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Evaluative Feedback and Social Visibility in Digital Green Evaluation: Emotional Responses and Green Purchase Intention

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Abstract

Within digital green evaluation environments, both social visibility (SV) and experimentally constructed evaluative-feedback conditions (EFCs) may shape green purchase intention (GPI). Prior research has emphasized observability and social signaling, while paying less attention to how the evaluative direction of feedback is translated into self-conscious emotions. Drawing on the stimulus–organism–response framework, this study examines how EFCs and SV relate to GPI in association with shame (SH) and pride (PR). A 2 × 3 between-subjects experiment (N = 270) manipulated SV (public versus private) and EFC (negative, neutral, positive). EFC showed significant differences in SH, PR, and GPI, whereas SV showed no significant main effects and operated conditionally. Multicategorical relative indirect-effect analyses, using neutral feedback as the reference condition and controlling for SV, showed significant PR-related relative indirect effects for both the negative versus neutral and positive versus neutral contrasts; the corresponding SH-related relative indirect effects were not significant. Exploratory EFC × SE interactions were significant for both emotional responses, but SE was measured post-stimulus and differed across EFCs; these results are therefore treated as post-stimulus conditional associations. Under the present experimental operationalization, differences across the bundled EFCs were more consistent than SV effects. Because the EFCs jointly varied product choice, score, evaluative message, and interface cues, the findings do not isolate pure valence effects; the relative indirect effects are interpreted as statistical patterns consistent with possible emotional pathways rather than as a complete causal mechanism.

Keywords: evaluative feedback; feedback valence; social visibility; shame; pride; self-esteem; green purchase intention

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1. Introduction

Within digital environments, platform mechanisms increasingly structure how information is presented, while standardized interfaces record, evaluate, and display individuals' actions [1]. In this study, social visibility (SV) refers to the extent to which an individual's evaluation outcome is observable to others, whereas feedback valence (FV) refers to the positive, neutral, or negative evaluative direction conveyed by feedback. In the present experiment, however, evaluative direction was instantiated through bundled evaluative-feedback conditions (EFCs) that jointly varied the depicted product choice, score, evaluative message, and interface cues; EFC therefore denotes the experimental factor, whereas FV

refers to the theoretical evaluative direction. Under such systems, environmentally relevant choices can be embedded in evaluation architectures characterized by scores, ratings, rankings, progress indicators, and comparative feedback. Prior research has shown that visibility can influence pro-environmental decisions by increasing the signaling value of behavior [2,3], while evaluative feedback can shape subsequent responses even without explicit social pressure [4,5]. However, when SV and these evaluative-feedback conditions coexist within the same digital evaluation context, their functional roles and emotional consequences remain insufficiently differentiated [6].

Green purchase intention (GPI)—widely recognized as a proximal predictor of pro-environmental behavior [7]—is shaped by multiple motivational and cognitive factors [8]. From a process perspective, this formation may be understood through the stimulus–organism–response (S–O–R) framework, which posits that external stimuli influence behavioral intentions through internal psychological states [9,10]. Within digital evaluation contexts, evaluative cues convey information about performance and shape how individuals interpret and internalize feedback, thereby influencing purchase intention [11]. This perspective makes the S–O–R framework useful for distinguishing external evaluation cues from the self-conscious emotional responses through which they may relate to GPI.

Digital evaluation systems may communicate feedback through several common formats, including scores, categorical ratings, progress indicators, and comparative benchmarks; these forms are illustrative rather than exhaustive. Such feedback provides outcome-related information and can activate social comparison and goal-regulation processes [12]. When feedback conveys a clear evaluative direction, high or favorable evaluations signal approval, whereas low or unfavorable evaluations imply deviation from expected standards. FV therefore captures the evaluative content of the message. By contrast, SV captures the social context in which that evaluative information is presented—specifically, whether the evaluation is private or observable to others.

Beyond shaping interpretation, FV activates self-conscious emotions. Negative FV tends to elicit shame (SH), whereas positive FV induces pride (PR) [13,14]. Within green consumption contexts, these emotional responses influence behavioral intention [15]. Meanwhile, SV may amplify the social evaluative meaning of feedback under negative FV, thereby intensifying SH [16]. This indicates that different informational cues not only differ in content but also operate through distinct emotional pathways.

Importantly, self-conscious emotions may have different unique associations with subsequent purchase intention. PR is an approach-oriented, positive self-evaluative emotion that can reinforce a favorable interpretation of one's behavior, whereas SH is a self-threatening emotion that can motivate correction but can also elicit avoidance, defensiveness, or withdrawal [17]. Thus, the two emotions need not translate into GPI in the same way. Additionally, individual differences may shape emotional responses to evaluative information. Self-esteem (SE), a core dimension of self-evaluation, may be associated with how individuals process feedback and report self-conscious emotions [18].

Building on this rationale, this study examines the differentiated roles of EFC and SV within structured digital evaluation environments. Employing a 2×3 between-subjects design, this study simultaneously manipulates SV (public versus private) and EFC (negative, neutral, positive), incorporating a neutral condition to distinguish negative and positive evaluative directions from non-directional feedback. SH and PR are examined as parallel post-stimulus emotional responses in relative indirect-effect analyses, while the EFC $\times$ SE pattern is examined exploratorily because SE was measured after the stimulus.

This study therefore focuses on functional differentiation rather than assuming that one evaluation cue is intrinsically more important than another. EFC represents the bundled evaluative-feedback condition, whereas SV represents social observability; the experiment

tests whether these cues show different patterns of association with immediate emotional responses and GPI under the present operationalization. By integrating evaluative content, social context, self-conscious emotions, and self-evaluation, this study offers a more precise account of green purchase intention within digitally structured evaluation settings. The present framing does not imply that pure valence effects, a complete causal emotional mechanism, or trait-based SE moderation have been identified.

2. Literature Review and Hypothesis Development

2.1. FV and Self-Conscious Emotions

Within digital evaluation environments, behavioral feedback may be communicated through several formats, including scores, categorical ratings, progress indicators, and comparative benchmarks. Unlike general informational cues, such feedback carries explicit evaluative meaning, enabling individuals to rapidly infer performance implications. When information conveys a clear evaluative direction, individuals tend to interpret it as a direct assessment of their own behavior rather than as neutral information [19]. This process aligns with message framing research, which demonstrates that evaluative cues shape behavioral responses through emotional pathways [20], particularly within contexts involving social comparison and normative standards [12]. Under green consumption settings, feedback may directly influence behavior even without explicit social pressure, as its evaluative content itself carries behavioral implications [5].

Within the S–O–R framework, FV functions as an evaluative stimulus that can influence purchase intention through internal psychological processes [9,10]. Rather than merely conveying objective information, evaluative feedback can be internalized as a performance judgment, triggering self-conscious emotions that link the external cue to subsequent intention.

Further, SH represents a self-focused evaluative emotion that arises when individuals perceive a discrepancy between their behavior and social or moral standards [21]. Therefore, negative (positive) FV is more likely to elicit SH (PR) [13,14]. Prior research has indicated that negative emotional frames, such as SH and guilt, are particularly salient within norm-based information environments [22]. This effect is particularly pronounced within green consumption contexts, wherein behaviors are closely linked to moral expectations and social responsibility [15], rendering individuals more susceptible to self-conscious emotional responses when evaluating their environmental performance [23].

Although negative emotional appeals may influence pro-environmental decisions through SH [24], the behavioral implications of SH are not uniform. SH may motivate corrective action, but it may also trigger avoidance or defensive responses [25]. PR, in contrast, can reinforce positive self-evaluation and has been associated with pro-environmental intentions and choices [17,26]. These findings suggest that SH and PR may play differentiated roles without implying that one emotion is inherently more stable or behaviorally dominant.

Building on this rationale, the experimentally constructed EFCs are expected to differentiate self-conscious emotional responses according to their evaluative direction. The negative EFC is expected to increase SH, whereas the positive EFC is expected to increase PR.

H1a. *SH is higher in the negative EFC than in the neutral and positive EFCs.*

H1b. *PR is higher in the positive EFC than in the negative and neutral EFCs.*

2.2. SV and the Conditional Amplification of SH

Notably, SV refers to the extent to which an individual's behavior is observable by others. Prior research has demonstrated that visibility enhances the social-signaling value of behavior, shaping individuals' psychological responses [2,3]. Public exposure increases sensitivity to social evaluation and may intensify self-conscious emotions, such as SH, particularly when behavior is subject to normative or moral judgment [27]. Simultaneously, individuals may exhibit different pro-environmental behaviors across public and private contexts, with some behaviors more likely to occur when not observed by others [28]. However, evidence has suggested that SV's effects are not uniform but depend on contextual and informational characteristics [6].

Within the S–O–R framework, SV operates as a contextual cue rather than a primary driver of emotional responses. Instead of directly eliciting emotions, SV shapes how individuals interpret evaluative information. This mechanism becomes particularly salient under green evaluation settings. When presented privately, negative FV is more likely to be interpreted as a personal evaluation. By contrast, when publicly visible, the same negative FV is more likely to be perceived as a form of social evaluation, thereby posing a threat to one's social image. As SH is inherently linked to concerns regarding social evaluation, public visibility is expected to intensify the social implications of negative feedback and thereby strengthen SH [16].

This rationale suggests that SV functions as a conditional amplification mechanism. Specifically, SV strengthens emotional responses by increasing the social implications of feedback, but only when the feedback itself carries negative implications. Under negative FV, public visibility should amplify SH relative to private conditions. By contrast, when FV is neutral or positive, the evaluative threat is reduced, and SV's amplifying effect is expected to diminish. In the present experiment, this prediction is tested as an EFC $\times$ SV interaction.

Based on this logic, the following hypothesis is proposed:

H2. *SV moderates the effect of EFC on SH, such that under the negative EFC, public visibility increases SH relative to private conditions.*

2.3. Self-Conscious Emotions and GPI

Emotions centrally contribute to consumer decision-making by linking evaluative information to behavioral intention [29]. Within the S–O–R framework, self-conscious emotions represent internal psychological responses to evaluative stimuli that may subsequently relate to behavioral intentions. In green consumption contexts, these emotions reflect how individuals evaluate their environmentally relevant performance and may therefore help explain how feedback is translated into purchase intention.

Self-conscious emotions can have differentiated behavioral implications [30]. As a negative self-conscious emotion, SH arises from perceived discrepancies between one's behavior and social or moral standards [21]. Although SH can motivate corrective action, it can also elicit avoidance, defensiveness, and self-devaluation [16]. Because future green purchase intention requires an approach-oriented commitment, the self-threatening and withdrawal-related aspects of SH provide a basis for expecting a negative association with GPI.

By contrast, PR reinforces positive self-evaluation and can strengthen identification with one's behavior [17]. Prior research links pride with value affirmation and pro-environmental behavioral intentions [31,32]. Favorable feedback that elicits PR may therefore support continued willingness to choose green products by affirming the individual's environmentally responsible self-evaluation.

These arguments motivate tests of the unique associations of SH and PR with GPI when the two emotions are considered simultaneously. This formulation does not presume that the emotions compete or that one pathway is intrinsically more stable than the other; rather, it evaluates whether each emotion explains unique variance in GPI after accounting for the other. Because SH, PR, and GPI were measured within the same post-stimulus sequence, these emotion–GPI relationships are interpreted as associations rather than experimentally identified causal effects.

Based on this rationale, the following hypotheses are proposed:

H3a. *SH is negatively associated with GPI.*

H3b. *PR is positively associated with GPI.*

2.4. SE and Post-Stimulus Conditional Associations

SE reflects individuals' overall evaluation of their self-worth and shapes how they process and respond to feedback valence. Prior research has indicated that SE influences self-perception and determines how individuals interpret and internalize self-relevant feedback [18]. Within contexts characterized by explicit evaluative meaning, responses to feedback depend not only on the content of the information but also on individuals' underlying self-evaluative systems. Accordingly, prior theory suggests that emotional responses to evaluative feedback may vary with SE.

Within green evaluation contexts, FV functions as a primary evaluative stimulus that triggers emotional responses. However, these responses are not uniform across individuals and systematically vary across SE levels. Under negative FV, individuals may interpret feedback as a threat to self-worth, resulting in stronger experiences of SH. However, SE may shape how individuals regulate feedback-related self-threat, with higher SE potentially buffering shame responses when feedback is less strongly negative [33]. This pattern provides a theoretical basis for examining whether SH varies across observed SE levels.

Under positive FV, SE's role operates in the opposite direction. As a positive self-conscious emotion closely associated with self-evaluation, PR tends to be amplified among individuals with high SE [13,14]. When exposed to positive feedback, high-SE individuals tend to internalize evaluative information as confirmation of their competence and self-worth, resulting in stronger PR. By contrast, low-SE individuals are less likely to fully internalize positive evaluation, resulting in weaker emotional responses. This pattern provides a theoretical basis for examining whether PR varies across observed SE levels.

Collectively, SE is expected to be associated with variation in emotional responses across feedback conditions rather than exerting an identical influence in every condition. Higher SE may be linked to lower SH when feedback is less threatening and to stronger PR under favorable feedback. The present model therefore tests whether the EFC–emotion association varies across observed SE levels, while the temporal placement of SE measurement is addressed in Sections 3 and 5.3.

Although some research has suggested that strong situational cues reduce the influence of individual traits, this effect may vary across emotional pathways. Given that SE was assessed after the experimental feedback in the present study, these interaction patterns are examined exploratorily rather than as confirmatory moderation by a pre-existing trait.

Based on this rationale, the following exploratory question is examined:

RQ1. Do emotional responses across EFCs vary as a function of observed post-stimulus SE?

Figure 1 summarizes the theoretical model. The exploratory associations involving post-stimulus SE are examined separately.

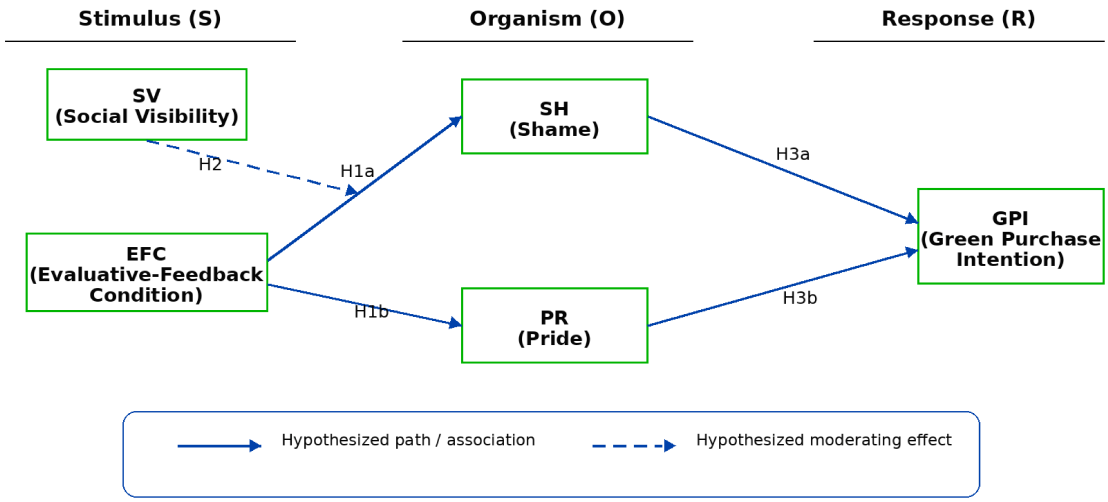


Figure 1. Theoretical model. Notes: EFC = evaluative-feedback condition; SH = shame; PR = pride; GPI = green purchase intention; SV = social visibility. SE is examined separately in the exploratory post-stimulus analysis.

3. Methods

3.1. Research Design

This study employed a 2 × 3 full-factorial between-subjects design, manipulating SV (public versus private) and EFC (negative, neutral, positive). Participants were randomly assigned to one of six experimental conditions.

This design enables the simultaneous examination of the main effects of EFC and SV, as well as their interaction effects, within a unified analytical framework. Incorporating a neutral EFC enhances ecological validity by approximating realistic evaluation structures and allows for clearer differentiation of the influences of evaluative cues on emotional responses and GPI.

The integrated single-study design was retained because the theoretical objective was to examine evaluative content, social observability, emotional responses, and individual-level conditional associations within the same standardized evaluation episode. Testing these components within one randomized experiment ensured that the factorial, relative indirect-effect, and interaction analyses referred to the same stimulus exposure and avoided cross-study differences in scenario implementation. Given the complexity of the model, robustness and diagnostic analyses were incorporated to assess the stability of the principal findings; the integrated design is not intended to substitute for independent replication.

3.2. Participants and Procedure

Participants were recruited from mainland China through Credamo, a professional online research participant recruitment platform. Eligible participants were adults aged 18 years or older who were registered Credamo users in mainland China. Random allocation to the six experimental conditions was implemented by the Credamo survey system. A prespecified target of 270 valid participants was set for the balanced 2 × 3 between-subjects design, corresponding to 45 valid participants in each of the six experimental conditions. This target maintained equal cell sizes across conditions and provided adequate sensitivity for the planned factorial analyses. To quantify the statistical sensitivity of this target, a sensitivity analysis for the 2 × 3 interaction indicated that N = 270 provides approximately 80% power at $\alpha = 0.05$ to detect an interaction effect of Cohen's $f \approx 0.19$ (approximately partial $\eta^2 = 0.035$), corresponding to a small-to-moderate effect. Participants received RMB 1 as compensation for completing the survey. Recruitment continued until the target number of valid responses was reached. The survey included a prespecified attention-check item

based on an obviously false statement ("The sun rises in the west every day"). During the recruitment process, 331 responses were collected in total; 61 respondents failed the attention check and were excluded before analysis. Credamo continued recruitment to replace excluded responses until 270 valid cases were obtained, yielding the final analytical sample of 270 participants, with 45 participants in each experimental condition.

At the beginning of the study, participants read a scenario description and provided informed consent. Subsequently, they were exposed to a simulated green evaluation interface presented as a screen-recorded sequence, which varied across conditions in terms of SV and EFC.

Following stimulus exposure, participants completed the focal measures in a fixed sequence. Among the variables reported in this article, perceived SV was assessed first as the manipulation check, followed by SH, PR, GPI, the attention-check item, SE, and demographic questions. The attention check was used as the prespecified exclusion screen described above. Thus, SE was assessed after the focal post-stimulus emotional and intention measures.

3.3. Experimental Stimuli and Manipulations

This study employed a simulated green evaluation scenario to represent how individuals receive behavioral feedback within digital platforms or organizational evaluation systems. Participants were instructed to imagine themselves as users undergoing a green behavior assessment, wherein the system generated a performance score based on their actions and presented the result through a standardized interface.

Further, SV was manipulated by varying whether others could observe participants' evaluation results. Under the public condition, participants were informed that their scores would be displayed on a team page or leaderboard, which could be viewed by other members. Under the private condition, participants were informed that their results would remain visible only to themselves.

Finally, EFC was operationalized across three levels—negative, neutral, and positive—through coherent evaluative scenarios that jointly varied the depicted product-choice outcome, the displayed score, and accompanying evaluative messages and interface cues. Participants did not make an interactive product selection; rather, the screen-recorded sequence depicted a preconfigured product-choice outcome as part of the assigned condition. In the negative EFC, the sequence depicted a conventional product choice followed by a score of 53/100, below-average performance feedback, and improvement-oriented cues. In the neutral EFC, the sequence depicted a green product choice followed by an intermediate score of 73/100 and non-evaluative, record-based information. In the positive EFC, the sequence depicted a green product choice followed by a high score of 93/100, favorable performance feedback, and positive recognition cues. The general interface architecture and presentation sequence were standardized across conditions, while these manipulation-relevant evaluative elements varied systematically. Accordingly, EFC should be understood as a bundled evaluative-feedback operationalization rather than as an isolated manipulation of verbal valence alone. SV was independently manipulated through repeated visibility cues indicating whether the participant's result was publicly observable to others or visible only to the participant. The complete condition-specific stimuli are provided in Supplementary Figures S1–S6.

3.4. Measures

All constructs were measured using seven-point Likert scales (1 = strongly disagree, 7 = strongly agree). For multi-item constructs, composite scores were computed by aver-

aging across items. All measurement items were adapted to align with the experimental context to ensure contextual relevance.

EFC and SV were experimentally assigned through scenario stimuli rather than measured as naturally occurring individual differences. EFC was operationalized through negative, neutral, or positive evaluative scenarios that combined a condition-specific depicted product-choice outcome, score, evaluative message, and interface cues. Thus, EFC represents a bundled evaluative-feedback operationalization in the present design. SV was manipulated by varying whether the evaluation outcome was publicly observable or privately visible. Perceived SV was assessed using a separate manipulation-check scale. The focal experiment did not include a separate post-exposure perceived-valence manipulation-check item; this limitation is considered in Section 5.3.

Perceived SV was assessed with three items capturing whether participants believed that other people could observe their evaluation result. The third item was reverse-coded before the three items were averaged to form the manipulation-check score.

SH was measured with four items adapted from established conceptualizations of shame [13], and PR was measured with three items adapted from prior pride research [14]. Both scales assessed participants' immediate self-conscious emotional responses to the evaluation feedback.

GPI was measured with a single item adapted from prior green consumption research [34,35]: "After experiencing this green evaluation activity, I am more willing to choose green products in the future." The item used the same seven-point response format. Methodological research indicates that the suitability of single-item indicators depends on the concreteness and breadth of the construct and on the intended predictive use of the measure [36]. In the present experiment, the item was used as a parsimonious indicator of a concrete, immediate, context-specific purchase intention. Nevertheless, a single item does not permit internal-consistency assessment and may provide a narrower representation of GPI than a validated multi-item scale; this measurement choice is therefore explicitly acknowledged as a limitation.

SE was assessed using an eight-item adapted version of the Rosenberg Self-Esteem Scale [37]. Positively and negatively worded items were included; negatively worded items were reverse-coded; and the eight items used in the reported analyses were averaged to form the SE composite score. The questionnaire administered to participants contained eight of the ten original Rosenberg items. The two original items "At times I think I am no good at all" and "I wish I could have more respect for myself" were not administered. This eight-item form was specified before data collection. The complete item wordings, English translations, source information, and item-level adaptations are provided in Supplementary Table S1.

3.5. Analytical Strategy

All analyses were conducted using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA), and relative indirect-effect analyses were performed using the PROCESS macro version 4.2 developed by Andrew F. Hayes [38].

An independent-samples *t*-test was conducted on perceived visibility scores to assess the effectiveness of the SV manipulation. This test evaluated whether participants assigned to the public and private conditions differed in perceived observability.

A series of 2 × 3 analyses of variance (ANOVAs) was performed to examine the main and interaction effects of EFC and SV on SH, PR, and GPI. All statistical tests were conducted at the $\alpha = 0.05$ significance level, and partial eta-squared values, partial η^2, were reported as effect sizes.

Because GPI was measured with a single ordinal item and showed concentration near the upper end of the response scale, a proportional-odds ordinal-logistic regression was additionally conducted as a robustness check. GPI was treated as an ordered categorical outcome, with EFC, SV, and the EFC × SV interaction entered as predictors.

Relative indirect-effect analyses used PROCESS Model 4, with EFC treated as a multicategorical predictor rather than as an ordered linear variable. Indicator coding was applied with neutral feedback as the reference condition, producing two theoretically relevant contrasts: negative versus neutral feedback and positive versus neutral feedback. SH and PR were entered simultaneously as parallel mediators, and SV was included as a covariate because it constituted the second experimentally manipulated factor. Relative indirect effects were estimated using 5000 bootstrap resamples and 95% bootstrap confidence intervals (BootCIs). Because SH and PR were modeled simultaneously, their zero-order association and variance-inflation diagnostics in the outcome model were examined. Additional HTMT diagnostics were evaluated in the pooled sample and within EFCs; an exploratory condition-adjusted HTMT was also calculated after removing variance associated with EFC, SV, and their interaction from the item scores. Bootstrap comparisons of the two specific indirect effects were used to avoid inferring that one pathway was statistically stronger merely because one confidence interval excluded zero and the other did not. Because EFC was experimentally assigned, whereas SH, PR, and GPI were measured within the same post-stimulus sequence, these indirect effects are interpreted as statistical evidence consistent with possible emotional pathways rather than as establishing complete causal mediation.

To examine the EFC × SE interaction, exploratory post-stimulus conditional association analyses were conducted using general linear models. EFC was entered as a categorical factor, SE was mean-centered before constructing the interaction term, and the EFC × SE interaction was used to test whether the association between EFC and SH or PR varied across SE. Partial was reported as the effect-size measure. Because SE was assessed after exposure to the experimental feedback, these interaction results are interpreted cautiously as post-stimulus statistical associations rather than definitive evidence of moderation by a pre-existing trait.

4. Results

4.1. Sample Characteristics

The final analytical sample comprised 270 participants from mainland China, including 99 men (36.67%) and 171 women (63.33%).

Regarding age, 28 participants (10.37%) were 18–22 years old, 121 (44.81%) were 23–30, 100 (37.04%) were 31–40, 13 (4.81%) were 41–50, and 8 (2.96%) were over 50. Regarding education, 5 participants (1.85%) had completed high school or below, 23 (8.52%) held an associate degree, 194 (71.85%) held a bachelor's degree, and 48 (17.78%) held a master's degree or above. Social-media use was frequent in the sample: 248 participants (91.85%) reported using social media almost every day, and 22 (8.15%) reported using it several times per week; no participants reported less frequent use.

4.2. Reliability, Descriptive Statistics, and Correlations

Reliability analyses were conducted for the multi-item constructs. SH (four items), PR (three items), and the eight-item adapted SE measure all demonstrated satisfactory internal consistency, with Cronbach's α values exceeding 0.70. However, the very high α coefficients for SH and PR may also indicate some redundancy among the emotion items and therefore should not be interpreted solely as evidence of measurement quality.

Table 1 reports descriptive statistics, reliability estimates, and zero-order correlations among SH, PR, SE, and GPI. SH, PR, and SE demonstrated high internal consistency. GPI had an overall mean of 6.17 (SD = 0.80); because it was measured with a single item, internal-consistency reliability does not apply. All zero-order correlations reported in Table 1 were significant at $p < 0.001$.

Table 1. Descriptive statistics, reliability, and zero-order correlations.

Variable	M	SD	α	1	2	3	4
1. Shame (SH)	3.13	1.85	0.968	-			
2. Pride (PR)	4.49	2.09	0.972	−0.942 ***	-		
3. Self-esteem (SE)	5.93	0.61	0.838	−0.427 ***	0.420 ***	-	
4. Green purchase intention (GPI)	6.17	0.80	-	−0.265 ***	0.284 ***	0.263 ***	-

Note. N = 270. Zero-order Pearson correlations are reported below the diagonal. Cronbach's α is not applicable to the single-item GPI measure. *** $p < 0.001$.

The single-item GPI measure captures a specific, immediately stated purchase intention in the experimental context. Nevertheless, its inability to support reliability assessment and the relatively high mean response are treated as measurement limitations rather than as evidence that the construct is fully represented by a single indicator.

Given the strong inverse association between SH and PR, additional discriminant-validity diagnostics were conducted using the heterotrait–monotrait ratio (HTMT) [39]. In the pooled sample, the HTMT between SH and PR was 0.970, indicating substantial empirical overlap. Because EFC systematically shifted SH and PR in opposite directions, condition-stratified diagnostics were also examined. HTMT values were 0.538, 0.758, and 0.776 within the negative, neutral, and positive EFCs, respectively. As an exploratory diagnostic, after variance associated with EFC, SV, and their interaction was removed from the item scores, the condition-adjusted HTMT was 0.709. Thus, the extreme pooled association appears to be partly induced by the experimental manipulation. Nevertheless, because the parallel indirect-effect model uses the pooled data and exhibited substantial shared variance, discriminant separation between SH and PR is not treated as unequivocally established. Complete SH–PR overlap and discriminant-validity diagnostics are reported in Supplementary Table S3.

4.3. Social Visibility Manipulation Check

An independent-samples *t*-test was conducted to assess the effectiveness of SV manipulation using perceived visibility as the dependent variable. Participants in the public condition reported substantially higher perceived visibility (M = 6.68, SD = 0.43) than those in the private condition (M = 1.34, SD = 0.48), $|t|(268) = 96.21$, $p < 0.001$.

These results indicate that participants clearly distinguished between the public and private visibility instructions.

4.4. Effects of EFC and SV on Emotional and Behavioral Responses

A series of 2 × 3 ANOVAs was conducted to examine the effects of EFC and SV on SH, PR, and GPI. The descriptive statistics by experimental condition and the two-way ANOVA results are presented in Table 2.

For SH, the main effect of EFC was significant, $F(2, 264) = 837.73$, $p < 0.001$, partial $\eta^2 = 0.864$. SH was highest under negative EFC and was substantially higher than under neutral or positive EFC. The main effect of SV was not significant, $F(1, 264) = 0.57$, $p = 0.453$, partial $\eta^2 = 0.002$. The EFC × SV interaction was significant, $F(2, 264) = 5.00$, $p = 0.007$, partial $\eta^2 = 0.036$.

Table 2. Results of two-way analysis of variance.

DV	Negative Private M (SD)	Negative Public M (SD)	Neutral Private M (SD)	Neutral Public M (SD)	Positive Private M (SD)	Positive Public M (SD)	EFC F(2, 264)	SV F(1, 264)	EFC × SV F(2, 264)
SH	5.34 (0.68)	5.74 (0.45)	2.22 (0.93)	1.98 (0.58)	1.73 (0.61)	1.75 (0.78)	837.73 ***	0.57	5.00 **
PR	1.75 (0.54)	1.72 (0.50)	5.45 (1.09)	5.70 (0.66)	6.17 (0.52)	6.16 (0.70)	1068.01 ***	0.66	1.16
GPI	5.96 (0.77)	5.87 (0.89)	6.07 (0.81)	6.49 (0.66)	6.38 (0.68)	6.29 (0.79)	7.97 ***	0.75	3.30 *

Note. N = 270; n = 45 per experimental cell. Values in the six condition columns are means, with standard deviations in parentheses. EFC = evaluative-feedback condition; SV = social visibility; SH = shame; PR = pride; GPI = green purchase intention. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Simple effects analyses indicated that, under negative EFC, SH was higher in the public condition (M = 5.74) than in the private condition (M = 5.34), M = 0.41, $p = 0.006$. No significant visibility differences were found under neutral or positive EFCs, ps > 0.10. Thus, SV did not exert a direct effect on SH, but it intensified SH when feedback was negative.

For PR, the main effect of EFC was significant, F(2, 264) = 1068.01, $p < 0.001$, partial $\eta^2 = 0.890$. PR was highest under positive EFC. The main effect of SV was not significant, F(1, 264) = 0.66, $p = 0.417$, partial $\eta^2 = 0.002$. The EFC × SV interaction was also not significant, F(2, 264) = 1.16, $p = 0.316$, partial $\eta^2 = 0.009$. These results indicate that PR was primarily shaped by EFC and was not significantly influenced by SV.

For GPI, the main effect of EFC was significant, F(2, 264) = 7.97, $p < 0.001$, partial $\eta^2 = 0.057$. Bonferroni-adjusted post hoc comparisons showed that GPI was significantly lower under negative EFC than under neutral EFC, $\Delta M = -0.37$, $p = 0.005$, and under positive EFC, $\Delta M = -0.42$, $p < 0.001$. The difference between neutral and positive EFCs was not significant, $\Delta M = -0.06$, $p = 1.000$.

The main effect of SV on GPI was not significant, F(1, 264) = 0.75, $p = 0.386$, partial $\eta^2 = 0.003$. However, the EFC × SV interaction was significant, F(2, 264) = 3.30, $p = 0.039$, partial $\eta^2 = 0.024$. Simple effects analyses showed that, under neutral EFC, GPI was higher in the public condition (M = 6.49) than in the private condition (M = 6.07), $\Delta M = 0.42$, $p = 0.010$. No significant visibility differences were found under negative or positive EFCs, ps = 0.585. Because the visibility difference under neutral EFC was not hypothesized a priori and the interaction effect was small, this pattern is treated as exploratory and interpreted cautiously.

Overall, EFC showed significant main effects across SH, PR, and GPI, whereas SV showed no significant main effects. The conditional role of SV differed across outcomes. Specifically, SV amplified SH under negative EFC, whereas its conditional effect on GPI emerged under neutral EFC. PR varied strongly across EFCs and was not significantly moderated by SV.

Taken together, these results support H1a and H1b, as SH was higher under the negative EFC and PR was higher under the positive EFC. H2 was also supported, as public visibility increased SH under negative EFC. Across the measured outcomes, differences across EFCs were more consistent than SV effects under the present experimental operationalization; this pattern should not be interpreted as evidence that pure FV is intrinsically more important than SV across digital contexts.

As a robustness check for the single-item GPI measure and its upper-end concentration, the factorial pattern was re-examined using proportional-odds ordinal-logistic regression, treating GPI as an ordered categorical outcome. EFC remained significant overall, likelihood ratio $\chi^2(2) = 15.10$, $p < 0.001$, whereas the overall effect of SV remained nonsignificant, $\chi^2(1) = 1.13$, $p = 0.287$. The omnibus EFC × SV interaction was marginal, $\chi^2(2) = 5.98$, $p = 0.050$. Importantly, the condition-specific pattern was retained: under neutral feedback, public visibility was associated with higher GPI categories than private

visibility, B = 1.05, SE = 0.41, OR = 2.85, 95% CI [1.29, 6.31], $p = 0.010$, whereas visibility differences remained nonsignificant under negative and positive feedback (ps > 0.68). Thus, treating GPI as ordinal rather than continuous yielded a substantively similar pattern, although the omnibus interaction was less robust under the ordinal specification. Full ordinal-logistic results are reported in Supplementary Table S2.

4.5. Relative Indirect-Effect Analysis

Relative indirect-effect analyses were estimated by treating EFC as a multicategorical predictor rather than as an ordered linear variable. Neutral feedback served as the reference condition, generating two relative contrasts: negative versus neutral EFC and positive versus neutral EFC. SH and PR were entered simultaneously as statistical mediators, with SV included as a covariate. Relative indirect effects were estimated using 5000 bootstrap resamples. Because the emotion–GPI relationships were measured in the same post-stimulus sequence, the following estimates do not establish a complete causal psychological mechanism.

Compared with neutral EFC, negative EFC significantly increased SH, B = 3.439, SE = 0.104, $t = 33.05$, $p < 0.001$, and significantly reduced PR, B = −3.844, SE = 0.104, $t = -36.90$, $p < 0.001$. Positive feedback, relative to neutral EFC, significantly reduced SH, B = −0.364, SE = 0.104, $t = -3.50$, $p < 0.001$, and increased PR, B = 0.585, SE = 0.104, $t = 5.62$, $p < 0.001$.

In the outcome model, PR was positively associated with GPI after accounting for SH, the two EFC contrasts, and SV, B = 0.188, SE = 0.080, $t = 2.34$, $p = 0.020$. The unique association between SH and GPI was not significant, B = −0.043, SE = 0.080, $t = -0.54$, $p = 0.590$). SH and PR were strongly negatively correlated at the zero-order level, r = −0.942. In the parallel outcome model, the variance-inflation factors for SH and PR were 10.18 and 12.91, respectively, indicating substantial shared variance. After removing variance associated with EFC and SV, their residual correlation was reduced to r = −0.549. These diagnostics warrant caution when interpreting the unique mediator coefficients. This interpretation is also consistent with the HTMT diagnostics reported in Section 4.2, which showed substantial overlap in the pooled sample but substantially lower overlap within EFCs.

For the negative versus neutral contrast, the SH-related relative indirect effect was not significant, effect = −0.149, BootSE = 0.269, 95% BootCI [−0.675, 0.367], whereas the PR-related relative indirect effect was significant, effect = −0.722, BootSE = 0.302, 95% BootCI [−1.284, −0.093]. Thus, relative to neutral EFC, the negative versus neutral contrast showed a detectable negative PR-related indirect effect, while no unique SH-related relative indirect effect was detected.

For the positive versus neutral contrast, the SH-related relative indirect effect was not significant, effect = 0.016, BootSE = 0.030, 95% BootCI [−0.042, 0.078]. In contrast, the PR-related relative indirect effect was significant, effect = 0.110, BootSE = 0.053, 95% BootCI [0.013, 0.224]. Bootstrap comparisons between the PR- and SH-specific indirect effects included zero for both the negative versus neutral contrast, difference = −0.572, 95% BootCI [−1.482, 0.417], and the positive versus neutral contrast, difference = 0.094, 95% BootCI [−0.035, 0.242]. Accordingly, the data do not establish that the PR-related indirect effect was statistically stronger than the SH-related indirect effect.

The total effect of negative versus neutral EFC on GPI was significant, B = −0.367, SE = 0.116, $t = -3.16$, $p = 0.002$, whereas the total effect of positive versus neutral EFC was not significant, B = 0.056, SE = 0.116, $t = 0.48$, $p = 0.632$. After SH and PR were included, the corresponding direct effects were not significant (negative versus neutral: B = 0.504, SE = 0.302, $t = 1.67$, $p = 0.096$; positive versus neutral: B = −0.070, SE = 0.121, $t = -0.58$, $p = 0.562$). The sign reversal for the negative versus neutral contrast, together

with the substantial SH–PR overlap, is consistent with an inconsistent or suppression-like pattern and does not support a claim of emotional competition. H3a was not supported, whereas H3b was supported. The relative indirect-effect findings are therefore interpreted as statistical patterns consistent with possible emotional pathways: a detectable PR-related indirect effect was observed, while a unique SH-related indirect effect was not detected. Table 3 summarizes the SH- and PR-related relative indirect effects for both EFC contrasts.

Table 3. Relative indirect effects for evaluative-feedback condition contrasts: SH- and PR-related effects.

EFC Contrast/Mediator	Effect	BootSE	95% BootCI
Negative vs. Neutral → SH	−0.149	0.269	[−0.675, 0.367]
Negative vs. Neutral → PR	−0.722 *	0.302	[−1.284, −0.093]
Positive vs. Neutral → SH	0.016	0.030	[−0.042, 0.078]
Positive vs. Neutral → PR	0.110 *	0.053	[0.013, 0.224]

Note. EFC was treated as a multicategorical predictor using indicator coding, with neutral feedback as the reference condition. SV was included as a covariate. Effects represent specific relative indirect effects based on 5000 bootstrap resamples. An asterisk indicates that the 95% bootstrap confidence interval does not include zero. EFC = evaluative-feedback condition; SH = shame; PR = pride; SV = social visibility; BootCI = bootstrap confidence interval.

4.6. Exploratory Post-Stimulus Conditional Association Analysis

Because SE was assessed after stimulus exposure, we first examined whether SE differed across the experimental conditions. A 2 × 3 ANOVA revealed a significant main effect of EFC on SE, $F(2, 264) = 19.81$, $p < 0.001$, partial $\eta^2 = 0.130$. SE was lower in the negative-feedback condition (M = 5.62, SD = 0.68) than in the neutral-feedback condition (M = 6.07, SD = 0.51) and the positive-feedback condition (M = 6.09, SD = 0.51). Bonferroni-adjusted pairwise comparisons showed that the negative-feedback condition differed significantly from both the neutral and positive conditions (ps < 0.001), whereas the neutral and positive conditions did not differ significantly ($p = 1.000$). Neither the main effect of SV, $F(1, 264) = 0.57$, $p = 0.450$, nor the EFC × SV interaction, $F(2, 264) = 0.52$, $p = 0.593$, was significant. This pattern reinforces the need to interpret the subsequent EFC × SE interactions as post-stimulus conditional associations rather than as unambiguous moderation by a pre-existing self-esteem trait. Moderation analyses were re-estimated after mean-centering SE. EFC was entered as a categorical factor, centered SE was entered as a continuous covariate, and the EFC × SE interaction was included to examine whether emotional responses varied across SE.

For SH, the main effect of EFC evaluated at the mean level of SE was significant, $F(2, 264) = 783.02$, $p < 0.001$, partial $\eta^2 = 0.856$. The omnibus effect associated with centered SE was significant, $F(1, 264) = 35.23$, $p < 0.001$, partial $\eta^2 = 0.118$. More importantly, the EFC × SE interaction remained significant, $F(2, 264) = 14.40$, $p < 0.001$, partial $\eta^2 = 0.098$. As shown in Figure 2, SH remained high under negative feedback across the observed SE range, whereas under neutral and positive feedback, higher SE was associated with lower SH.

For PR, the main effect of EFC evaluated at the mean level of SE was significant, $F(2, 264) = 1116.71$, $p < 0.001$, partial $\eta^2 = 0.894$. The omnibus effect associated with centered SE was significant, $F(1, 264) = 40.97$, $p < 0.001$, partial $\eta^2 = 0.134$. The EFC × SE interaction also remained significant, $F(2, 264) = 24.86$, $p < 0.001$, partial $\eta^2 = 0.158$. As shown in Figure 2, PR increased as feedback became more positive, and the increase was more pronounced at higher observed levels of SE.

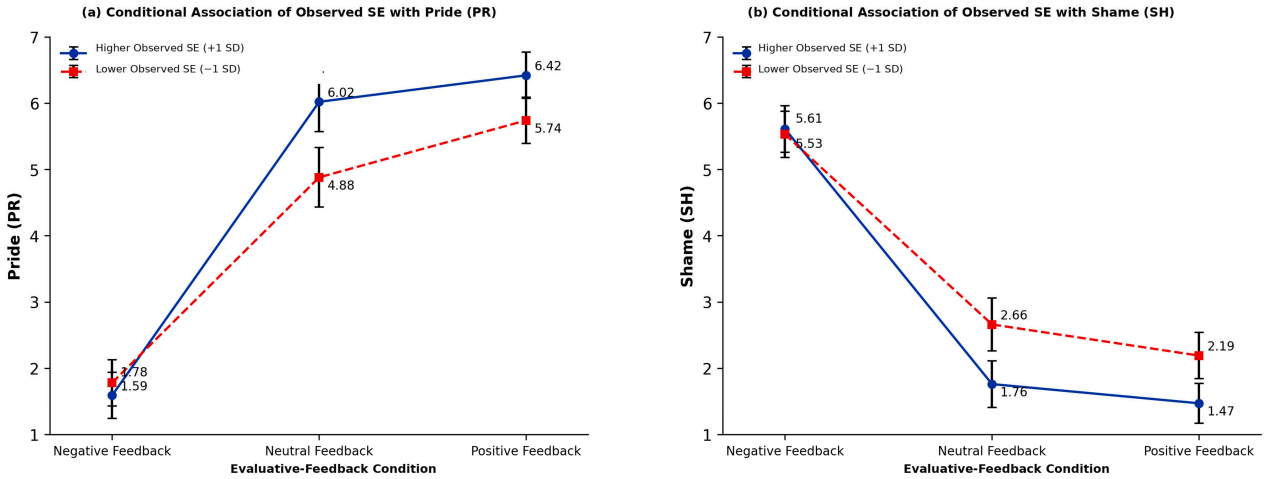


Figure 2. Exploratory conditional associations of observed post-stimulus self-esteem (SE) with self-conscious emotions across EFCs. Note. EFC = evaluative-feedback condition; SE = self-esteem; PR = pride; SH = shame. Values represent estimated marginal means. Error bars indicate ±1 standard error.

Thus, mean-centering corrected the interpretation of the EFC main effects without changing the substantive significance of the EFC × SE interactions. Statistically, higher SE was associated with lower SH mainly under neutral and positive feedback and with higher PR as feedback became more favorable. However, because SE was measured after the experimental feedback and after the focal emotional and intention measures, these interactions cannot unambiguously be attributed to a pre-existing self-esteem trait. These interaction patterns are retained as exploratory post-stimulus conditional associations; because SE was measured post-stimulus and differed across EFCs, they do not constitute support for trait-moderation hypotheses.

4.7. Summary of Findings

In sum, EFC significantly differentiated self-conscious emotions, with SH highest in the negative EFC and PR highest in the positive EFC, thereby supporting H1a and H1b. SV did not show a significant main effect, but it amplified SH under negative EFC, supporting H2.

In the multicategorical relative indirect-effect model, PR showed a significant positive unique association with GPI, whereas SH did not. PR-related relative indirect effects were significant for both the negative versus neutral and positive versus neutral contrasts, while the corresponding SH-related indirect effects were not significant. Because bootstrap comparisons of the two specific indirect effects included zero, the results do not establish that PR was statistically stronger or more stable than SH. Accordingly, H3a was not supported, whereas H3b was supported. These indirect effects are consistent with possible emotional pathways but do not establish complete causal mediation.

After SE was mean-centered, the EFC × SE interactions remained significant for both SH and PR. Higher observed SE was associated with lower SH mainly under neutral and positive EFCs and with higher PR as feedback became more positive. These patterns are reported as exploratory post-stimulus conditional associations rather than as support for trait-moderation hypotheses.

Overall, differences across the bundled EFCs were more consistent across the measured outcomes under the present experimental operationalization, whereas SV showed conditional effects. The results are consistent with possible differentiated emotional pathways but do not justify claims that FV is universally more important than SV or that PR is intrinsically stronger than SH.

5. Discussion

This study examined how EFC and SV relate to immediate GPI within a structured digital green evaluation scenario. The findings show that evaluative feedback was associated with differentiated self-conscious emotional responses and that these responses had different unique associations with GPI. The results concern purchase intention measured immediately after a hypothetical evaluation rather than actual purchasing behavior or sustained behavioral change.

At the informational level, the experimentally assigned EFCs produced significant differences in SH, PR, and GPI, whereas SV showed no significant main effects and operated conditionally. Prior research has emphasized the social-signaling role of visibility in pro-environmental contexts [2,3], but the present findings suggest that, under this particular experimental operationalization, the evaluative scenarios generated more consistent immediate responses than the visibility instruction. This should not be interpreted as evidence that pure FV is intrinsically more important than SV. Moreover, because the EFCs jointly varied a depicted product-choice outcome, condition-specific scores, evaluative messages, and corresponding interface cues, the observed differences should be interpreted as effects of the experimentally constructed EFCs rather than as pure effects of verbal valence in isolation. SV was communicated as whether the result would be publicly or privately visible without an actual audience present.

At the emotional-association level, the multicategorical relative indirect-effect results indicate differentiated unique roles of SH and PR rather than a competitive emotional mechanism. Compared with neutral feedback, both negative and positive feedback produced significant PR-related relative indirect effects, whereas the corresponding unique SH-related effects were not significant. PR also retained a significant positive association with GPI when SH was included in the same outcome model. However, SH and PR were strongly correlated; their parallel-model variance-inflation factors were high; and bootstrap comparisons did not show a statistically significant difference between the two specific indirect effects. The findings therefore do not establish that PR is inherently stronger or more stable than SH. They indicate only that a detectable unique PR-related indirect pattern emerged under the present specification while a unique SH-related indirect pattern did not. Hurst and Sintov [16] found that guilt showed more consistent pro-environmental associations whereas pride depended on context. Because the negative self-conscious emotion examined in the present study is shame rather than guilt, our findings should not be interpreted as contradicting that evidence or as establishing a general motivational advantage of pride over negative self-conscious emotions. Instead, the present results concern pride versus shame within a specific digital evaluation vignette and should not be generalized into a universal hierarchy of self-conscious emotions. Because SH, PR, and GPI were measured within the same post-stimulus sequence, these patterns are consistent with possible emotional pathways rather than establishing a complete causal psychological mechanism.

At the individual level, the EFC $\times$ SE interactions remained significant after SE was mean-centered. Higher observed SE was associated with lower SH mainly under neutral and positive EFCs and with higher PR as feedback became more favorable. At the same time, SE was assessed after participants viewed the feedback and after the focal emotional and intention measures. The data therefore cannot determine whether the observed differences reflect a pre-existing self-esteem disposition, a post-feedback state shift, or both. Consistent with this concern, SE differed significantly across EFCs, with lower observed SE following negative feedback than following neutral or positive feedback. The SE findings are consequently treated as conditional associations that warrant replication with pre-stimulus trait measurement.

Collectively, the findings support a multi-layered account of immediate green purchase intention in a structured digital evaluation context. EFC represents the bundled evaluative-feedback condition, SV represents its social-observability context, SH and PR represent distinct self-conscious emotional responses, and SE is associated with variations in those responses. This functional differentiation is more consistent with the data than a hierarchy in which one cue or emotional pathway is assumed to dominate universally.

5.1. Theoretical Contributions

This study advances research on green consumption within digital evaluation environments by offering a more fine-grained account of how bundled evaluative feedback relates to behavioral intention.

This study extends the S–O–R framework by differentiating the functions of evaluative content and social observability within a digital green evaluation context. EFC represents the experimentally constructed negative, neutral, or positive evaluative-feedback condition, whereas SV determines whether the evaluation is framed as privately or publicly observable. Under the present operationalization, differences across EFCs were more consistent across the measured outcomes, while SV showed conditional effects. The contribution therefore lies in distinguishing the functions of these cues rather than claiming a universal primacy of pure FV over SV.

This study contributes to research on self-conscious emotions by demonstrating differentiated unique associations in a multicategorical relative indirect-effect framework. PR showed significant relative indirect effects for both negative versus neutral and positive versus neutral feedback contrasts, whereas the corresponding unique SH-related indirect effects were not significant. At the same time, the indirect effects were not statistically different from one another and the two emotions shared substantial variance. The contribution is therefore not evidence of emotional competition or superior stability of PR, but a more cautious demonstration that self-conscious emotions can differ in the unique variance they account for within the same feedback–intention model.

This study delineates a boundary condition of SV in the present evaluation context. SV did not exert a significant main effect on SH, PR, or GPI, but it amplified SH under the negative EFC. This conditional pattern provides a more nuanced account of visibility by positioning it as a contextual feature whose effects depend on the evaluative situation rather than as a universal determinant of green purchase intention [6].

Finally, this study reports exploratory EFC $\times$ SE interaction patterns in emotional responses. Mean-centering SE clarifies that the strong EFC differences remain evident at the average observed level of SE. Because SE was assessed after the stimulus, however, the findings should be understood as evidence of conditional association rather than definitive causal moderation by a pre-existing trait. This qualification refines the role assigned to individual self-evaluation within the present S–O–R application.

In sum, the theoretical contribution centers on differences across bundled evaluative-feedback conditions, conditional effects of social visibility, and associations among immediate self-conscious emotional responses and green purchase intention. The SE patterns are retained as exploratory evidence for future pre-stimulus trait research.

5.2. Managerial Implications

The present findings offer potential design considerations for digital green feedback systems, but these implications are restricted to immediate purchase intention within the simulated evaluation scenario.

The results suggest that the configuration of evaluative feedback can meaningfully shape immediate emotional responses and purchase intention. In the present experiment,

differences across EFCs were more consistent than those across the visibility instruction. Platforms may therefore consider whether feedback is sufficiently interpretable and psychologically meaningful, for example, through clear scores, tiered labels, or progress indicators [1]. This implication concerns the present feedback format and should not be read as evidence that visibility is generally unimportant.

The relative indirect-effect results suggest a potential role for pride-related positive reinforcement. PR showed detectable unique relative indirect effects linking both negative versus neutral and positive versus neutral feedback contrasts to GPI, whereas unique SH-related effects were not detected. Accordingly, achievement-oriented cues such as recognition or progress messages may be worth testing as ways to support immediate green purchase intention. The present study does not establish that such cues produce sustained behavior change or that pride is universally more effective than shame [16,17]. These findings should not be interpreted as establishing causal mediation from emotion to GPI.

Visibility features should be interpreted cautiously. Public visibility intensified SH under the negative EFC, while the visibility difference in GPI emerged only under neutral feedback. Because the latter effect was not hypothesized a priori and the interaction effect was small, it should be regarded as exploratory rather than as a firm basis for design recommendations. Replication with stronger and more behaviorally realistic visibility manipulations is needed before recommending when platforms should make green evaluations public.

The exploratory EFC $\times$ SE interactions indicate that users may differ in their emotional responses to the same evaluative message. However, because SE was measured after the feedback, the present data do not justify personalized interventions based on presumed stable self-esteem differences. Future studies that measure relevant traits before exposure could more directly evaluate whether adaptive feedback design improves user responses.

Overall, the practical implications should be viewed as preliminary design considerations for immediate intentions in simulated digital green evaluation settings, rather than as established prescriptions for actual purchasing behavior, long-term engagement, or personalized intervention.

5.3. Limitations and Future Research

This study has several limitations that provide avenues for future research.

First, the study used a bundled evaluative manipulation and a comparatively simple visibility manipulation in a structured digital vignette. The EFCs jointly varied the depicted product-choice outcome, condition-specific score, evaluative message, and corresponding interface cues rather than isolating verbal valence alone. In particular, the negative condition depicted a conventional product choice, whereas the neutral and positive conditions depicted a green product choice. Consequently, the present design cannot fully separate the effect of feedback valence itself from the broader evaluative meaning created by the depicted choice, score, and accompanying feedback cues. In addition, although the SV manipulation check confirmed that participants noticed the public versus private distinction, the focal experiment did not include a separate perceived-valence manipulation check, and noticing that a result is described as public is not equivalent to experiencing an actual audience. The larger and more consistent differences across EFCs may therefore partly reflect the strength and bundled nature of the manipulation. Future work should hold the underlying depicted behavior constant, independently manipulate and validate feedback valence, and use behaviorally stronger visibility manipulations such as a credible audience or actual sharing mechanism.

Second, the study used a single-shot hypothetical scenario, a fixed post-stimulus measurement order, and immediate self-reports. Participants viewed an explicit feedback screen and then reported SH, PR, and GPI, which may have increased demand characteristics and correspondence between the manipulation and the emotional measures. The same-session, fixed-order self-report design may also have increased common-method covariance among the focal measures. The findings therefore demonstrate short-term responses to imagined digital evaluation rather than experienced emotion during actual purchasing, sustained motivation, or behavioral change. Longitudinal, repeated-feedback, field, or behavioral-task designs would provide stronger evidence about persistence and real-world consequences. Moreover, although EFC was experimentally assigned, SH, PR, and GPI were measured within the same post-stimulus sequence; consequently, the relative indirect effects do not establish complete causal mediation from an emotional response to GPI.

Third, GPI was assessed with a single item. Although the item captured a concrete intention, it does not permit internal-consistency assessment and provides a narrower representation of purchase intention than a validated multi-item scale. The overall GPI mean was high (M = 6.17 on a seven-point scale), indicating restricted upper-end variance and a possible ceiling tendency. Although the ordinal-logistic robustness analysis produced a broadly similar substantive pattern, the upper-end concentration of GPI responses remains a measurement limitation and should not be interpreted as resolved by the robustness analysis. Future research should use validated multi-item measures and, where possible, observed choice or purchase behavior.

Fourth, SH and PR showed substantial empirical overlap in the pooled sample. Their zero-order correlation was $r = -0.942$, the pooled HTMT value was 0.970, and variance-inflation diagnostics in the parallel outcome model were elevated. Importantly, the overlap was substantially lower within individual EFCs (HTMTs = 0.538–0.776) and after accounting for experimentally induced condition variance (exploratory condition-adjusted HTMT = 0.709), indicating that part of the pooled association arose because EFC systematically shifted the two emotions in opposite directions. Nevertheless, because the parallel relative indirect-effect estimates are based on the pooled sample, this overlap increases uncertainty around their unique coefficients. The present findings therefore should not be interpreted as establishing strong discriminant validity, emotional competition, or the intrinsic superiority of one pathway. Future studies should employ measurement designs that allow clearer separation of self-conscious emotional responses and should consider additional emotions such as guilt, embarrassment, moral satisfaction, or anticipated regret.

Finally, SE was measured after the experimental feedback and after the focal outcome measures. Moreover, the observed SE scores showed relatively restricted variability (M = 5.93, SD = 0.61) and differed significantly across EFCs. These features may reduce the precision and generalizability of the EFC $\times$ SE interaction estimates and prevent the present analyses from establishing moderation by a purely pre-existing trait. Future studies should measure trait SE before random assignment or in a separate session and recruit samples with greater variability in self-evaluation. More broadly, the sample was recruited exclusively from mainland China and the study relied on self-reported outcomes; cross-cultural replication, pre-registered measurement timing, and multi-source or behavioral data would strengthen generalizability and causal interpretation.

5.4. Conclusions

This study examined how EFC and SV relate to immediate GPI within a structured digital green evaluation environment. EFC significantly differentiated SH and PR and showed effects on GPI, whereas SV showed conditional rather than consistent main effects.

Under the present experimental operationalization, differences across the bundled EFCs produced more consistent responses than the visibility instruction, but this pattern does not establish a universal hierarchy between the two cues.

Multicategorical relative indirect-effect analysis further showed that PR had significant relative indirect effects for the negative versus neutral and positive versus neutral feedback contrasts, whereas the corresponding unique SH-related indirect effects were not significant. Because SH and PR shared substantial variance and the specific indirect effects were not statistically different from each other, the findings are best interpreted as statistical patterns consistent with possible emotional pathways rather than as evidence of emotional competition or superior stability of PR. The same-session measurement of SH, PR, and GPI precludes interpretation as a complete causal mechanism.

The exploratory EFC × SE interactions also remained significant after SE was mean-centered, indicating systematic variation in emotional responses across observed SE levels. Because SE was assessed after feedback exposure, these results require cautious interpretation and future replication with pre-stimulus trait measurement.

Overall, this study integrates bundled evaluative feedback, social observability, and self-conscious emotional responses within a single digital green evaluation framework. In doing so, it provides a more qualified account of how these factors are associated with immediate green purchase intention while identifying important methodological boundary conditions for future research.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/jtaer21090309/s1, Figure S1: Private × Negative Feedback Condition; Figure S2: Private × Neutral Feedback Condition; Figure S3: Private × Positive Feedback Condition; Figure S4: Public × Negative Feedback Condition; Figure S5: Public × Neutral Feedback Condition; Figure S6: Public × Positive Feedback Condition; Table S1: Measurement Items and Attention Check; Table S2: Ordinal-Logistic Robustness Analysis for Green Purchase Intention; Table S3: SH–PR Overlap and Discriminant-Validity Diagnostics. The measurement sources cited in Table S1 are included in the main reference list [13,14,34,35,37].

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Institutional Review Board Statement: The study posed minimal risk to participants, involved no deception, manipulation, or intervention, and complied with the principles of respect for persons, beneficence, and justice as described in international ethical guidelines such as the Declaration of Helsinki (2013 revision) [40] the APA Ethical Principles of Psychologists and Code of Conduct, and the ESOMAR/ICC International Code on Market and Social Research. In many jurisdictions and according to common international academic practice, anonymous, non-interventional, minimal-risk survey studies like this one may not require formal IRB approval. Given that this study was conducted in the Republic of Korea, under Article 15(2) of the Korean Bioethics and Safety Act and Article 13(1)(1)(a) of its Enforcement Rule, this study meets the criteria for exemption from IRB review. The study was conducted in full accordance with all applicable ethical standards for research involving human participants.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data will be made available on request.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

SV	social visibility
FV	feedback valence
SH	shame
PR	pride
GPI	green purchase intention
SE	self-esteem
S–O–R	stimulus–organism–response
EFC	evaluative-feedback condition

References

1. Treem, J.W.; Leonardi, P.M. Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. *Ann. Int. Commun. Assoc.* **2013**, *36*, 143–189. [CrossRef]
2. Griskevicius, V.; Tybur, J.M.; Van den Bergh, B. Going green to be seen: Status, reputation, and conspicuous conservation. *J. Pers. Soc. Psychol.* **2010**, *98*, 392–404. [CrossRef]
3. Brick, C.; Sherman, D.K.; Kim, H.S. Green to be seen and brown to keep down: Visibility moderates the effect of identity on pro-environmental behavior. *J. Environ. Psychol.* **2017**, *51*, 226–238. [CrossRef]
4. Noureddine, A.; Lodeiro, M.D.; Bru, N.; Chbeir, R. The impact of green feedback on users' software usage. *IEEE Trans. Sustain. Comput.* **2022**, *8*, 280–292. [CrossRef]
5. Shou, Y.; Shan, S.; Chen, A.; Cheng, Y.; Boer, H. Aspirations and environmental performance feedback: A behavioral perspective for green supply chain management. *Int. J. Oper. Prod. Manag.* **2020**, *40*, 729–751. [CrossRef]
6. Brick, C.; Sherman, D.K. When does being watched change pro-environmental behaviors in the laboratory? *Sustainability* **2021**, *13*, 2766. [CrossRef]
7. Ajzen, I. The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 179–211.
8. Ng, P.M.; Cheung, C.T.; Lit, K.K.; Wan, C.; Choy, E.T. Green consumption and sustainable development. *Bus. Strateg. Environ.* **2024**, *33*, 1024–1039. [CrossRef]
9. Mehrabian, A.; Russell, J.A. *An Approach to Environmental Psychology*; MIT Press: Cambridge, MA, USA, 1974.
10. Han, M.S.; Hampson, D.P.; Wang, Y.; Wang, H. Consumer confidence and green purchase intention: An application of the stimulus–organism–response model. *J. Retail. Consum. Serv.* **2022**, *68*, 103061. [CrossRef]
11. Ikhsan, R.B.; Fernando, Y.; Gui, A.; Fernando, E. The power of online reviews: Exploring information asymmetry and its impact on green product purchasing behavior. *Int. J. Consum. Stud.* **2024**, *48*, e13050. [CrossRef]
12. Loock, C.M.; Staake, T.; Thiesse, F. Motivating energy-efficient behavior with green IS: An investigation of goal setting and the role of defaults. *MIS Q.* **2013**, *37*, 1313–1332.
13. Tangney, J.P.; Dearing, R.L. *Shame and Guilt*; Guilford Press: New York, NY, USA, 2003.
14. Tracy, J.L.; Robins, R.W. The psychological structure of pride: A tale of two facets. *J. Pers. Soc. Psychol.* **2007**, *92*, 506–525. [CrossRef]
15. Schneider, C.R.; Zaval, L.; Weber, E.U.; Markowitz, E.M. The influence of anticipated pride and guilt on pro-environmental decision making. *PLoS ONE* **2017**, *12*, e0188781. [CrossRef]
16. Hurst, K.F.; Sintov, N.D. Guilt consistently motivates pro-environmental outcomes while pride depends on context. *J. Environ. Psychol.* **2022**, *80*, 101776. [CrossRef]
17. Bissing-Olson, M.J.; Fielding, K.S.; Iyer, A. Experiences of pride, not guilt, predict pro-environmental behavior when pro-environmental descriptive norms are more positive. *J. Environ. Psychol.* **2016**, *45*, 145–153. [CrossRef]
18. Stuppy, A.; Mead, N.L.; Van Osselaer, S.M.J. I am, therefore I buy: Low self-esteem and the pursuit of self-verifying consumption. *J. Consum. Res.* **2020**, *46*, 956–973. [CrossRef]
19. White, K.; Habib, R.; Hardisty, D.J. How to SHIFT consumer behaviors to be more sustainable: A literature review and guiding framework. *J. Mark.* **2019**, *83*, 22–49. [CrossRef]
20. Zubair, M.; Iqbal, S.; Usman, S.M.; Awais, M.; Wang, R.; Wang, X. Message framing and self-conscious emotions. *Sci. Rep.* **2020**, *10*, 18304. [CrossRef]
21. Lewis, M. The role of the self in shame. *Soc. Res.* **2003**, *70*, 1181–1204.
22. Baek, T.H.; Yoon, S. Guilt and shame: Environmental message framing effects. *J. Advert.* **2017**, *46*, 440–453. [CrossRef]
23. Mkono, M.; Hughes, K. Eco-guilt and eco-shame in tourism consumption contexts. *J. Sustain. Tour.* **2020**, *28*, 1223–1244. [CrossRef]

24. Amatulli, C.; De Angelis, M.; Peluso, A.M.; Soscia, I.; Guido, G. The effect of negative message framing on green consumption: An investigation of the role of shame. *J. Bus. Ethics* **2019**, *157*, 1111–1132. [CrossRef]
25. Nielsen, R.S.; Gamborg, C.; Lund, T.B. Eco-guilt and eco-shame in everyday life. *Front. Sustain.* **2024**, *5*, 1357656.
26. Antonetti, P.; Maklan, S. Feelings that make a difference: How guilt and pride convince consumers of the effectiveness of sustainable consumption choices. *J. Bus. Ethics* **2014**, *124*, 117–134. [CrossRef]
27. Smith, R.H.; Webster, J.M.; Parrott, W.G.; Eyre, H.L. The role of public exposure in moral and nonmoral shame and guilt. *J. Pers. Soc. Psychol.* **2002**, *83*, 138–159. [CrossRef]
28. Hynes, N.; Wilson, J. I do it, but don't tell anyone! Personal values, personal and social norms: Can social media play a role in changing pro-environmental behaviours? *Technol. Forecast. Soc. Change* **2016**, *111*, 349–359. [CrossRef]
29. Trudel, R. Sustainable consumer behavior. *Consum. Psychol. Rev.* **2019**, *2*, 85–96. [CrossRef]
30. Haj-Salem, N.; Ishaq, M.I.; Raza, A. How anticipated pride and guilt influence green consumption in the Middle East: The moderating role of environmental consciousness. *J. Retail. Consum. Serv.* **2022**, *68*, 103062. [CrossRef]
31. Yan, L.; Keh, H.T.; Murray, K.B. Feeling the values: How pride and awe differentially enhance consumers' sustainable behavioral intentions. *J. Acad. Mark. Sci.* **2024**, *52*, 75–96. [CrossRef]
32. Hong, J.M.; Lim, R.E.; Atkinson, L. "Doing good" versus "being good": The interplay between pride appeals and regulatory-focused messages in green advertising. *J. Appl. Soc. Psychol.* **2021**, *51*, 1089–1108. [CrossRef]
33. Orth, U.; Robins, R.W. The development of self-esteem. *Curr. Dir. Psychol. Sci.* **2014**, *23*, 381–387. [CrossRef]
34. Chan, R.Y.K. Determinants of Chinese consumers' green purchase behavior. *Psychol. Mark.* **2001**, *18*, 389–413. [CrossRef]
35. Lee, K. Opportunities for green marketing: Young consumers. *Mark. Intell. Plan.* **2008**, *26*, 573–586. [CrossRef]
36. Diamantopoulos, A.; Sarstedt, M.; Fuchs, C.; Wilczynski, P.; Kaiser, S. Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. *J. Acad. Mark. Sci.* **2012**, *40*, 434–449. [CrossRef]
37. Rosenberg, M. *Society and the Adolescent Self-Image*; Princeton University Press: Princeton, NJ, USA, 1965.
38. Hayes, A.F. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*, 2nd ed.; The Guilford Press: New York, NY, USA, 2018.
39. Henseler, J.; Ringle, C.M.; Sarstedt, M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. Acad. Mark. Sci.* **2015**, *43*, 115–135. [CrossRef]
40. World Medical Association. World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA* **2013**, *310*, 2191–2194. [CrossRef]

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