce recognition of long-term effectiveness and to mitigate disengagement arising from the delayed trap. At the level of consumer policy, initiatives intended to foster PEB should acknowledge this distinction: policies that scaffold community-based engagement can enhance consumers' willingness to invest time and effort, whereas programs that emphasize individual responsibility and autonomy are better suited to behaviors entailing additional financial expenditure. Such differentiation has the potential to improve both the effectiveness and the efficiency of pro-environmental campaigns. In the domain of consumer education, a shift from purely normative appeals toward strategies that cultivate agency can empower consumers to construe PEB not as an externally imposed obligation but as an expression of their own competence and autonomy—an orientation that supports consumer well-being while sustaining long-term engagement.

These contributions should nonetheless be interpreted in light of the study's boundary conditions. The sample was confined to consumers in their forties with children, a demographic profile whose family-oriented life stage may shape sensitivity to both cost considerations and agency framing in ways that do not necessarily generalize to other populations. It therefore remains an open question whether the patterns observed here extend to younger or older consumers, to those without dependents, or to households at different points in the life cycle.

Building on these limitations, several avenues for future research warrant attention. Subsequent studies should test agency framing across broader cultural and demographic contexts and examine how the effectiveness of agency framing interacts with personal values, identity, and other individual-difference variables. Such extensions would deepen understanding of how empowered consumer agency can simultaneously advance environmental sustainability and consumer well-being and would refine the boundary conditions under which the patterns observed in this study generalize.

In sum, the present research identifies cost-contingent pathways through which cognitive factors translate into PEB intention and articulates agency framing as a mechanism that conditions these pathways. In doing so, it reframes PEB as a domain in which environmental and consumer interests converge; sustainable behavior is most likely to endure when consumers are not merely instructed to comply, but empowered to choose.

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Table 1
 Descriptive statistics of respondents (N=210)

	Variables	N (%) / mean
Gender	Male	105 (50%)
	Female	105 (50%)
Age		44.49
Monthly income (KRW)	Less than 6 million	109 (51.9%)
	6 million or more	101 (49.1%)
Education level	High school or below	20 (9.5%)
	Higher than high school	190 (90.5%)

Note. 1 million KRW = 670.56 USD (May 14, 2026)

Table 2
 Regression Results for Predictors of Pro-Environmental Behavioral Intentions

Variables	Financial cost PEB				Effort cost PEB			
	B	SE	t	p	B	SE	t	p
Effectiveness	0.008	0.059	0.13	0.896	0.148**	0.050	2.99	0.003
Delayed trap	0.049	0.035	1.38	0.170	-0.011	0.030	-0.38	0.704
Benefit	0.245***	0.047	5.19	0.000	0.118**	0.040	2.97	0.003
Burden	-0.004	0.040	-0.09	0.926	-0.044	0.034	-1.29	0.200
Gender	0.082	0.185	0.44	0.658	0.138	0.157	0.88	0.381
age	-0.047	0.033	-1.44	0.151	-0.030	0.028	-1.08	0.282
Income	0.075†	0.039	1.93	0.055	0.028	0.033	0.86	0.389
education	0.013	0.089	0.14	0.888	0.084	0.076	1.12	0.265
(constant)	3.580	1.705	2.10	0.037	3.707	1.443	2.57	0.011
R ²				0.175				0.183
Adj R ²				0.142				0.150

Note. ***p<.001, **p<.01, †p<.10

Table 3
Interaction Effects of Perceived Benefit and Agency Condition on Pro-Environmental Behavioral Intentions

Variables	Financial cost PEB				Effort cost PEB			
	B	SE	t	p	B	SE	t	p
Benefit × Agency	0.038	0.082	0.46	0.648	-0.126 [†]	0.069	-1.83	0.069
Agency (we=0)	-0.291	0.656	-0.44	0.657	1.067 [†]	0.550	1.94	0.054
Benefit	0.225 ^{***}	0.063	3.56	0.000	0.183 ^{***}	0.053	3.44	0.001
Effectiveness	0.008	0.059	0.14	0.891	0.148 ^{**}	0.049	2.99	0.003
Delayed trap	0.049	0.036	1.37	0.171	-0.011	0.030	-0.37	0.714
Burden	-0.005	0.041	-0.11	0.911	-0.044	0.034	-1.28	0.201
Gender	0.081	0.187	0.43	0.664	0.136	0.157	0.87	0.388
age	-0.048	0.033	-1.45	0.148	-0.028	0.028	-1.03	0.307
Income	0.075 [†]	0.039	1.93	0.055	0.027	0.033	0.83	0.405
education	0.010	0.090	0.11	0.915	0.091	0.076	1.20	0.232
(constant)	3.766	1.760	2.14	0.034	3.079	1.476	2.09	0.038
R ²	0.176				0.198			
Adj R ²	0.134				0.158			

Note. ***p<.001, **p<.01, †p<.10

Figure 1
Interaction Effect of Perceived Benefit and Agency Condition on Intention for Effort-Costly Pro-Environmental Behavior (p<.10)

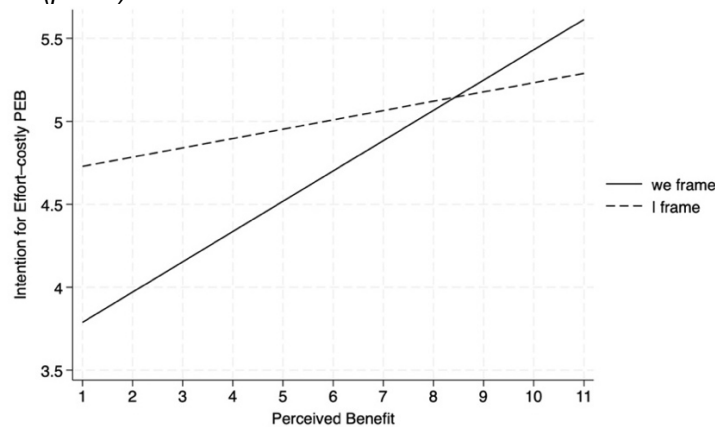


Table 4
Interaction Effects of Delayed Trap and Agency Condition on Pro-Environmental Behavioral Intentions

Variables	Financial cost PEB				Effort cost PEB			
	B	SE	t	p	B	SE	t	p
DT × Agency	0.116 [†]	0.067	1.72	0.087	0.050	0.057	0.87	0.387
Agency (we=0)	-0.858	0.528	-1.63	0.106	-0.267	0.449	-0.60	0.552
Delayed trap	-0.019	0.053	-0.35	0.725	-0.038	0.045	-0.84	0.400
Effectiveness	0.014	0.059	0.24	0.811	0.152 ^{**}	0.050	3.05	0.003
Benefit	0.242 ^{***}	0.047	5.15	0.000	0.117 ^{**}	0.040	2.93	0.004
Burden	0.004	0.041	0.09	0.930	-0.044	0.035	-1.27	0.205
Gender	0.091	0.185	0.49	0.626	0.135	0.158	0.85	0.394
age	-0.049	0.033	-1.49	0.138	-0.031	0.028	-1.12	0.263
Income	0.072 [†]	0.039	1.85	0.065	0.029	0.033	0.86	0.389
education	0.014	0.089	0.15	0.879	0.081	0.076	1.06	0.289
(constant)	4.081	1.726	2.37	0.019	3.916	1.467	2.67	0.008
R ²	0.187				0.188			
Adj R ²	0.146				0.147			

Note. *** $p < .001$, ** $p < .01$, [†] $p < .10$, DT=Delayed Trap

Figure 2
Interaction Effect of Delayed Trap and Agency Condition on Intention for Financially Costly Pro-Environmental Behavior ($p < .10$)

