Promoting Pro-Environmental Behavior Through Anticipated Emotions: A Preliminary Study Using an Episodic Recall Task to Encourage Positive Outcome Expectations

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ABSTRACT

This study examines how anticipated emotions—expectation and regret—can promote pro-environmental behavior (PEB) by reframing its perceived inconvenience. Participants completed a computer-based Pro-Environmental Behavior Task (PEBT) before and after an emotion-induction intervention. Those in the Anticipated Emotion group recalled personal experiences of expectation or regret, while the Control group performed neutral tasks. Results showed a tendency toward increased environmentally friendly choices in the Anticipated Emotion group, suggesting that anticipated emotions can enhance the perceived value of effortful actions and serve as a psychological driver for sustainable behavior.
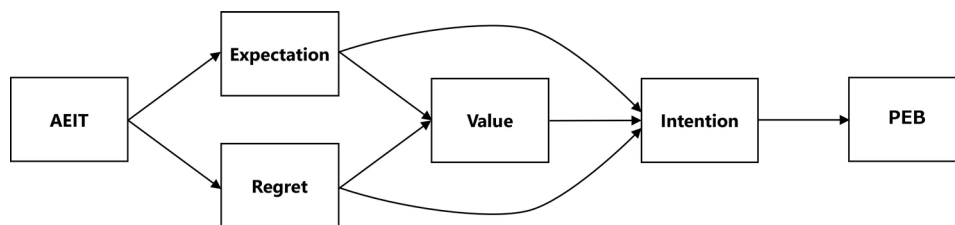
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INTRODUCTION

In recent years, pro-environmental behaviors (PEBs) such as saving electricity and water, separating waste, and choosing eco-friendly means of transportation have become increasingly important. However, many PEBs involve a decrease in convenience or comfort, and the resulting sense of bothersomeness often serves as a psychological barrier to action.

To address this challenge, various approaches have been proposed—such as environmental education (Hungerford and Volk, 1990) and the introduction of monetary incentives (Maki et al., 2016)—and each has demonstrated certain levels of effectiveness. Nevertheless, most of these approaches do not directly tackle the fundamental psychological barrier inherent in PEBs themselves, namely the perception of inconvenience or effort.

Against this background, this study focuses on anticipated emotion as a new psychological perspective for overcoming the perceived burden of PEBs. Anticipated emotions are feelings that arise when individuals imagine the outcomes of their actions, and they are known to have a strong influence on decision-making (Rivis et al., 2009). In particular, this study highlights two representative anticipated emotions—expectation and regret—and aims to promote PEBs by evoking such emotions in advance: the expectation that "something good might happen after enduring inconvenience," and the regret that "I might feel sorry later if I do not take action." By evoking these emotions before the behavior occurs, this study seeks to encourage a revaluation of inconvenience from something to be avoided into something meaningful or worthwhile.

Figure 1: Hypothesized psychological model of anticipated emotion and pro-environmental behavior.

Based on this idea, this study proposes the mechanism illustrated in Figure 1. Specifically, it assumes that a psychological task designed to induce anticipated emotions—hereafter referred to as the Anticipated Emotion Induction Task (AEIT)—elicits expectation and regret, which in turn promote a positive reappraisal of inconvenience (Value), enhance behavioral intention (Intention), and ultimately promote pro-environmental behaviors (PEBs). To empirically test this hypothesis, the AEIT was developed and examined for its impact on behavioral choice and psychological evaluation.

DESIGN OF THE ANTICIPATED EMOTION INDUCTION TASK (AEIT)

In this study, the Anticipated Emotion Induction Task (AEIT) was employed to effectively induce anticipated emotions. The AEIT was designed as a free-writing task that evokes recollection of past personal experiences. By prompting participants to describe concrete episodes based on their own experiences, the AEIT aimed to enhance both the realism and the intensity of the emotions recalled.

The AEIT began with three sample episodes illustrating two types of experiences: those in which performing a bothersome action led to a positive outcome (expectation), and those in which refraining from a bothersome action resulted in regret (regret). Referring to these examples, participants were instructed to reflect on their own past experiences and freely describe corresponding episodes in their own words. All descriptions were written on a tablet device using a note-taking application, with each AEIT session lasting ten minutes.

Furthermore, after the recall and writing process, participants were presented with a brief supporting message emphasizing that "bothersome actions can hold value." This message was intended to reinforce and sustain the anticipated emotions (expectation or regret) that had been evoked, rather than allowing them to remain as transient recollections. In this way, the AEIT was designed not only as a simple writing exercise, but also as a psychological intervention that facilitates emotional reconstruction and the revaluation of inconvenience as something meaningful and worthwhile.
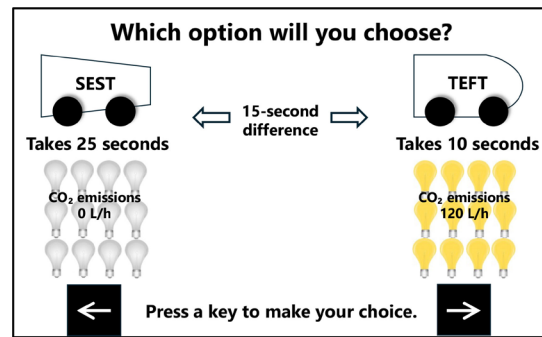
EXPERIMENT

This study employed a two-group experimental design to examine changes in pro-environmental behavioral choice (PEB) between an Anticipated Emotion group (AE) and a Control group (CTL). The AE group performed tasks designed to evoke anticipated emotions, while the CTL group completed emotionally neutral writing tasks as a baseline. Specifically, CTL participants described "yesterday's events" and "next week's plans" in a fact-based manner. Task format and duration were identical across groups to ensure equivalence, with the manipulation limited to the induced psychological element. The overall procedure is shown in Figure 2.

To evaluate the effects of the intervention, both objective and subjective measures were employed. As an objective behavioral indicator, the Pro-Environmental Behavioral Task (PEBT) was used to assess participants' actual pro-environmental decisions (Lange et al., 2018). As shown in Figure 3, each trial of the PEBT presented two transportation options: SEST—an environmentally friendly but slower mode—and TEFT—a faster but environmentally harmful one. The number of times participants chose SEST served as the behavioral index of PEB. This study adopted a shortened version of the PEBT (24 trials per set) (Yamawaki et al., 2023), and participants completed the PEBT both before and after the intervention. Subjective measures were obtained through questionnaires designed to verify the psychological mechanism proposed in Figure 1. These included four key variables—expectation, regret, value reappraisal (value of inconvenience), and behavioral intention—along with scales assessing personality traits and everyday PEB tendencies. Personality traits were measured using the Japanese version of the Ten Item Personality Inventory (TIPI-J) (Oshio et al., 2012), which assesses the five major factors: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. Daily PEB tendencies were assessed with a 15-item scale based on previous research (Kimura and Shibata, 2019), covering behaviors such as waste separation, energy saving, and water conservation. All questionnaire items were rated on a 7-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"), except for the daily PEB items, which used a 5-point frequency scale.
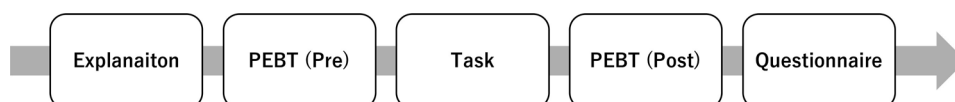
**Figure 2:** Overview of the experimental procedure.

Figure 3: Example of the pro-environmental behavioral task (PEBT).

RESULTS

A total of twelve students from Kyoto University participated in the experiment. Participants were randomly assigned to one of two conditions: the AE group or the CTL group, with six participants in each. All participants were fluent in Japanese and able to understand and complete the written tasks without difficulty. The experiment was conducted individually on personal computers and tablets, and each session lasted approximately 90 minutes.

Figure 4 presents the results of the pre- and post-intervention comparisons of PEBT scores. In the AE group, the proportion of PEB choices significantly increased after the intervention, $t(5) = 3.80$, $p = .013$, $d = 1.55$. The CTL group also showed an upward trend, though the increase was not statistically significant, $t(5) = 1.94$, $p = .110$, $d = 0.79$. Although the difference in change scores between groups was not significant ($t(10) = 0.44$, $p = .667$), all participants in the AE group exhibited a consistent increase in PEB choices, suggesting that anticipated emotion may have contributed to promoting PEB. At the same time, the moderate increase observed in the CTL group indicates that PEB may also have been partially promoted even without emotional intervention—a point discussed later in this chapter.
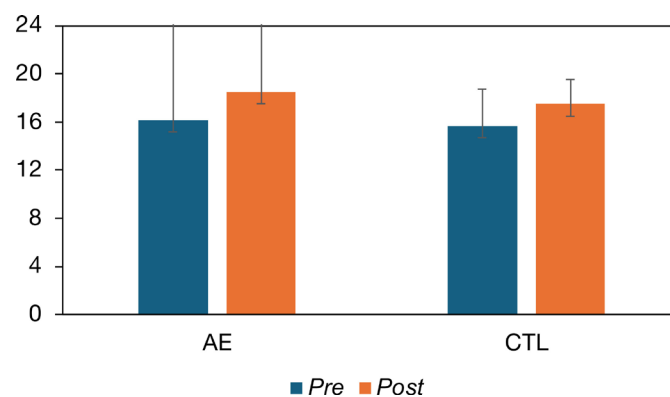
Figure 4: Changes in PEB choices before and after the intervention (AE vs. CTL).

**Table 1:** Descriptive statistics of psychological variables (expectation, regret, value, and intention).

	AE	CTL	t	p
Expectation	5.00±1.26	4.67±1.26	0.50	.628
Regret	5.67±0.82	5.00±1.79	0.83	.426
Value	5.00±0.82	5.83±1.17	−0.29	.780
Intention	5.00±1.17	5.00±1.10	0.25	.804

Table 1 summarizes the questionnaire results for expectation, regret, value reappraisal, and behavioral intention. Although no statistically significant group differences were found, expectation and regret scores tended to be higher in the AE group than in the CTL group, suggesting that the AEIT effectively elicited anticipated emotions. However, because the control tasks required participants to recall recent and upcoming daily experiences ("yesterday's activities" and "next week's plans"), they may also have unintentionally evoked mild emotions of expectation or regret—for example, "I'm looking forward to that" or "I should have done that." In addition, these introspective tasks may have fostered psychological calmness and self-reflection, functioning as a reflective writing exercise that promotes emotional regulation and thoughtful decision-making, thereby indirectly enhancing pro-environmental choices. Consequently, the control group showed relatively high value reappraisal and behavioral intention scores despite the absence of explicit emotional induction. Overall, while the AEIT effectively evoked anticipated emotions, the non-neutral, introspective nature of the control task likely produced similar psychological effects, blurring the contrast between conditions.

To examine how these psychological variables were interrelated and contributed to behavioral change, correlation and multiple regression analyses were conducted on the key measures. The results, shown in Figure 5, present standardized regression coefficients (β) from an exploratory path analysis identifying the relative strengths and directions of associations. Expectation and regret each had weak but positive effects on value reappraisal ($\beta = .08$ and $\beta = .13$, respectively). Value reappraisal showed a moderate positive effect on behavioral intention ($\beta = .32$), which in turn predicted changes in PEBT ($\beta = .38$). A moderate correlation was also observed between value reappraisal and behavioral change (ΔPEBT; $r = .46$), indicating that value reappraisal served as a key mediating factor. Additionally, expectation had a moderate positive direct effect on behavioral intention ($\beta = .34$), whereas regret had a negative one ($\beta = −.20$), suggesting that expectation enhances proactive motivation, while regret may act as an avoidance-oriented emotion that suppresses intention.

Taken together, these results imply that the AEIT facilitated a psychological chain in which anticipated emotions—expectation and regret—prompted participants to reappraise bothersome actions as meaningful, thereby strengthening behavioral intention and actual PEB choices. However, because the control tasks were not affectively neutral, similar motivational processes may have been partially shared across conditions, potentially masking the

AEIT's unique contribution. Future studies should therefore adopt a more emotionally neutral control condition to isolate the causal role of anticipated-emotion induction.
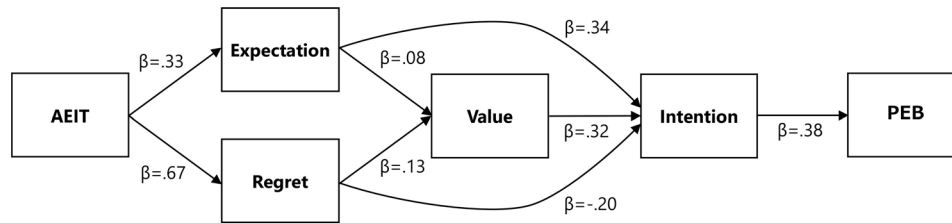
Figure 5: Path model of the psychological mechanism underlying PEB promotion.

Table 2: Correlations between personality traits (big five) and psychological/behavioral variables.

	Expectation	Regret	Value	Intention	ΔPEBT
Extraversion	−0.22	0.66	0.19	−0.59	0.19
Agreeableness	−0.42	−0.08	−0.05	−0.06	0.04
Conscientiousness	−0.29	0.30	0.17	−0.45	−0.23
Neuroticism	−0.11	0.28	0.70	0.20	0.35
Openness	−0.01	0.30	−0.36	−0.77	−0.21

Finally, the effects of individual differences were examined through analyses of personality traits (Big Five) and daily pro-environmental behavior tendencies. As shown in Table 2, Neuroticism correlated strongly and positively with value reappraisal (r = .70), suggesting that individuals with higher emotional sensitivity may be more likely to reinterpret bothersome actions in a positive light. Extraversion correlated positively with regret (r = .66), indicating that more socially attuned individuals may respond more emotionally to behavioral outcomes, particularly in contexts involving social evaluation or feedback. Conversely, Conscientiousness and Openness showed negative associations with behavioral intention, implying that individuals who are typically self-disciplined and plan-oriented may rely less on affective cues when forming intentions. These findings indicate that the psychological mechanisms underlying pro-environmental motivation differ according to personality traits: emotionally reactive individuals may be more susceptible to emotion-based interventions, whereas self-regulated individuals may depend more on cognitive control and established habits.

In addition, daily PEB tendencies showed a moderate positive correlation with behavioral change (ΔPEBT; r = .46), suggesting that individuals who habitually engage in pro-environmental actions are more likely to exhibit enhanced PEB choices following emotional or introspective interventions. This pattern implies that the present intervention may not have created entirely new behaviors, but rather strengthened existing pro-environmental habits and motivations through emotional reinforcement and reflective engagement.

CONCLUSION

This study examined how anticipated emotions can promote PEB by reframing the perception of inconvenience associated with such actions. The results indicated that the AEIT effectively elicited expectation and regret, facilitating cognitive reappraisal and enhancing behavioral intention. However, the control task—though designed as affectively neutral—appeared to evoke similar emotional and reflective states, suggesting that introspection itself may partially promote PEB.

Overall, the findings highlight that emotional and reflective processes both contribute to internal motivation for sustainable behavior. Future research should expand the sample size and adopt a more strictly neutral control condition to isolate the specific causal effects of anticipated emotion on pro-environmental action.

ACKNOWLEDGMENT

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