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Published Version

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Wan, C., Wong, P. and Homapour, E. (2025) The role of reward certainty and incidental emotion in encouraging pro-environmental behaviors. *Journal of Consumer Behaviour*. ISSN 1479-1838 doi: 10.1002/cb.70009 Available at <https://centaur.reading.ac.uk/123378/>

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To link to this article DOI: <http://dx.doi.org/10.1002/cb.70009>

Publisher: Wiley

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The Role of Reward Certainty and Incidental Emotion in Encouraging Pro-Environmental Behaviors

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Received: 21 February 2025 | **Revised:** 10 June 2025 | **Accepted:** 17 June 2025

Funding: This work was supported by Research Grants Council, The Hong Kong Special Administrative Region (UGC/FDS24/H10/20).

Keywords: appraisal tendency framework | emotion | environment | expectancy theory | reward certainty | sustainability

ABSTRACT

Rewards are effective promotional tools for promoting desirable behaviors, strengthening engagement, and incentivizing pro-environmental actions. Integrating expectancy theory and the appraisal tendency framework, this research investigated the interplay of reward certainty and incidental emotions on pro-environmental behaviors. While previous research primarily focused on integral emotions directly linked to the consumption context, this study makes a unique contribution by analyzing the impact of incidental emotions, which are developed from a separate and unconnected situation but still influence customer choices. The three experimental studies provided convergent empirical evidence that certain rewards significantly strengthen individuals' outcome expectancy and pro-environmental intentions, particularly when incidental fear (compared with hope) is induced. Theoretically, this research bridged the gaps in prior research by examining the interaction of reward certainty and incidental emotions. Practically, businesses and policymakers are suggested to leverage certain rewards and fear-inducing stimuli to promote sustainable behaviors effectively.

1 | Introduction

Rewards are popular marketing strategies to encourage desirable customer behaviors and foster brand-customer relationships (Gorlier and Michel 2020). Rewards could be in many different forms, for example, products, services, cash back, and so on (Bagga et al. 2024). Rewards are not only used for encouraging purchases but can also incentivize pro-environmental behaviors (Bolderdijk et al. 2019). For example, H&M offers a voucher for recycling unwanted clothes, Starbucks offers a discount for using reusable cups, and IKEA offers in-store credits for bringing back used furniture. These initiatives demonstrate how rewards have been used to encourage sustainability practices and highlight the need for businesses and marketers to consider how rewards should be designed to address both business and environmental goals (Ji et al. 2023; Lange and Dewitte 2023).

Rewards can generally be categorized based on various attributes such as their relatedness to the products or services being bought, whether they are immediate or delayed, and whether they are monetary or nonmonetary (Choi and Kim 2013; Ji et al. 2023; Zhang et al. 2024). Among these attributes, reward certainty, that is, whether a reward is guaranteed or random, plays a crucial role in influencing consumer behaviors (Shen et al. 2019). While the role of reward certainty has been examined in prior studies (e.g., Jung et al. 2020; Shi et al. 2021), it has not been sufficiently studied in pro-environmental contexts. Furthermore, marketers have been using certain rewards (e.g., points, cash-back) and uncertain rewards (e.g., entering a prize draw) to encourage customers' pro-environmental engagement (Qureshi 2024; Stone 2024). However, research is needed on when and how to effectively use certain versus uncertain rewards to promote sustainable behaviors.

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Prior studies yielded mixed results on the role of reward certainty. For example, Annamalai et al. (2021) found that certain rewards can elicit stronger fan engagement in sports clubs; in contrast, Shen et al. (2019) demonstrated that uncertain rewards are more effective for encouraging repetitive behaviors. These findings suggested that the level of reward certainty may vary depending on the behavioral context. A recent study by Zou et al. (2022) found that uncertain rewards can strengthen the impact of surprise rewards on customers' loyalty. However, Wong and Wan (2024) found that certain rewards are particularly effective in motivating hotel guests to participate in towel reuse initiatives, especially when they experience fear.

Individuals' evaluations typically integrate both cognitive and emotional appraisals during their decision-making processes (Achar et al. 2016). For example, when exposed to varying social (e.g., being appreciated vs. threatened) or physical contexts (e.g., hot or cold weather), individuals interpret and respond to the same information differently, contingent upon whether they are in a positive or negative mood (Kim et al. 2010; Van Lange et al. 2011). In other words, emotions are not just feelings but also shape the cognitive lens through which individuals perceive and judge their new experiences (Lerner and Keltner 2000). Emotions influencing customers' decisions and behaviors can broadly be categorized into two distinctive types, that is, **integral emotion** (related to the situation) versus **incidental emotion** (unrelated or separated from the situation) (Hillebrandt and Barclay 2017). For example, when considering purchasing a product in a store, **integral emotions** may arise from the product variety and customer services, while **incidental emotions** might be influenced by factors such as the customer's mood, a busy workday, or other external events that have happened. Individuals often are not aware that incidental emotions influence their judgments. These emotions can impact decisions in the short term and later inform future choices. This makes incidental emotions particularly relevant for understanding how individuals' pre-existing emotional states interact with cognitive evaluations such as reward certainty. While marketers and businesses often prioritize understanding customers' integral emotions, prior studies focusing on incidental emotions in decision-making and judgment are underexplored (Lerner and Keltner 2000; Wyer et al. 2019).

Despite some understanding of the individual effects of rewards and incidental emotions, the interplay between reward certainty and incidental emotions on pro-environmental behavior has not been thoroughly examined. In this study, we integrate expectancy theory and the appraisal tendency framework to examine how cognitive and emotional factors jointly influence pro-environmental behaviors. Expectancy theory explains how individuals' cognitive evaluations of outcome expectancies are shaped by reward certainty, while the appraisal tendency framework accounts for the moderating role of individual emotions influencing cognitive appraisals through emotion-specific predispositions (Sandberg et al. 2022; Zou et al. 2022). This research advances our understanding of the effective use of incentives to encourage pro-environmental behaviors by employing three experimental studies. Furthermore, it offers practical insights into the design of rewards programs that marketers, businesses, and policymakers can apply to promote environmental sustainability.

2 | Theoretical Background

2.1 | Reward Certainty, Outcome Expectancy, and Pro-Environmental Behaviors

The expectancy theory (Vroom 1964) posits that the motivational force driving individual behaviors is shaped by three components: Valence, expectancy, and instrumentality. The theory suggests that individuals' motivation depends on their evaluation of rewards (**valence**), their belief in their ability to perform the desired action (**expectancy**), and their confidence that successfully performing the action will lead to the expected outcomes (**instrumentality**) (Al Rousan et al. 2023; Kiatkawsin and Han 2017). For example, a customer who chooses to purchase a reusable water bottle is driven by the product value (valence), his or her ability to consistently use the bottle (expectancy), and confidence in the positive environmental impact of their actions (instrumentality). The expectancy theory was originally developed to comprehend employees motivation (Heneman and Schwab 1972) and later in other areas, such as educational research to understand student performance (Hancock 1995), consumer research to examine consumers' product evaluation (Talwar et al. 2021), technology adoption (Chopra 2019), achievement from online games (Lin et al. 2015), and pro-environmental behaviors (Talwar et al. 2021); this demonstrated that the parsimonious and flexible nature of the theory can effectively be applied in various contexts.

Extending this theoretical foundation, Kiatkawsin and Han (2017) highlighted that individuals' motivational processes can be understood through interconnected evaluations of rewards and expected outcomes. In particular, individuals' perceptions of the value of rewards (valence) may influence their belief that performing specific behaviors will produce desirable outcomes, thus enhancing their outcome expectancy. This perspective is especially relevant in pro-environmental contexts, where actions like reducing plastic consumption are often linked to broader environmental benefits. Therefore, it is important to emphasize that outcome expectancy, the belief that performing a specific behavior will lead to positive environmental outcomes, has been identified as a key determinant of pro-environmental behaviors (Abrams et al. 2021). Prior research has demonstrated that the stronger individuals believe their actions can effectively contribute to environmental improvements, the more likely they are to engage in such actions (Bradley et al. 2020; Chen et al. 2022; Collado and Evans 2019; Zhang et al. 2023). Therefore, outcome expectancy plays a pivotal role in motivating environmentally responsible behaviors.

Shen et al. (2015) categorized rewards into two distinctive types: certain rewards encompass incentives of a definite value, like bonuses, premiums, prizes, or discounts, while uncertain rewards involve unknown reward values, such as lucky draws or contests. Prior studies have examined and compared the effectiveness of certain versus uncertain rewards. Certain rewards are generally considered more effective (Shen et al. 2015), as uncertainty with limited reward information may evoke a feeling of apprehension and a perceived lack of control (Zou et al. 2022). Laran and Tsiros (2013) suggested that those who rely heavily on cognitive decision-making processes tend to have stronger risk-averse tendencies and are therefore more likely to avoid

the risks associated with uncertain rewards. Nevertheless, uncertain rewards can be desirable for consumers who are more involved in the affective decision-making process, as they perceive the uncertainty as positive and full of possible outcomes (Goldsmith and Amir 2010). Shi et al. (2022) explained that uncertain rewards offer an opportunity to customers to experience a sense of achievement or to gain benefits. Similarly, Leclercq et al. (2018) explained that uncertainty can make a consumption context more engaging and motivate individuals' reward-seeking behaviors.

In this study, we focus on a context in which rewards for pro-environmental engagement are typically modest cash rebates or similar incentives. Therefore, customers are more likely to prioritize cognitive considerations over affective factors in their decision-making process (Bolderdijk et al. 2019; Langenbach et al. 2020). This implies that certain rewards with clear and predictable benefits are more effective in promoting pro-environmental actions by strengthening individuals' outcome expectancy. Importantly, outcome expectancy is conceptualized as a cognitive belief regarding the effectiveness of one's actions in producing desirable outcomes. When individuals encounter a certain reward, they are more likely to engage in deliberate cognitive evaluation rather than affective responses. This cognitive focus strengthens the perceived connection between their behavior and the anticipated positive environmental outcomes, and therefore enhances their outcome expectancy. As a result, outcome expectancy tends to increase under conditions that activate cognitive processing, such as when rewards are certain and predictable. Outcome expectancy also functions as a key psychological mechanism through which reward certainty affects individuals' likelihood to act. Specifically, the enhanced outcome expectancy induced by certain rewards is expected to facilitate greater engagement in pro-environmental actions by reinforcing individuals' belief that their efforts will lead to meaningful environmental improvements.

The following hypotheses are proposed based on the above-mentioned literature on expectancy theory and reward (un)certainly.

Hypothesis 1 (H1). *Certain rewards elicited a higher level of outcome expectancy than uncertain rewards.*

Hypothesis 2 (H2). *Outcome expectancy mediates the relationship between reward (un)certainly and pro-environmental behaviors.*

2.2 | Incidental Emotion

The appraisal tendency framework suggested that emotions often elicit cognitive responses and appraisal, which leads to an effect on individuals' judgment (Lerner and Keltner 2000). Individuals' judgment and decision-making process often involves both cognitive and emotional evaluations (Achar et al. 2016; Wang et al. 2020). There are two distinctive types of emotion influencing individual decision-making processes and behaviors, that is, **integral emotion** (related to the situation) versus **incidental emotion** (unrelated or separated

from the situation) (Hillebrandt and Barclay 2017). Prior studies often focused on integral emotions directly related to the specific decision-making context (Baek et al. 2022; Bergquist et al. 2020; Santos et al. 2022). Despite the unrelatedness of incidental emotion to the context of consumption, individuals perceive and react differently to the same information when encountering various social and physical environments (Kim et al. 2010; Van Lange et al. 2011). The incidental emotion developed from an unrelated context can influence subsequent judgements and behaviors in another distinct context (Achar et al. 2016). For example, Kim et al. (2010)'s study showed that individuals who were asked to recall exciting life events (incidental emotion developed from past events) evaluated more favorably adventurous appeals of a tourism product. The influence of incidental emotions has been demonstrated across various behavioral contexts, including brand preferences (Venkatraman et al. 2012), risk perception (Ferrer and Ellis 2021), advertisements (Poels and Dewitte 2019), and behavioral intentions toward tourism events (Le et al. 2020). Previous studies have also shown that incidental emotions affect individuals' involvement in pro-environmental behaviors. Positive emotions like awe and happiness have been shown to enhance the likelihood of individuals participating in sustainable behaviors, while negative emotions, such as anger, can also drive environmental engagement (Bissing-Olson et al. 2016; Ibanez and Roussel 2022; Rees et al. 2015). However, the interaction between reward certainty and incidental emotions in relation to pro-environmental behaviors remains underexplored, particularly regarding how the certainty of rewards influences emotional responses and subsequent sustainable actions (Wong and Wan 2024; Wyer et al. 2019).

2.3 | Incidental Fear and Hope

Grounded in the appraisal tendency theory, the emotions of fear and hope play a significant role in influencing individuals' attitudes and behaviors (Kim et al. 2022; Moulard et al. 2012). Both the emotions of fear and hope are future-oriented emotions associated with uncertainty with different valences (Cavanaugh et al. 2015; Lerner and Keltner 2000; Wyer et al. 2019). **Fear**, typically regarded as a negative emotion, emerges when individuals feel threatened in dangerous or frightening situations (Dunn and Hoegg 2014; Longmire et al. 2021; Wang and Lee 2021). In response to fear emotions, individuals often make choices that help ease their feelings and gain a sense of control (Moulard et al. 2012). For example, prior studies showed that individuals who experienced incidental fear from an unrelated event were more likely to opt for less-risky decisions (Lee and Andrade 2011; Schulreich et al. 2016). Dunn and Hoegg (2014) discovered that consumers who encounter fear-inducing situations often form stronger emotional connections to brands, using this as a coping mechanism to seek affiliation. Those experiencing incidental fear may perceive material possessions as a way to alleviate uncertainty and offer a sense of security in challenging circumstances (Longmire et al. 2021). In contrast, **hope** is typically seen as a positive emotion driven by the expectation of favorable outcomes (Cavanaugh et al. 2015; Wyer et al. 2019). In the context of consumer marketing, customers often select and purchase products with the hope of

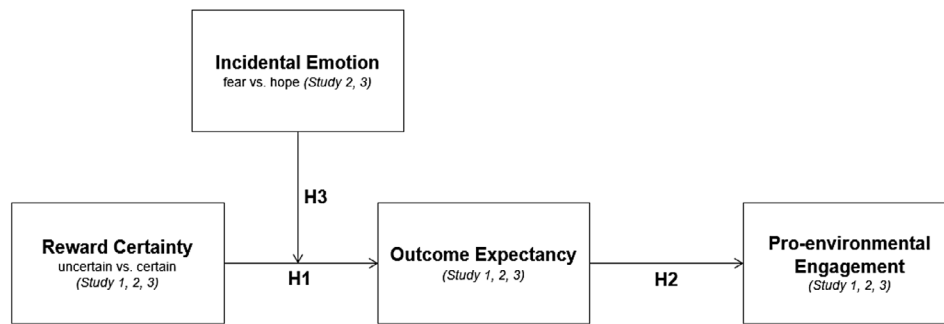


FIGURE 1 | The conceptual framework.

achieving desired outcomes, for example, buying cosmetics for their outlook, joining a gym for health (Lazarus 2006; Maclaran and Chatzidakis 2022). Hope is, therefore, future-oriented, reflecting a willingness to take chances and maintain a positive outlook regarding achievable outcomes (Lerner and Keltner 2000). In other words, positive emotions from past events may evoke a sense of hope, which in turn influences individuals' perception of future events as uncertain yet achievable with positive outcomes (Smith and Ellsworth 1985; Winterich and Haws 2011). Previous research has indicated that consumers experiencing positive emotions tend to enjoy reward uncertainty and are more willing to take risks for unpredictable outcomes (Lee and Qiu 2009; Zou et al. 2022).

Despite the general association of incidental fear with risk-averse behavior and the influence of hope in increasing the willingness to take risks, Lee and Andrade (2015) discovered a notable exception in their study that incidental fear induced risk-averse behavior in stock investment decisions but not in an exciting casino game; this could be due to the fact that fear and excitement both involve high physiological arousal and uncertainty appraisals, with fear potentially becoming exciting depending on the contextual cues. This suggests that the mechanisms through which incidental emotions impact reward certainty have yet to be fully explored. A deeper understanding of incidental emotions can aid in crafting more effective strategies to promote and encourage pro-environmental behaviors. In a review article by Shipley and van Riper (2022), individuals who experienced the emotion of guilt are more likely to engage in pro-environmental behaviors than those who feel pride. This suggests that negative emotions, such as guilt from not contributing to environmental efforts, are more effective in motivating individuals to adopt pro-environmental actions than positive emotions like the satisfaction derived from such engagement (Adams et al. 2020). Therefore, we argue that incidental fear may enhance environmental motivation by driving individuals to prefer certain rewards that offer security and control, thereby promoting immediate pro-environmental actions. Based on this rationale, the following hypothesis is thus proposed:

Hypothesis 3 (H3). *Incidental emotion of fear (versus hope) strengthened the impact of reward certainty on outcome expectancy.*

Based on the above-mentioned literature, the research model is presented in Figure 1.

3 | Overview of Research Design

3.1 | Study Design

This research comprises three experimental studies. Study 1 examines the relationship between reward certainty, outcome expectancy, and pro-environmental engagement. Study 2 investigates the moderating effect of incidental emotion on the relationship between reward certainty and outcome expectancy when opting out of cutlery in food delivery orders. Study 3 replicates the findings of Study 2, testing the hypothesized relationships in a different context, specifically household waste recycling, to validate the generalizability of the results. Ethics approval was obtained at the author's institution.

3.2 | Data Collection

Study 1 was conducted based on a student sample from the author's institution for initial hypothesis testing. Study 2 and 3 utilized panel services from an international research company to collect data from Chinese customers in Hong Kong. This research focuses on Chinese customers due to the significant environmental challenges faced in the country (Yang et al. 2023) and this offers a culturally relevant context for the three studies. The minimum sample size required for each of the studies was estimated using G*Power 3.1 software (Faul et al. 2009). A priori power analysis for ANOVA was conducted using a two-tailed test of significance at the 5% level, under a power of 95% and an estimated medium effect size of 0.3; the minimum sample sizes were 148 participants for Study 1 and 196 participants for Studies 2 and 3.

3.3 | Materials and Measures

3.3.1 | Materials for Reward Certainty

To manipulate the conditions of reward certainty, respondents were directed to read a paragraph describing a reward initiative aimed at encouraging pro-environmental behaviors. In our studies, we employed a certain reward (e.g., HK\$5 rebate) or a binary uncertain reward condition (e.g., HK\$0 or HK\$5 rebate). This approach is supported by existing research on reward uncertainty manipulation. For example, studies like Zou et al. (2022) and Goldsmith and Amir (2010) have utilized similar binary reward structures for uncertain rewards, where the

reward alternates between a desirable or less desirable outcome. Additionally, Shi et al. (2021) used a “lucky draw” scenario in which participants had the chance to receive a zero reward. This approach also mirrors real-world situations, such as lucky draws or promotional rewards where the final reward is uncertain and contingent on chance.

In Studies 1 and 2, the two conditions differentiate by offering HK\$5 (~USD0.7) rebate for not requesting cutlery (certain reward) in the food delivery order, or a random rebate of HK\$0 or 5 (uncertain reward).

Certain Reward

Imagine staying at home and ordering food delivery using a food ordering app. The app launches a promotional campaign in which customers will receive an instant cash rebate of \$5 for the current order if they opt out of cutlery.

Uncertain Reward

Imagine staying at home and ordering food delivery using a food ordering app. The app launches a promotional campaign in which customers may receive an instant cash rebate of either \$0 or \$5 for the current order if they opt out of cutlery.

Study 3 employed a similar approach, but with a different context focused on rewards for household waste recycling. The two conditions offer a certain reward of HK \$20 (~USD2.7) or an uncertain one of HK\$0 or HK\$20.

Certain Reward

An organization has set up a recycling bin next to the building where you live. The organization has launched a recycling program in which individuals need only deposit one kilogram of recyclable materials into the bin to receive an immediate cash reward of \$20.

Uncertain Reward

An organization has set up a recycling bin next to the building where you live. The organization has launched a recycling program in which individuals need only deposit one kilogram of recyclable materials into the bin to receive an immediate cash reward of either \$0 or \$20. The specific reward amount will be randomly determined by the system.

3.3.2 | Materials for Incidental Emotion

Previous research has typically employed two main approaches to evoke incidental emotions. One method involves asking participants to recall and write about a personal experience related

to a specific emotion (Dunn and Schweitzer 2005; Jin and Atkinson 2021). The other method exposes participants to external stimuli, such as reading a text or viewing a video, designed to elicit the target emotion (Dunn and Hoegg 2014; Longmire et al. 2021). This study adopted the second approach for greater consistency and control and minimizing the variability introduced by individual experiences. The materials used were selected and pretested with a student sample. In the fear condition, participants read an article from *The Sun* about a woman's experience with a neglected mouth ulcer that turned into cancer and watched a trailer from the horror movie *Halloween Kills*. Conversely, the hope condition involved reading a BBC News article on maintaining hope and watching a video of the poem *And the People Stayed Home*, which presents an optimistic outlook for the future. Links to the original stimuli (i.e., the video and news article used to elicit incidental emotions) are provided in Supporting Information 1.

3.3.3 | Measures

In addition to manipulation conditions, outcome expectancy was measured by three items in a 1–7 scale adapted from Chiang and Jang (2008) including “If I reduced plastic cutlery consumption, environmental deterioration can be prevented,” “If I reduced plastic cutlery consumption, environmental quality will be improved,” “If I reduced plastic cutlery consumption, natural resources would be conserved.”. The wordings of these statements were adjusted to focus on recycling for aligning with the context in Study 3.

Pro-environmental engagement in Study 1 was measured by the intention of participants to perform the pro-environmental action (opting-out cutlery in food delivery order). In Studies 2 and 3, the engagement was measured by whether the participants chose to opt-out cutlery and to join in the pro-environmental action promoted in the relevant reward scheme, respectively.

Other measures include manipulation checks, demographic questions, and items for a control variable, perceived barriers, adapted from Van Der Linden (2015). The items measuring perceived barriers assessed whether the pro-environmental actions affect participants' enjoyment, daily life, and ease of carrying out the actions, and this aims to control for any potential confounding impact that may influence participants' responses.

4 | Study 1

4.1 | Design, Participants, Stimuli, and Procedures

Study 1 examined the impact of reward certainty on outcome expectancy and subsequently pro-environmental intention. Responses were collected from a student sample of 177 final year students at a public university in Hong Kong (42.4% male, 57.6% female; $M_{Age} = 25.12$, $SD = 7.835$). The students were randomly assigned to one of the two experimental groups, that is, uncertain rewards and certain rewards. The sample size for each of the two conditions was 88 and 89, respectively. The scenario in Study 1 centered around the decision to opt out of receiving cutlery in online food delivery orders. This scenario was chosen due to the

persistent challenges posed by the widespread use of single-use plastic cutlery in the food industry, despite efforts to promote eco-friendly alternatives (Borg et al. 2020; Molloy et al. 2022). Moreover, the popularity of food delivery services resonates with participants' daily experiences, facilitating their engagement with the scenario (Janairo 2021; Molina-Besch 2020). After completing the demographic questions, participants were presented with the scenario. They then completed measures of pro-environmental behavior followed by outcome expectancy.

4.2 | Results

4.2.1 | Manipulation Checks

The effectiveness of the manipulation was assessed using a 7-point bipolar scale, where respondents rated the certainty level of the rewards described in the scenario (from 1 = uncertain to 7 = certain). An independent *t*-test showed that respondents exposed to the low certainty condition rated the reward as uncertain, while the respondents in the high certainty condition rated that as certain ($M_{\text{Uncertain}} = 2.44$, $M_{\text{Certain}} = 6.59$, $t = 20.073$, $p < 0.001$). Therefore, the manipulation was successful.

4.2.2 | Hypothesis Testing

A one-way ANCOVA was performed to test the effect of reward certainty on outcome expectancy and pro-environmental intention; respectively, gender, age, education level, and perceived barriers were included as covariates. The effect of reward certainty on outcome expectancy was significant ($M_{\text{Uncertain}} = 4.615$, $M_{\text{Certain}} = 5.457$, $F = 16.517$, $p < 0.001$, $\eta_p^2 = 0.088$) (Figure 2).

To collectively test the manipulated and measured variables, we conducted a mediation analysis using PROCESS MACRO v4.2 Model 4 (Hayes 2022) (95% confidence interval; 10,000 bootstrap samples). Reward certainty (0 = uncertain; 1 = certain) was included as an independent variable, and outcome expectancy and pro-environmental intention were included as a mediator and dependent variable, respectively. The same control variables in the ANCOVA analysis were included as covariates in the analysis.

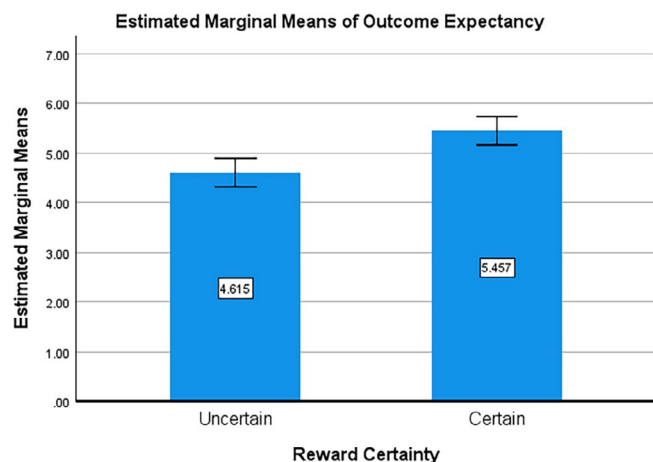


FIGURE 2 | Effect of reward certainty on outcome expectancy (Study 1).

The relationship between reward certainty and outcome expectancy was significant ($\beta = 0.8423$, $SE = 0.2073$, $p < 0.001$, $CI = [0.4332, 1.2514]$) and the positive sign indicated that the certain reward elicited a higher level of outcome expectancy than the uncertain reward. The effect of outcome expectancy on pro-environmental intention was also positive and significant ($\beta = 0.2297$, $SE = 0.1011$, $p < 0.05$, $CI = [0.0302, 0.4293]$). Lastly, the indirect effect of reward certainty on pro-environmental intention was also significant ($\beta = 0.1935$, $SE = 0.0976$, $CI = [0.0252, 0.4113]$). Overall, H1 and H2 were supported; this confirmed that the certain reward strengthened the respondents' belief in the positive environmental impact of their actions (i.e., outcome expectancy), which, in turn, enhanced their pro-environmental intentions.

5 | Study 2

5.1 | Design, Participants, Stimuli, and Procedures

Study 2 collected data from an online panel of the commissioned marketing research company, and 364 respondents were recruited (49.5% male, 50.5% female; $M_{\text{Age}} = 40.33$, $SD = 12.186$). The number of participants for each condition ranged from 90 to 92. This study employed a 2 (uncertain vs. certain rewards) $\times$ 2 (incidental fear vs. hope) between-subject experimental design, using the same context as Study 1. The respondents were randomly assigned to one of the four conditions. After completing the demographic questions, participants were exposed to the experimental materials. They first watched the video and read the news article designed to elicit the assigned incidental emotion, followed by the reward certainty scenario. Participants then responded to the pro-environmental behavior measure, followed by the outcome expectancy items. All the measures were consistent with Study 1, except that pro-environmental engagement was operationalized as the participants' choice between "Require Cutlery" or "No Cutlery" following the manipulations.

5.2 | Results

5.2.1 | Manipulation Checks

One-way ANOVA was conducted to assess the successfulness of the experimental manipulations. Respondents in the uncertain-reward condition rated the reward as uncertain more than those in the certain condition ($M_{\text{Uncertain}} = 5.85$, $M_{\text{Certain}} = 3.54$, $p < 0.001$). By contrast, respondents in the certain-reward condition rated the reward as certain more than those in the uncertain condition ($M_{\text{Uncertain}} = 2.14$, $M_{\text{Certain}} = 5.97$, $p < 0.001$). The items evaluating the incidental fear and hope manipulations asked whether the video and news article made the respondents feel afraid and hopeful. Respondents in the fear condition rated both the video ($M_{\text{Fear}} = 4.82$, $M_{\text{Hope}} = 2.17$, $p < 0.001$) and news article ($M_{\text{Fear}} = 5.39$, $M_{\text{Hope}} = 2.55$, $p < 0.001$) as making them feel afraid significantly higher than those in the hope condition. Conversely, respondents in the hope condition rated the video ($M_{\text{Fear}} = 2.68$, $M_{\text{Hope}} = 4.70$, $p < 0.001$) and news article ($M_{\text{Fear}} = 3.35$, $M_{\text{Hope}} = 4.54$, $p < 0.001$) as making them feel hopeful significantly higher than those in the fear condition. Overall, both manipulations were successful.

5.2.2 | Hypothesis Testing

An ANCOVA analysis was performed to test the main and interaction effects of reward certainty and incidental emotion on outcome expectancy. The same set of control variables, that is gender, age, education level, and perceived barriers, was included in the analyses. The main effect of reward certainty on outcome expectancy was significant ($M_{\text{Uncertain}}=4.898$, $M_{\text{Certain}}=5.102$, $F=4.812$, $p<0.05$, $\eta_p^2=0.013$); H1 was supported. The main effect of incidental emotion was also significant ($M_{\text{Fear}}=5.120$, $M_{\text{Hope}}=4.880$, $F=6.676$, $p<0.05$, $\eta_p^2=0.018$) in which incidental fear was more effective in eliciting stronger outcome expectance than incidental hope. Furthermore, the interaction effect of reward certainty and incidental emotion was significant ($F=4.198$, $p<0.05$, $\eta_p^2=0.012$). The pairwise comparisons showed that participants in the certain-fear condition reported a significantly higher level of outcome expectancy than those in the certain-hope condition ($M_{\text{Certain-Fear}}=5.318$, $M_{\text{Certain-Hope}}=4.886$, $p<0.01$); this supported H3 that incidental fear strengthened the impact of certain reward on outcome expectancy. The graphical presentation of the results is presented in Figure 3.

We conducted a moderated mediation analysis using PROCESS MACRO v4.2 Model 7 (Hayes 2022), with a 95% confidence interval and 10,000 bootstrap samples for testing the hypothesized relationships in the conceptual framework. In the analysis, reward certainty (0=uncertain reward; 1=certain reward) was included as an independent variable, incidental emotion (0=fear; 1=hope) as a moderator, outcome expectancy as mediator, and pro-environmental engagement (0=require cutlery; 1=no cutlery) as a dependent variable. As the dependent variable is dichotomous, PROCESS automatically applied logistic regression to estimate the model, and all coefficients related to the DV are reported on a log-odds metric (Hayes 2022).

The index of moderated mediation was significant (index= -0.2548 , $SE=0.1633$, $CI=[-0.6464, -0.0093]$) indicating that the effect of reward certainty on pro-environmental engagement via outcome expectancy is conditional on incidental emotion.

A negative index of moderated mediation indicates that the strength of the indirect effect differs across levels of the moderator, with the effect being stronger at the lower level of the moderator (Hayes 2015). In our study, this means the indirect effect of reward certainty on pro-environmental engagement via outcome expectancy was stronger when fear (coded as 0) was induced than when hope (coded as 1) was induced. This supports our hypothesis that fear strengthens the impact of reward certainty on outcome expectancy and enhances the overall indirect pathway to pro-environmental behavior.

The results showed a significant relationship between reward certainty and outcome expectancy ($\beta=0.3952$, $SE=0.1318$, $p<0.01$, $CI=[0.1359, 0.6544]$), and this indicated that a higher level of reward certainty enhanced individuals' outcome expectancy. Therefore, H1 was supported. The effect of incidental emotion on outcome expectancy was not significant ($\beta=-0.0485$, $SE=0.1312$, $p=0.7118$, $CI=[-0.3065, 0.2095]$). However, the interaction effect of reward certainty and incidental emotion was negatively significant ($\beta=-0.3831$, $SE=0.1870$, $p<0.05$, $CI=[-0.7508, -0.0154]$). Conditional effects analysis showed that reward certainty significantly increased outcome expectancy when fear was induced ($\beta=0.3952$, $SE=0.1318$, $p<0.01$, $CI=[0.1359, 0.6544]$) but not when hope was induced ($\beta=0.0121$, $SE=0.1317$, $p=0.9269$, $CI=[-0.2468, 0.2710]$). This indicates that the influence of reward certainty on outcome expectancy was stronger under fear than under hope, thus supporting H3. Finally, outcome expectancy significantly predicted pro-environmental engagement ($\beta=0.6650$, $SE=0.2058$, $p<0.01$, $CI=[0.2616, 1.0685]$) and thus H2 was supported.

6 | Study 3

6.1 | Design, Participants, Stimuli, and Procedures

Study 3 aims to replicate the findings of Study 2 but within a different context of pro-environmental engagement. This study focuses on the scenario of household waste recycling, for which participants are incentivized to recycle in numerous

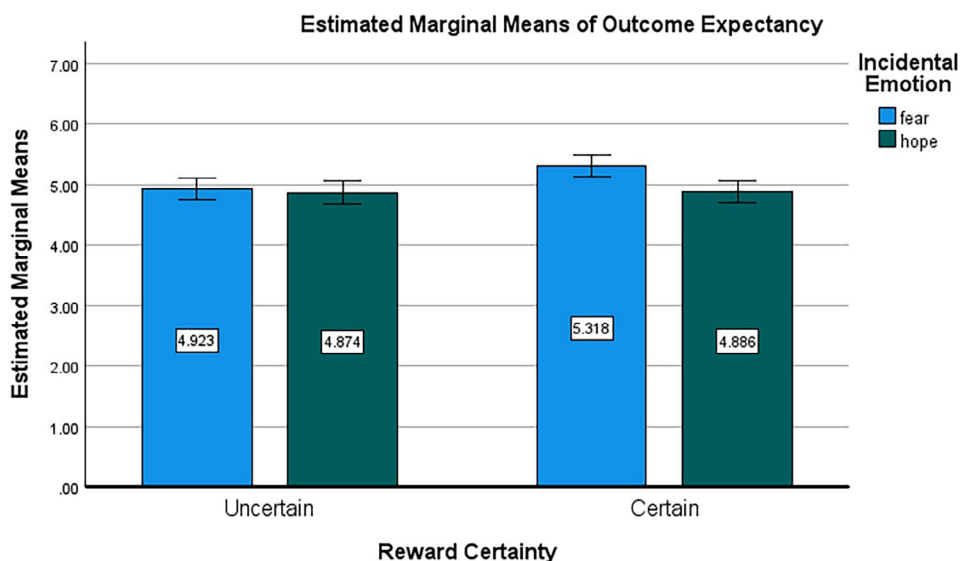


FIGURE 3 | Effect of reward certainty and incidental emotion on outcome expectancy (Study 2).

schemes in the country (Ling and Xu 2021; Lu and Wang 2022). Furthermore, this context provides more comprehensive insights into the generalizability of the findings across different types of pro-environmental behaviors. Similar to Study 2, this study employed a 2 (uncertain vs. certain rewards) $\times$ 2 (incidental fear vs. hope) between-subject experimental design. Except for the context of the reward scenario, the materials, procedures, and measures were identical to those used in Study 2. After completing the demographic questions, participants were exposed to the experimental materials. They first watched the video and read the news article designed to elicit the assigned incidental emotion, followed by the reward certainty scenario. They then responded to the pro-environmental behavior measure, followed by the outcome expectancy items. In this study, pro-environmental engagement was measured by participants' decision to participate in the recycling scheme described in the scenario. A total of 358 responses were collected through the same marketing research company (49.4% male, 50.6% female; $M_{\text{Age}} = 40.08$, $SD = 12.039$).

6.2 | Results

6.2.1 | Manipulation Checks

One-way ANOVA was conducted to assess the successfulness of the experimental manipulations. Respondents in the uncertain-reward condition rated the reward as more uncertain than those in the certain condition ($M_{\text{Uncertain}} = 5.94$, $M_{\text{Certain}} = 3.34$, $p < 0.001$). By contrast, respondents in the certain-reward condition rated the reward as more certain than those in the uncertain condition ($M_{\text{Uncertain}} = 3.08$, $M_{\text{Certain}} = 6.12$, $p < 0.001$). Same as Study 2, the items evaluating the incidental fear and hope manipulations asked whether the video and news article made the respondents feel afraid and hopeful. Respondents in the fear condition rated both the video ($M_{\text{Fear}} = 5.15$, $M_{\text{Hope}} = 2.15$, $p < 0.001$) and news article ($M_{\text{Fear}} = 5.63$, $M_{\text{Hope}} = 2.53$, $p < 0.001$) as making them feel afraid significantly higher than those in the hope condition. Conversely, respondents in the hope condition rated the video ($M_{\text{Fear}} = 2.70$, $M_{\text{Hope}} = 5.11$, $p < 0.001$) and news

article ($M_{\text{Fear}} = 3.28$, $M_{\text{Hope}} = 4.59$, $p < 0.001$) as making them feel hopeful significantly higher than those in the fear condition. Overall, both manipulations in Study 3 were successful.

6.2.2 | Hypothesis Testing

We conducted a two-way ANCOVA to test the main and interaction effects of reward certainty and incidental emotion on outcome expectancy. The same control variables as previous studies were included as covariates in the analyses. The main effect of reward certainty on outcome expectancy was significant ($M_{\text{Uncertain}} = 4.886$, $M_{\text{Certain}} = 5.040$, $F = 4.584$, $p < 0.05$, $\eta_p^2 = 0.013$); H1 was supported. The main effect of incidental emotion was also significant ($M_{\text{Fear}} = 5.036$, $M_{\text{Hope}} = 4.890$, $F = 4.317$, $p < 0.05$, $\eta_p^2 = 0.012$) in which outcome expectancy was enhanced when incidental fear (vs. hope) was induced. Furthermore, the interaction effect of reward certainty and incidental emotion was significant ($F = 8.637$, $p < 0.01$, $\eta_p^2 = 0.024$). The pairwise comparisons showed that participants in the certain-fear condition reported a significantly higher level of outcome expectancy than those in the certain-hope condition ($M_{\text{Certain-Fear}} = 5.217$, $M_{\text{Certain-Hope}} = 4.863$, $p < 0.01$); this indicated that incidental fear strengthened the impact of certain reward on outcome expectancy and thus H3 was supported. The graphical presentation of the results is presented in Figure 4.

To test the hypothesized moderated mediation relationships in Study 3, we conducted an analysis using PROCESS MACRO v4.2 Model 7 (Hayes 2022), with a 95% confidence interval and 10,000 bootstrap samples. In the analysis, reward certainty (0 = uncertain reward; 1 = certain reward) was included as an independent variable, incidental emotion (0 = fear; 1 = hope) as a moderator, outcome expectancy as mediator, and pro-environmental engagement (0 = not join; 1 = Join) as a dependent variable. Logistic regression was automatically applied in PROCESS when the outcome variable is binary (Hayes 2022). The index of moderated mediation was significant (Index = -0.5843 , $SE = 0.4020$, $CI = [-1.6046, -0.0945]$) indicating that the indirect effect of reward certainty on pro-environmental engagement through

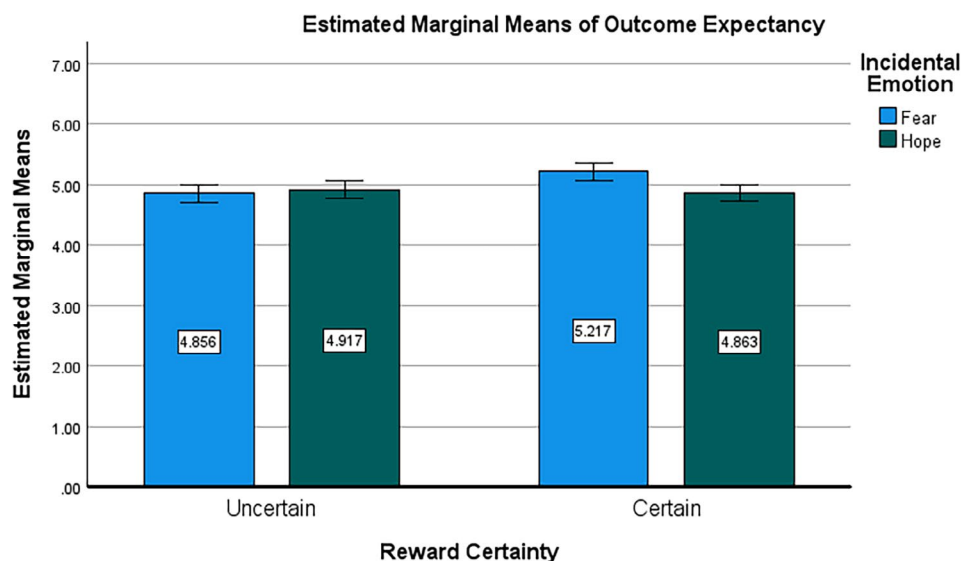


FIGURE 4 | Effect of reward certainty and incidental emotion on outcome expectancy (Study 3).

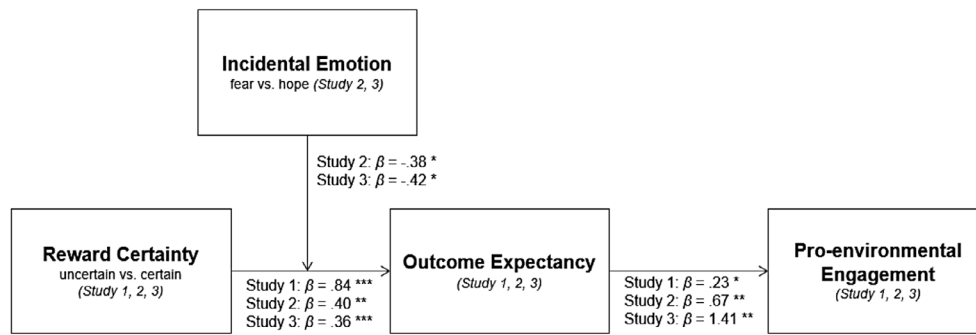


FIGURE 5 | Key findings of the three studies.

outcome expectancy differed by incidental emotion. The negative sign suggests that this indirect pathway was stronger under incidental fear than under hope.

Supporting H1, reward certainty significantly increased outcome expectancy ($\beta = 0.3612$, $SE = 0.1011$, $p < 0.001$, $CI = [0.1623, 0.5600]$). The effect of incidental emotion alone was nonsignificant ($\beta = 0.0614$, $SE = 0.0993$, $p = 0.5365$, $CI = [-0.1339, 0.2568]$), but the interaction between reward certainty and incidental emotion was significant and negative ($\beta = -0.4153$, $SE = 0.1413$, $p < 0.05$, $CI = [-0.6932, -0.1374]$). This interaction confirms that the effect of reward certainty on outcome expectancy was moderated by incidental emotion. Conditional effects analysis showed that reward certainty significantly increased outcome expectancy under fear ($\beta = 0.3612$, $SE = 0.1011$, $p < 0.001$, $CI = [0.1623, 0.5600]$) but not under hope ($\beta = -0.0541$, $SE = 1002$, $p = 0.5897$, $CI = [-0.2513, 0.1430]$). This supports H3 and indicates that the effect of reward certainty on outcome expectancy was strengthened when incidental fear was evoked. Finally, outcome expectancy significantly predicted pro-environmental engagement ($\beta = 1.4069$, $SE = 0.5009$, $p < 0.01$, $CI = [0.4251, 2.3888]$) and thus H2 was supported.

The key findings from the three studies are summarized in Figure 5. To further assess the robustness of our findings, we conducted additional analyses for all three studies excluding covariates (i.e., gender, age, education, and perceived barriers). A summary of these results and our interpretation is provided in Supporting Information 2.

7 | Discussion

7.1 | Theoretical Implications

This research makes three key contributions to the literature. First, it integrated expectancy theory (Vroom 1964) and the appraisal tendency framework (Lerner and Keltner 2000), offering a more comprehensive understanding of how reward and incidental emotion influence customers' decisions. By bridging these two theoretical perspectives, the study enriches our insights into the interplay between motivational factors and emotional states in shaping consumer behaviors.

This research filled an important gap in prior studies, which often examined the impact of reward and incidental emotions, respectively (e.g., Ji et al. 2023; Lagomarsino and Lemarié 2024).

This research uniquely investigated the interplay between reward certainty and incidental emotions in encouraging pro-environmental engagement. Overall, our research demonstrated that a certain reward is the most effective to enhance pro-environmental actions when incident fear is induced. This advanced our understanding of how reward mechanisms interact with the incidental emotions experienced by customers.

The research provides empirical evidence through three experimental studies on pro-environmental behaviors. To enhance the generalizability of the findings, the studies collected data and tested the hypothesized relationship in two different contexts: Opting out of cutlery in food delivery orders and joining a household recycling scheme. This provides valuable empirical insight into reward certainty and incidental emotions in pro-environmental settings. It highlights the complexity of emotions' influence on decision-making and their potential to drive positive behavioral outcomes.

7.2 | Practical Implications

It is crucial for businesses and marketers to understand how rewards can be used in behavioral change strategies, particularly in pro-environmental behaviors. Based on the findings of this study, it is recommended that financial rewards should occur in certain and guaranteed forms. This approach can strengthen the customers' belief in the positive impact of their actions and that they have a profound effect on their behavioral decisions. Although it is a common business practice to introduce uncertain rewards, such as lucky draws and surprise offers, to enhance excitement and maintain customer interest (Hwang and Mattila 2018; Shen et al. 2019), these should serve as a complementary approach to certain rewards that encourage pro-environmental behaviors.

Incidental fear drives customers to act to alleviate aversive emotions (So et al. 2016) that can help promote actions in environmental conservation. Although marketers do not have direct control over the incidental emotions experienced by customers, they can influence these emotions through service design, environment, and ambiance to induce the desired emotional experience (Yang and Hu 2021). Service environments or user platforms can evoke a sense of fear by using background music, images, or videos, which depict urgent environmental problems, such as the threatening situation of deforestation or polluting oceans (Hartmann et al. 2014). Technology like virtual reality

may also be effective in providing a feeling of the environment being destroyed and the consequences of sustainable actions, giving customers a feeling of empowered fear when presented with tangible measures (Xiong et al. 2024).

Authorities should also extend their support to policy measures that foster pro-environmental actions. One effective strategy could be implementing tax exemptions and incentives for companies that actively promote sustainable consumption and environmentally friendly products. This approach can serve as a powerful incentive to encourage businesses to adopt more sustainable practices and, in turn, influence customers to opt for eco-friendly alternatives. By providing financial incentives to companies that prioritize pro-environmental behaviors, governments can reinforce the importance of sustainability and drive positive changes toward a greener future (Hong and Park 2018; Mohanty et al. 2021).

7.3 | Limitations and Future Research

However, this study is not without limitations. First, the research was based on survey data from Chinese consumers, which may limit the generalizability of the findings. Future studies with larger and more diverse samples should explore other businesses or online contexts. Second, this study focused on rewards in the form of cash rebates. However, future research could explore the impact of different types of rewards, such as points, contests, or instant-win games, to gain deeper insights into the various ways of promoting sustainable consumption. Diversifying the types of rewards examined may shed light on more effective and engaging strategies to encourage pro-environmental behaviors among consumers. Third, this study utilized a cross-sectional design, which provides valuable insights into the current state of pro-environmental engagement. However, future research could employ longitudinal studies to investigate the behavioral continuance and the long-term impact of rewards and incidental emotions to gain a more comprehensive understanding. Analyzing the long-term impact allows researchers and marketers to derive information on designing efficient interventions that consistently encourage the desired behaviors. Finally, while we manipulated reward uncertainty using a binary structure (e.g., HK\$0 or HK\$5), future research could investigate more granular forms of uncertainty (e.g., varying probabilities or levels of reward) to explore how different degrees of uncertainty influence consumer decision-making and pro-environmental behaviors.

8 | Conclusions

Drawing upon the expectancy theory and appraisal tendency framework, this research examined the interplay of reward certainty and incidental emotion on pro-environmental engagement. The findings from the three studies provided convergent evidence that customers favor certain rewards, which strengthen outcome expectancy and subsequently influence pro-environmental engagement. Moreover, this research demonstrated that the impact of reward certainty is strengthened when incidental fear is induced. This suggests that fear can increase arousal and stimulate a sense of urgency in taking

actions to mitigate environmental problems. These results suggest important implications for businesses and marketers. Incorporating guaranteed and certain rewards is an effective strategy in encouraging pro-environmental actions among customers. Additionally, the service environment and user platforms, such as website and app design, should carefully consider enhancing the overall experience to evoke a sense of fear in the users, thereby further reinforcing their motivation for environmentally responsible choices.

Acknowledgments

This work is supported by a grant from the Research Grants Council, The Hong Kong Special Administrative Region (Project Reference No.: UGC/FDS24/H10/20).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.