

**RESEARCH GRANTS COUNCIL
COMPETITIVE RESEARCH FUNDING SCHEMES FOR
THE LOCAL SELF-FINANCING DEGREE SECTOR**

FACULTY DEVELOPMENT SCHEME (FDS)

Completion Report
(for completed projects only)

Submission Deadlines: 1. Auditor's report with unspent balance, if any: within six months of the approved project completion date.
2. Completion report: within 12 months of the approved project completion date.

Part A: The Project and Investigator(s)

1. Project Title

Environmental communications: Interplay effects between heterogeneous goal-framed messages on recycling behaviours

2. Investigator(s) and Academic Department(s) / Unit(s) Involved

Research Team	Name / Post	Unit / Department / Institution
Principal Investigator	Dr WONG Phoebe Wai Sum / Senior Lecturer	Division of Business and Hospitality Management / PolyU SPEED
Co-Investigator(s)	Dr WAN Kar Ho / Senior Lecturer	Nottingham Business School, Nottingham Trent University
	Professor SHEN Qiping / Chair Professor	Department of Building and Real Estate, PolyU
Others	Miss CHOI Wai Fan / Research Assistant	PolyU SPEED

3. Project Duration

	Original	Revised	Date of RGC / Institution Approval (must be quoted)
Project Start Date	01/01/2021	N/A	N/A

Project Completion Date	30/06/2022	31/12/2022	14/06/2022
Duration (<i>in month</i>)	18 months	24 months	14/06/2022
Deadline for Submission of Completion Report	30/06/2023	31/12/2023	14/06/2022

4.3 Please attach photo(s) of acknowledgement of RGC-funded facilities / equipment.

N/A

Part B: The Final Report

5. Project Objectives

5.1 Objectives as per original application

1. To investigate multiple goals of activating recycling behaviours in framed messages
2. To examine interplay effects between goal-framed messages on recycling behaviours
3. To provide empirical support for tailoring effective environmental messages

5.2 Revised objectives

Date of approval from the RGC: N/A

Reasons for the change: N/A

5.3 Realisation of the objectives

(Maximum 1 page; please state how and to what extent the project objectives have been achieved; give reasons for under-achievements and outline attempts to overcome problems, if any)

Message framing is a widely used communication strategy to promote behavioural change, particularly encouraging individuals to adopt a sustainable lifestyle. Extensive research has examined the effectiveness of framed messages in environmental communications. However, most of these studies have focused on framed messages that utilise a single motivator, neglecting the complex nature of human behaviour, which is often driven by multiple goals. Moreover, it is crucial to recognise that various goals can interact and collectively influence our behaviours. To address the research gaps, this project conducted various studies using between-subjects experimental design to investigate how multiple goal-framed messages influence and interact effectively on recycling attitudes and intentions in different contexts (e.g., recycling behaviours, reusing towels in the hotel industry and reducing plastic cutlery when ordering takeaway) (**Objective 1 & 2**).

With the guidance of Goal Framing theory, the **first paper** examined the effects of gain-loss framing by hedonic-rational appeals and descriptive-injunctive messages on recycling intentions. The interaction effects of gain-loss framing, hedonic-rational and descriptive-injunctive frames are assessed on recycling intention by employing a 2×2 (Study 1, N = 152) and 2×2×2 (Study 2, N = 372) between-subjects experimental design. The results reveal that a loss-rational message and a gain-hedonic-descriptive message induce stronger recycling intentions.

The **second paper** employed the Appraisal Tendency Framework (ATF) to investigate the interaction effect of the incidental emotions of hope and fear and reward types on tourists' pro-environmental behaviours. Using the context of towel reuse, the study employs a 2x2 between-subject design (Incidental emotion: hope vs fear) x (Reward type: certain vs uncertain). The findings show that there are significant interaction effects of incidental emotion and reward certainty on guests' intention to reuse towels.

Building upon the expectancy theory and appraisal tendency framework, the **third paper** explored the impact of certain versus uncertain rewards and incidental emotions of fear versus hope on food delivery app users' decisions regarding requesting single-use cutlery in their food delivery orders. The findings revealed that stronger environmental motivation was induced by the uncertain-fear condition, expectancy and instrumentality, which subsequently affected their choice behaviours.

Studies in this project have theoretical implications for research on framed messages, reward types and incidental emotions on pro-environmental behaviours. The findings of these studies are expected to offer insights into the development of well-rounded public promotional campaigns and advance theory development of environmental psychology and communications (**Objective 3**).

5.4 Summary of objectives addressed to date

Objectives <i>(as per 5.1/5.2 above)</i>	Addressed <i>(please tick)</i>	Percentage Achieved <i>(please estimate)</i>
1. To investigate multiple goals of activating recycling behaviours in framed messages	√	100%
2. To examine interplay effects between goal-framed messages on recycling behaviours	√	100%
3. To provide empirical support for tailoring effective environmental messages	√	100%

6. Research Outcome

6.1 Major findings and research outcome

(Maximum 1 page; please make reference to Part C where necessary)

Although environmental consciousness is gradually rising among individuals, the number of people taking pro-environmental behaviours is far from satisfaction. Government agencies, non-profit organizations, and advertisers around the world have attempted to address this attitude-behaviour gap. To examine this timely issue, this project investigated the interaction effects of various framed messages influencing their sustainable practices.

The findings in the **first paper** show that the normative messages moderate the effects of gain-loss by hedonic-rational framing on recycling intention. Importantly, when presenting a descriptive norm message, gain-hedonic induces a stronger recycling intention than an injunctive message. This aligns with the literature that individuals engage in pro-environmental behaviour with the prevalence of social norms (Steg et al., 2016). Descriptive norm messages are found to be more persuasive than injunctive norm messages in enhancing the indirect effect on recycling intention.

Using the context of towel reuse, the **second paper** employed a 2x2 between-subject design (Incidental emotion: hope vs fear) x (Reward type: certain vs uncertain) to examine tourists' sustainable behaviours. The findings show that there are significant interaction effects of incidental emotion and reward certainty on guests' intention to reuse towels. When the incidental emotion of fear is paired with the reward certainty, respondents showed a strong intention to reuse towels. In contrast, stronger participation intention in towel reuse was found in the hope-framed condition paired with uncertain rewards.

The third paper explored pro-environmental behaviour on opting out of plastic cutlery in online food delivery services, an online survey using a 2 (certain reward vs. uncertain reward) \times 2 (fear vs. hope) between-subjects experimental design recruited 386 respondents through a marketing research agency. The data was analysed by SmartPLS. The results demonstrate that pairing uncertain rewards with fear leads to the strongest motivation. This finding challenges the notion put forth by Poels and Dewitte (2019) that the emotion of fear primarily activates self-protection mechanisms to avoid harm. Instead, our study suggests that in certain contexts, the incidental emotion of fear can heighten customers' physiological arousal, transforming fear into an exciting and motivating factor (Lee & Andrade, 2015). These findings highlighted the complexity of emotion's influence on decision-making and its potential to drive positive behavioural outcomes.

A portion of the above findings was presented at *one conference* in ANZMAC, Australia. The three papers are currently under review in the *European Journal of Social Psychology, Environment & Behavior* and *Internet Research*.

6.2 Potential for further development of the research and the proposed course of action (*Maximum half a page*)

Our contribution to this FDS project has significant theoretical and practical implications. This project conducted various studies using between-subjects experimental design and demonstrated that there is no one-size-fits-all reward in motivating pro-environmental behaviours. The **first paper** suggested that when a promotional campaign aims to increase individuals' behavioural intention to recycle, descriptive norm messages are best paired with the gain-hedonic appeal. Hence, a clear and interpretable norm message is a key to effective persuasive communication. In addition, the findings in the **second paper** found that customers' incidental emotions play a role in determining the effectiveness of the rewards. By understanding the underlying mechanisms that drive the relationship between emotions and decision-making, researchers can further develop theoretical models to understand individuals' sustainable behaviours, which in turn can inform the development of more effective interventions and policies. The **third paper** also contributed to the literature by understanding the role reward (un)certainity plays in influencing customers' pro-environmental choice when ordering food delivery online. Furthermore, unlike previous research that primarily focused on integral emotions directly linked to the consumption context, this study makes a unique contribution by analysing the impact of incidental emotions, which are developed from a separate and unconnected situation yet still influence customer choices.

The findings of this project may explain the gap between attitudes and behavioural intention. Theoretically, the project provides an empirical basis for future investigation of the interplay effects of environmental messages. The knowledge advances the development of the theory of environmental behavioural patterns and communications. Practically, the findings inform the design of environmental promotional messages.

7. Layman's Summary

(Describe *in layman's language* the nature, significance and value of the research project, in ***no more than 200 words***)

Framing is a type of nudge strategy in environmental communications and marketing. A genuinely effective message should be able to guide behavioural change. Framed messages transform consumer behaviour holistically; they aim to change our cognitive pathways of processing information and, subsequently our behaviours. Thus, framed messages are suggested to enhance the successfulness of public campaigns by shaping perceptions of the outcomes of promoted behaviour in combination with a specific target audience.

The findings in this project provide insightful recommendations for non-profit organisations, businesses and managers for designing appropriate framed messages for encouraging pro-environmental behaviours. Message framing that combines words, images, and phrases for relaying tailored information is a popular communication strategy for guiding behavioural change. In addition, the findings provide empirical evidence that rewards in practice can be certain or uncertain. For example, hospitality and tourism businesses can offer certain rewards (e.g. price discounts, rebates, etc.) to customers for performing pro-environmental behaviours; uncertain rewards may also be effective, e.g. lucky draws, surprise deals, games, etc. This has been an important issue for businesses because uncertain elements in an incentive can be a way to reduce marketing costs while effectively motivating customers towards more environmentally sustainable behaviours.

Part C: Research Output

- 8. Peer-Reviewed Journal Publication(s) Arising Directly From This Research Project**
(Please attach a copy of the publication and/or the letter of acceptance if not yet submitted in the previous progress report(s). All listed publications must acknowledge RGC's funding support by quoting the specific grant reference.)

The Latest Status of Publications				Author(s) (denote the corresponding author with an asterisk*)	Title and Journal / Book (with the volume, pages and other necessary publishing details specified)	Submitted to RGC (indicate the year ending of the relevant progress report)	Attached to this Report (Yes or No)	Acknowledged the Support of RGC (Yes or No)	Accessible from the Institutional Repository (Yes or No)
Year of Publication	Year of Acceptance (For paper accepted but not yet published)	Under Review	Under Preparation (optional)						
N/A	N/A	√	N/A	WAN, Calvin*, WONG Phoebe	The Mediating Role of Anticipated Guilt and the Interplay of Gain-Loss, Hedonic-Rational and Descriptive-Injunctive Framing on Recycling Intentions European Journal of Social Psychology	No	Yes [Appendix III]	Yes	Yes
N/A	N/A	√	N/A	WONG, Phoebe*, WAN, Calvin	Hope of Fear? Exploring the Moderating Effects of Incidental Emotions on Reward Types for Encouraging Hotel Guests' Towel Reuse Intention Environment & Education	No	Yes [Appendix IV]	Yes	Yes

		√		WAN, Calvin*, WONG, Phoebe,	Opting Out Cutlery as a Pro-environmental Behaviour among Food Delivery App Users: An Expectancy and Appraisal Tendency Perspective Internet Research	No	Yes [Appendix V]	Yes	Yes
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9. Recognized International Conference(s) In Which Paper(s) Related To This Research Project Was / Were Delivered

(Please attach a copy of each conference abstract)

Month / Year / Place	Title	Conference Name	Submitted to RGC <i>(indicate the year ending of the relevant progress report)</i>	Attached to this Report <i>(Yes or No)</i>	Acknowledged the Support of RGC <i>(Yes or No)</i>	Accessible from the Institutional Repository <i>(Yes or No)</i>
Nov-Dec/ 2021/ Australia (via online event platform)	Interplay Effects of Different Goal-framed Environmental Messages	ANZMAC 2021	Yes	Yes [Appendix I & II]	Yes	Yes

10. Whether Research Experience And New Knowledge Has Been Transferred / Has Contributed To Teaching And Learning

(Please elaborate)

The concept of framed messages and some of the findings of the studies were shared with the first-year marketing students in the subject of BHMS 3174 Integrated Marketing Communications, followed by discussions with students on how to promote green marketing [Appendix VI].

11. Student(s) Trained

(Please attach a copy of the title page of the thesis)

Name	Degree Registered for	Date of Registration	Date of Thesis Submission / Graduation
N/A	N/A	N/A	N/A

12. Other Impact

(e.g. award of patents or prizes, collaboration with other research institutions, technology transfer, teaching enhancement, etc.)

The FDS project is collaborated with Dr Calvin Wan from School of Business, Nottingham Trent University, UK.

13. Statistics on Research Outputs

	Peer-reviewed Journal Publications	Conference Papers	Scholarly Books, Monographs and Chapters	Patents Awarded	Other Research Outputs (please specify)	
No. of outputs arising directly from this research project	3*	1	N/A	N/A	Type	No.
					N/A	N/A

*3 papers are the *European Journal of Social Psychology* (Under Review), *Environment & Education* (Submitted), and *Internet Research* (Under Review) respectively.

14. Public Access Of Completion Report

(Please specify the information, if any, that cannot be provided for public access and give the reasons.)

Information that Cannot Be Provided for Public Access	Reasons
N/A	N/A