# Nudges and Monetary Incentives: A Green Partnership?

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# Team and Funding

National Science Challenges

NEW ZEALAND'S BIOLOGICAL HERITAGE

Ngā Koiora Tuku Iho

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# Introduction

# Motivations

In this paper, we look at the individual and combined effects of nudges and incentives on volunteering behaviour.

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- Nudges and incentives are two of the most common interventions in environmental economics (Carlsson et al., 2021; Maki et al., 2016).
- Growing policy and research interest in combining interventions (Brent et al., 2015; Gravert and Olsson Collentine, 2021; List et al., 2017).

# Effects of Nudges and Incentives

Overall, both nudges and incentives have proven to be effective tools to promote PEBs in *some* (but not all) contexts.

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- Monetary incentives are a standard solution for economists and do affect behaviour - for a review, see Maki et al. (2016).
    - However, concerns around motivational crowding out in some contexts.
- Relatively few studies experimentally evaluating the synergies between nudges and incentives and evidence is very mixed (tends to be null findings) (Drews et al., 2020; Fanghella et al., 2021; Panzone et al., 2021; van der Werff et al., 2013).

# Drews et al. (2020) Synergy Framework

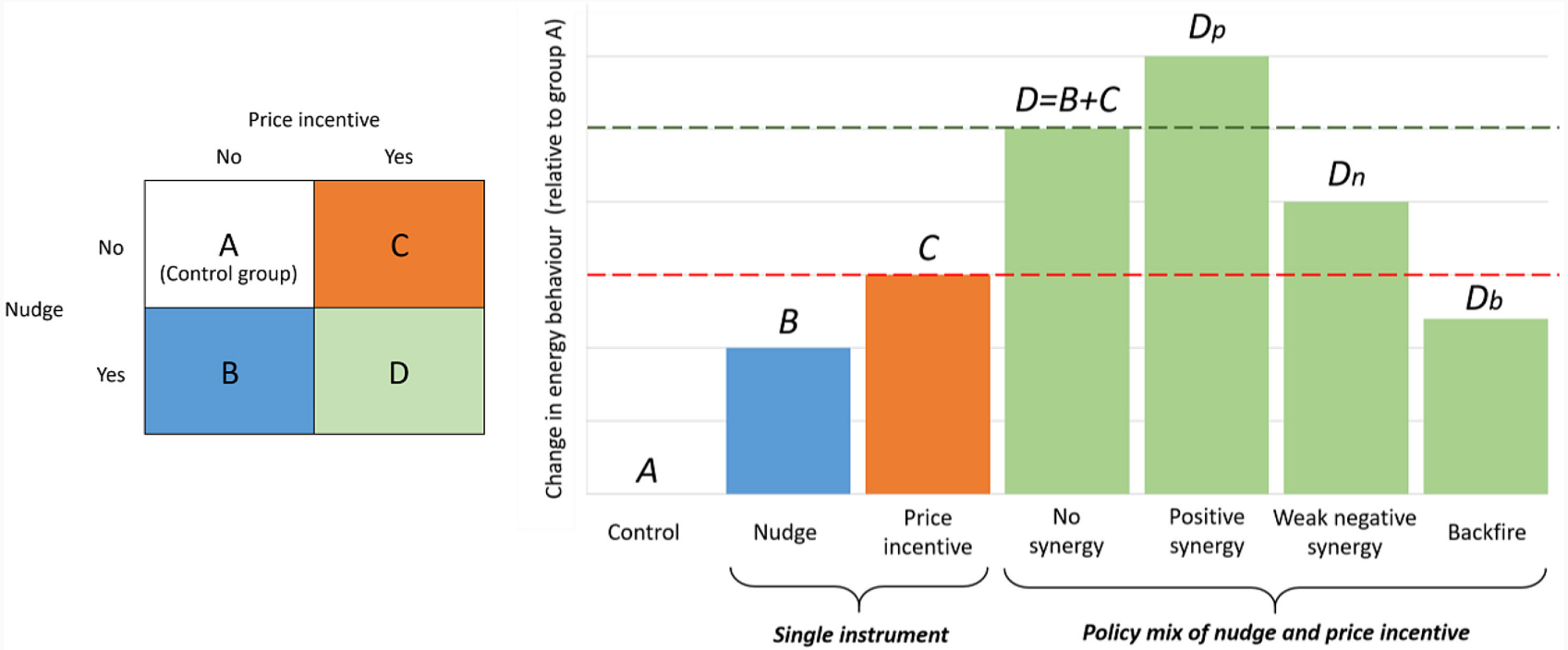


**Figure 1:** Drews et al. (2020) framework for thinking about the synergies between nudges and incentives in energy economics.

# Theory

# Theory overview

We develop a simple novel theoretical model building off of Bowles and Polania-Reyes (2012). Basic points are:

- We allow the nudge and incentive to have direct effects on utility.
- As in original model, incentive can crowd out/in behaviour (indirect effect).
- We make this crowding out term a function of the nudge.
- Nudge can affect utility by influencing the salience of intrinsic rewards (direct effect) and crowding out parameter.

Not enough time to discuss further. Happy to discuss later.

# Hypotheses

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**H3** implies more crowding out from the highly motivated in the voucher condition and less crowding out in combined treatment condition (Dorner and Lancsar, 2023).

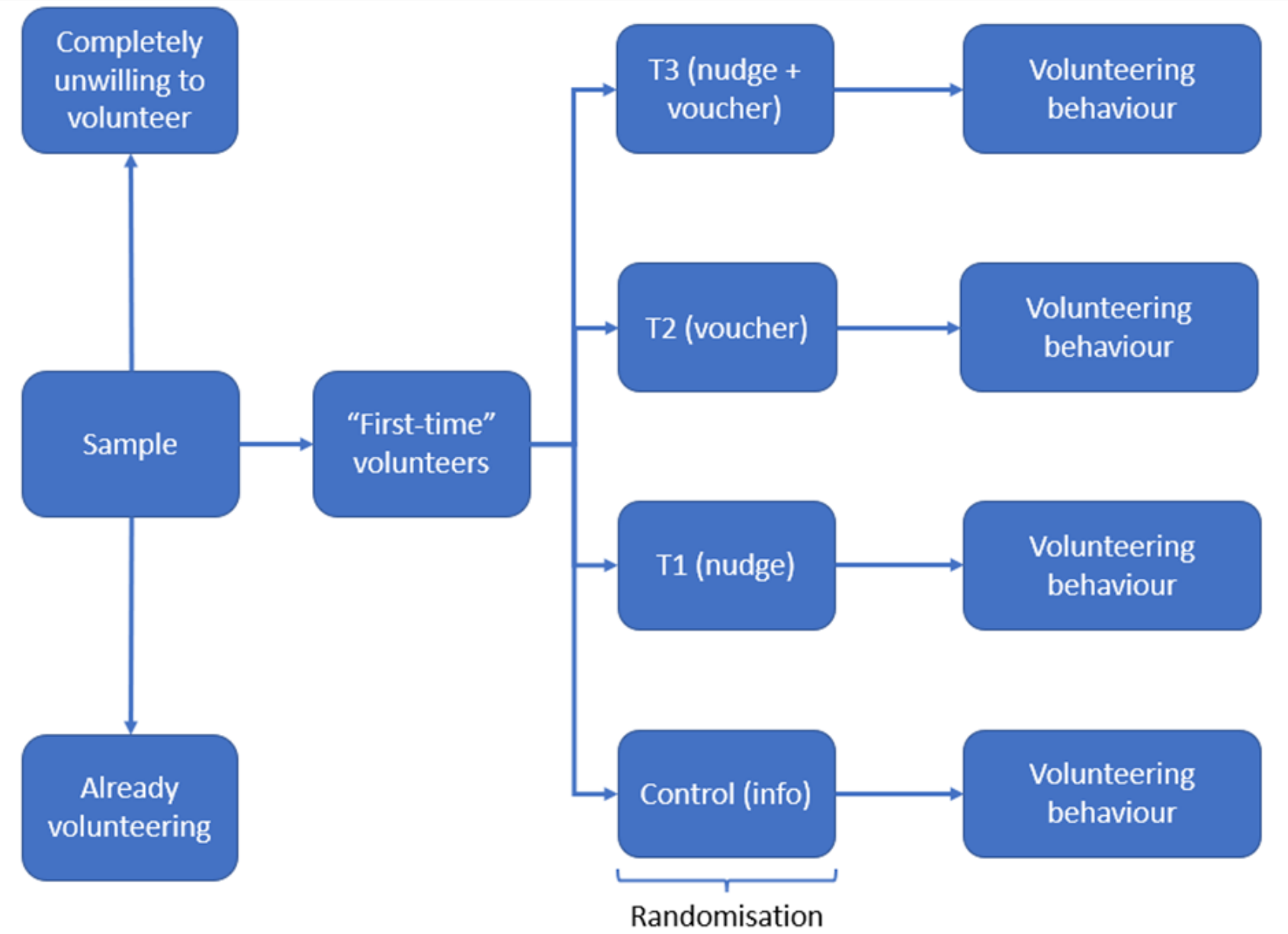
# Experimental design and methods

# Overview

We carried out a field experiment with a nature restoration group called the Fairfield Project in Kirikiriroa | Hamilton, New Zealand.

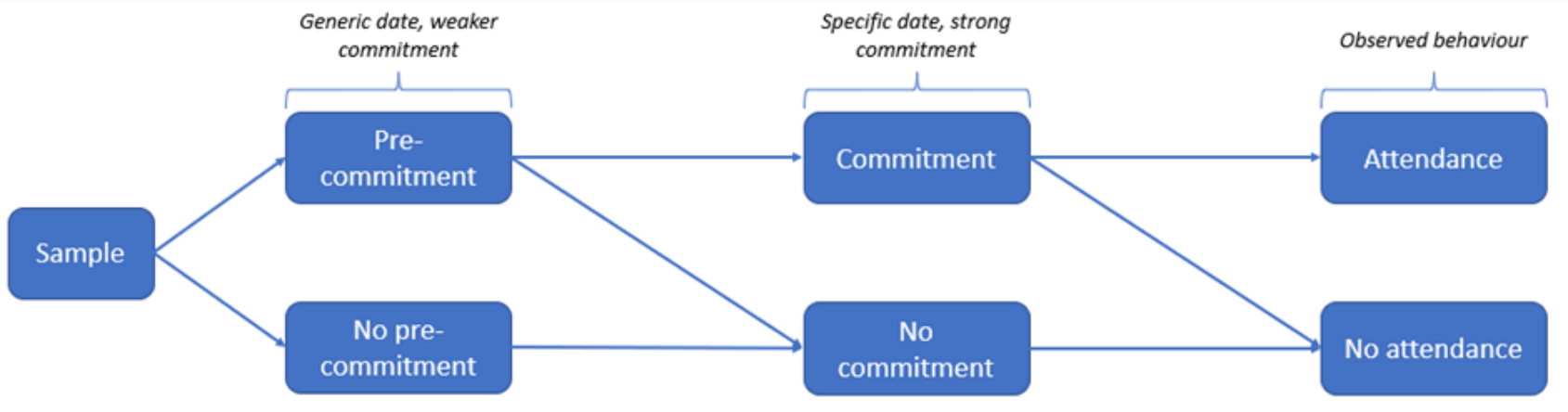

We tested the effects of a nudge, incentive and combined treatment on volunteering behaviour.

# Design


Completely unwilling to volunteer
Sample
Already volunteering
"First-time" volunteers
T3 (nudge + voucher)
T2 (voucher)
T1 (nudge)
Control (info)
Volunteering behaviour
Volunteering behaviour
Volunteering behaviour
Volunteering behaviour
Randomisation

# Outcome variables

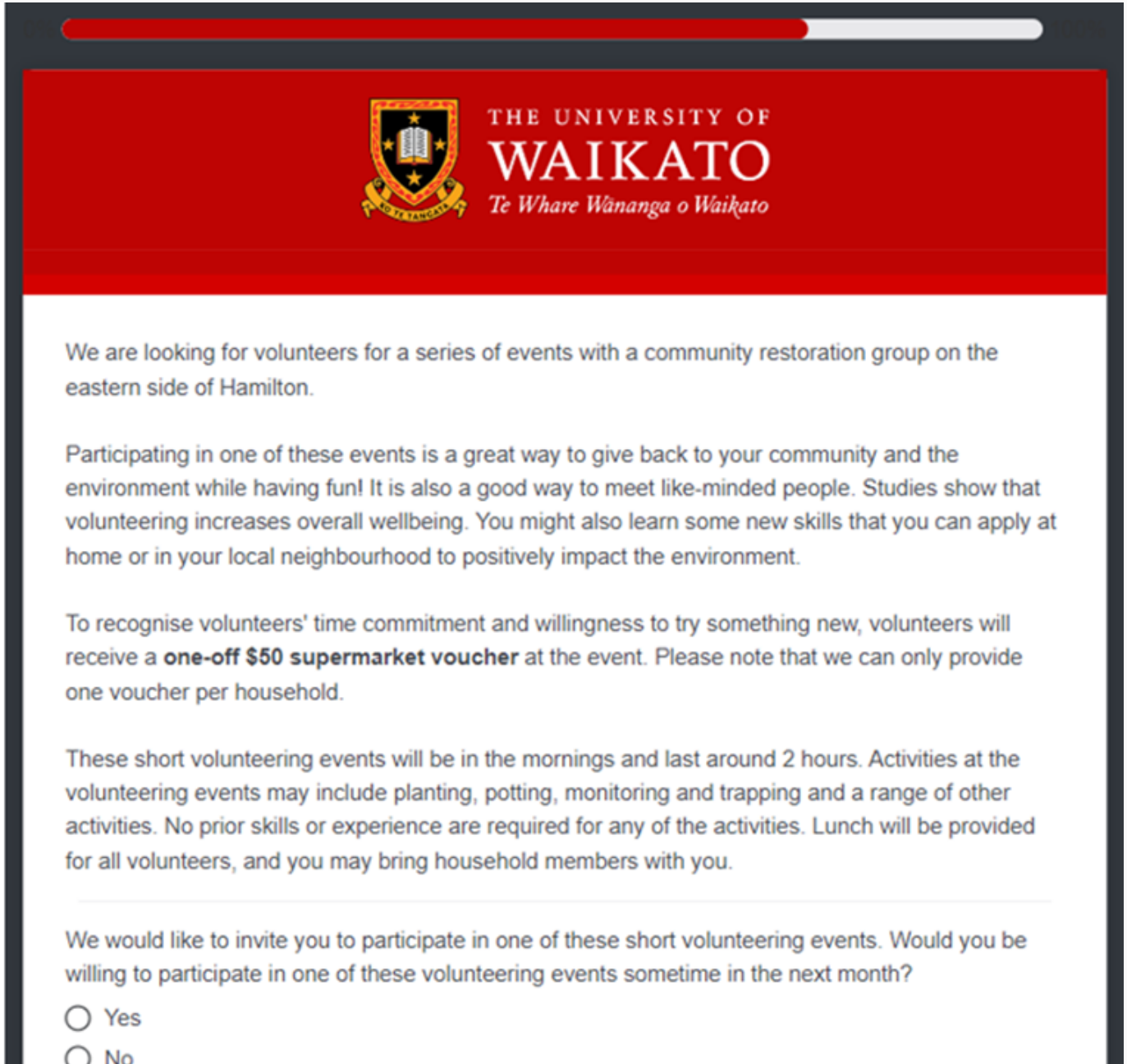
- Initial survey - N = 627 *first-time* volunteers. Pre-commitment occurs during initial survey.
- Follow-up short survey with specific dates for those who pre-committed (= commitment)
- Observe actual attendance



# Treatments

*Nudge*

*Incentive*



THE UNIVERSITY OF WAIKATO
*Te Whare Wānanga o Waikato*

We are looking for volunteers for a series of events with a community restoration group on the eastern side of Hamilton.

Participating in one of these events is a great way to give back to your community and the environment while having fun! It is also a good way to meet like-minded people. Studies show that volunteering increases overall wellbeing. You might also learn some new skills that you can apply at home or in your local neighbourhood to positively impact the environment.

To recognise volunteers' time commitment and willingness to try something new, volunteers will receive a **one-off $50 supermarket voucher** at the event. Please note that we can only provide one voucher per household.

These short volunteering events will be in the mornings and last around 2 hours. Activities at the volunteering events may include planting, potting, monitoring and trapping and a range of other activities. No prior skills or experience are required for any of the activities. Lunch will be provided for all volunteers, and you may bring household members with you.

We would like to invite you to participate in one of these short volunteering events. Would you be willing to participate in one of these volunteering events sometime in the next month?

- ○ Yes
- ○ No

# Methods

For first two hypotheses, use non-parametric chi-squared hypothesis tests in line with pre-registration.

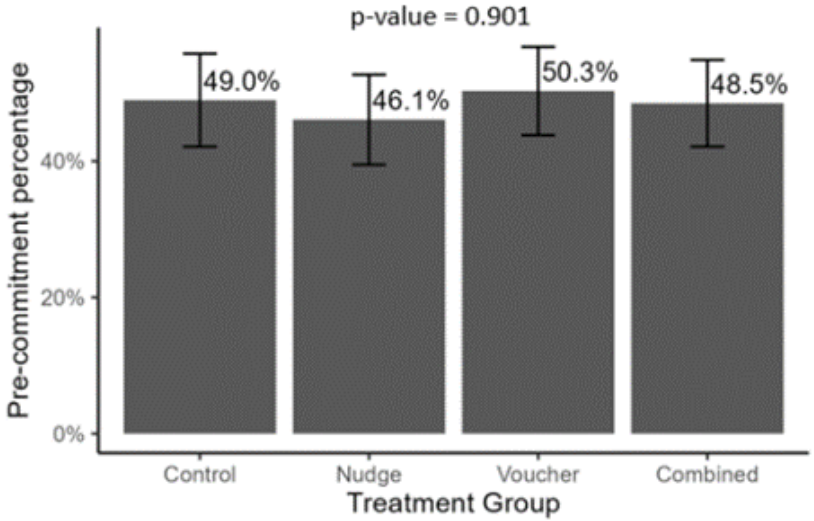
For **H3** test using data on environmental attitudes. We measure using van der Werff et al. (2013) environmental self identity scale (EID).

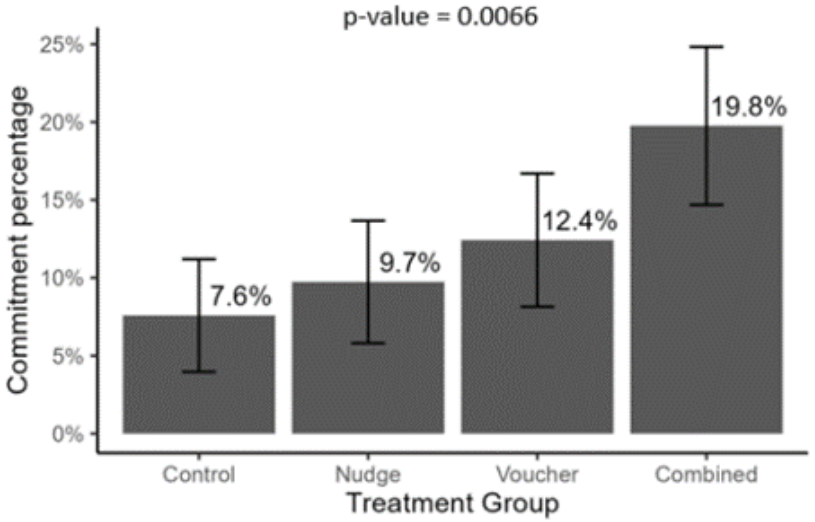
Estimate following linear probability model (LPM):

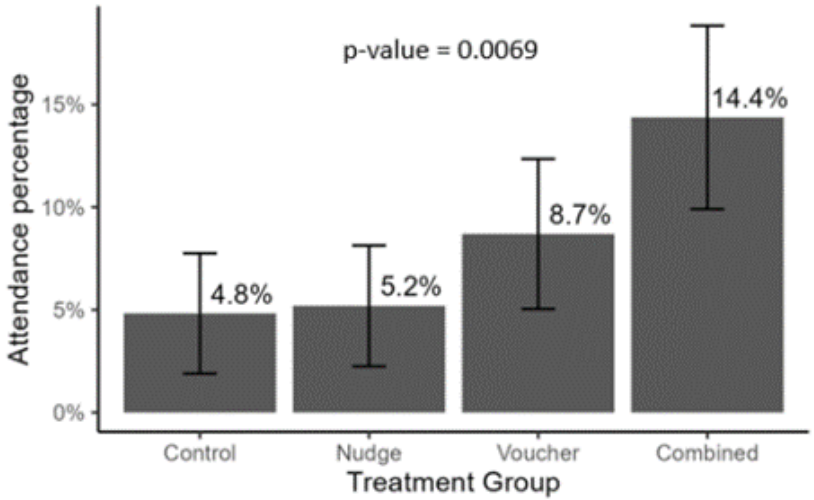
$$Y_i = \beta_0 + \beta_1 Nudge_i + \beta_2 Voucher_i + \beta_3 Combined_i + \beta_4 EID_i + \beta_5 (Nudge * EID)_i + \beta_6 (Voucher * EID)_i + \beta_7 (Combined * EID)_i + \epsilon_i$$

# Results

# Headline results



# Results

**Table 1:** Chi-squared non-parametric comparisons between treatments and control

| | Nudge v Control | | Voucher v Control | | Combined v Control | |
|---|---|---|---|---|---|---|
| Pairwise comparisons | ATE | p-value | ATE | p-value | ATE | p-value |
| Pre-commitment | -2.9% | 0.690 | 1.3% | 0.407 | -0.5% | 0.533 |
| Commitment | 2.1% | 0.254 | 4.8%* | 0.081 | 12.2%*** | 0.0010 |
| Attendance | 0.4% | 0.442 | 3.9%* | 0.091 | 9.6%*** | 0.0025 |

*Note: These are one-sided chi-squared tests in line with our hypotheses and pre-registration. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

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- But is the combined treatment at least as large as what we would expect from the individual treatments?
    - If it is, positive synergy observed (in case of diminishing returns to policy effort).

# Positive synergies?

**Table 2:** Predicted combined effect vs actual combined effect

| | Expected | Actual | Actual – Exp | Two-sided | One-sided |
|---|---|---|---|---|---|
| Pre-commitment | -1.60% | -0.50% | 1.10% | 0.295 | 0.148 |
| Commitment | 6.90% | 12.20% | 5.30% | 0.021** | 0.011** |
| Attendance | 4.30% | 9.60% | 5.30% | 0.050** | 0.025** |
| N | 315 | 167 | 482 | - | - |

*Note: These are simple two-proportion Z tests comparing the expected ATE under no positive synergy and the actual ATE. $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

- Simply adding the nudge and voucher treatment effects gives an upper bound on no synergy because of the convex cost of effort function (linear addition will likely overestimate the true effect on effort under no synergy).
- Good support for the presence of synergies between nudges and incentives in our context.
- Are they arising due to behavioural crowding out effects (**H3**)?

# Mechanism - Regressions with EID

**Table 3:** Regression results for treatment-EID interactions

| | Pre-commitment | Commitment | Attendance |
|---|---|---|---|
| Nudge | 0.004 | 0.013 | -0.012 |
| | (0.111) | (0.030) | (0.024) |
| Voucher | 0.135 | 0.185*** | 0.064 |
| | (0.120) | (0.064) | (0.043) |
| Combined | 0.169 | 0.153*** | 0.152*** |
| | (0.119) | (0.058) | (0.058) |
| Moderate to High EID | 0.283*** | 0.079*** | 0.046* |
| | (0.096) | (0.030) | (0.024) |
| Availability | | 0.023*** | 0.021*** |
| | | (0.004) | (0.004) |
| Nudge*High EID | -0.020 | 0.009 | 0.016 |
| | (0.128) | (0.049) | (0.038) |
| Voucher*High EID | -0.146 | -0.172** | -0.032 |
| | (0.136) | (0.074) | (0.053) |
| Combined*High EID | -0.212 | -0.029 | -0.063 |
| | (0.135) | (0.071) | (0.067) |
| Intercept | 0.259*** | -0.035** | -0.032** |
| | (0.084) | (0.017) | (0.016) |
| Observations | 627 | 627 | 627 |
| R2 | 0.029 | 0.116 | 0.127 |
| Adjusted R2 | 0.018 | 0.105 | 0.115 |

*Note: Robust standard errors in parentheses. $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

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# Conclusions

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- We looked at the synergies between incentives and nudges in the context of encouraging people to volunteer for nature restoration groups in New Zealand.
- We found the incentive was effective at encouraging first-time volunteering but the nudge alone was not effective.
- However, when combined, the treatment effect was significantly larger than the sum of the observed individual treatment effects.
- Our theoretical model and empirical evidence suggests this *may* be because the nudge reduces some motivational crowding out arising from those with higher pre-existing intrinsic motivation.
- Still need more work replicating elsewhere but a promising sign that nudges may help reduce crowding out risks associated with highly effective monetary incentives!

# Thank you! Questions?

# Email

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