Exploring the Application of Behavioural Strategies to Improve Multi-Residential's Waste Diversion

SSM1100Y MScSM Research Paper

Institute for Management & Innovation
UNIVERSITY OF TORONTO
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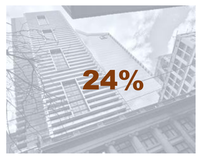
MScSM
Master of Science in Sustainability Management UofT

Introduction

In Canada, waste is a shared responsibility between Federal, Provincial and Municipal governments. As the trend for urban intensive, high-density living spaces increase, identifying best practices to establish long term pro-environmental behaviours such as recycling and composting are imperative to reach Ontario's over waste diversion goals of 80% by 2050. Waste imposes a negative externality on the environment, furthermore, waste management practices generate delayed feedback on one's participation. Therefore, changing human behaviour is a central objective for policymakers and waste management alike. Behavioral economics could be explored to encourage pro-environmental behaviours in multi-residential tenants.

It can be observed through diversion rate data Multi-residential waste diversion is especially challenging. and overall there is a lack of empirical research addressing waste diversion issues with this targeted population. This research aims to develop an understanding of behavioral change models that can be implemented to increase participation in waste diversion to those that are living in multi-residential units.



Research Objectives

The research will examine four types of behavioural strategies 1) System 1 and System 2 thinking, 2) Social Norms nudge, 3) Pre-commitment nudge and 4) Monitor and control strategies.
Supporting question include: How could the implementation of behavioral strategies increase multi-residential units' participation in recycling and composting behaviors?

Methodology

The framework for this section follows the TESTS methodology framework

Quantitative

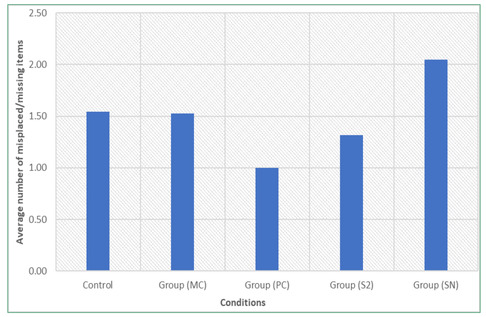
- Relevant Behavioural economic tools are identified through TEST methodology
- These economic tools will be integrated as part of the semi-structured interview questionnaire

Qualitative

- Respondents are randomly assigned to one of five conditions on Qualtrics (4 behavioural strategy treatment groups and 1 control group)
- Respondents to complete a waste sorting activity with restricted timing of on each question to increase the cognitive load to mimic real-world conditions

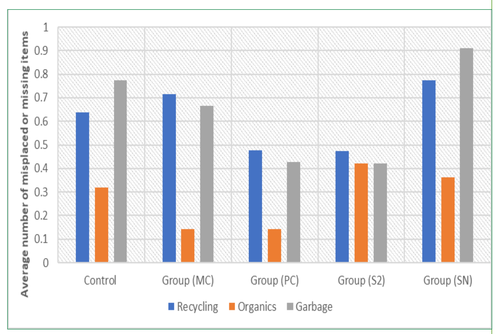
Key findings

Waste separation accuracy is scored based on the number of misplaced or missing items for each bin. Average number of misplaced or missing items are used to generate the following ANOVA analysis.

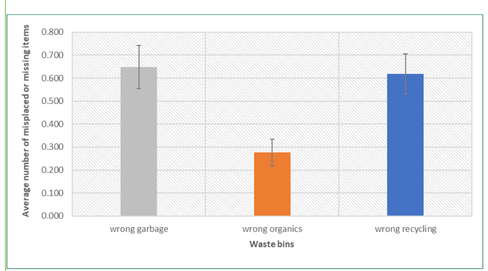


- The results of the one-way analysis of variance (ANOVA) examined the effect of behavioural economic strategies on total multi-residential waste sorting accuracy
- The results indicated there was not a significant sorting accuracy difference between the five conditions 1) System 1 and System 2 thinking (S2), 2) Social Norms nudge (SN), 3) Pre-commitment nudge(PC), 4) Monitor and control strategies (MC), and 5) Control group,

- Similar ANOVA analysis examined the effects of behavioural economics strategies on waste diversion accuracy in each of the bins (garbage, recycling, and organics)
- Consistent with the total findings, there was no significant waste diversion accuracy difference in each of these bins.



Together, these results suggest that the behavioral strategies presented under the four treatment groups do not affect the multi-residential waste sorting performance. However there is still a slight improvement on the source separation accuracy in the (PC) and (S2) treatment groups when compared to the control group.

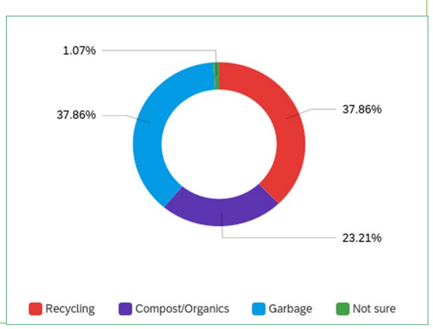


- The following analysis is made to create a better understanding of the waste sorting behaviours of multi-unit residence.
- Further analysis ignored the factor of the treatment groups, by only analyzing the sorting accuracy between the three bins, a significant difference was observed
- Since there is a statistically significant result found in this analysis, the researcher computed a Tukey-Kramer multiple comparison test, to determine which pairs are significantly different from each other

Tukey-kramer Procedure

Comparison	Absolute Difference	Critical Range	Results	
garbage to organics	0.371	0.273	Means Sig. Different	in this case, garbage is not equal to organics,
garbage to recycling	0.0285	0.273	Not Sig. different	not sig. different doesn't' have a sig. different mean
organics to recycling	0.343	0.273	Means Sig. Different	sig. different mean

Respondents performed poorly in recycling and garbage sorting when compared to organics sorting. Interestingly, only 23% of respondents indicated that their building provides organics services, compared to 37% of the respondents indicated to have garbage and recycling services



Key Take-aways

- It was found that sorting accuracy between garbage/organics and recycling/organics showed the significant difference
- By analyzing commonly misplaced items, it is clear that waste sorting is a very difficult task
- It was not surprising to find respondent performed poorly on recycling since common household items can have very complex
- It was found that behavioural strategies might not be the most effective in improving waste diversion behaviours, but it can be used in conjunction with educational support to nudge pro-environmental behaviours and create a sustained result
- There is very limited research conducted in the behavioural economics literature to address waste management challenges, even less on the waste management challenges faced by Multi-residential units

Recommendation

Building management and Municipalities can use similar TEST methodology to identify desired behaviour to change

As identified in the current research, building management needs to improve upon the pre-conditions of achieving Canada's waste diversion goals- knowledge of waste identification and aligning with Provincial and Federal waste management Policy.

Development of a strategic communications plan through a collaborative effort. Behavioural economics should be implemented as part of the communications plan to deliver various tools and design interventions.

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