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Differences in self reported recycling behavior of first and second generation South Asians in Ontario, Canada

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ABSTRACT

This study examines differences in self-reported recycling behavior between first and second generation South Asians in Ontario, Canada. Using a combination of semi structured surveys and interviews with 341 South Asians in seven communities, focus is placed on: (1) identifying differences in attitudes toward recycling and recycling participation between first and second generation South Asians, (2) exploring how past recycling experiences affect current recycling behavior among first generation South Asians and (3) explore how first and second generation South Asians respond to recycling promotion and education literature. Significant differences were observed between the two groups, with second generation respondents viewing recycling more favorably, as well as indicating higher levels of recycling participation, awareness and willingness to respond to recycling promotion and education literature. This study also found that source separation of recyclables was not a common waste management practices in first generation respondents' country of origin. A lack of past participation in recycling programs may serve as a barrier to recycling behavior, potentially explaining differences in levels of recycling participation between first and second generation South Asians in Ontario.

1. Introduction

The question of "Why do people recycle?" is a topic that has received extensive academic attention from a multitude of researchers. There is a significant body of research that examines the demographic (age, income, education, etc.) and cognitive (habit, perception, normative influences, etc.) antecedents to recycling behavior (see Hornik et al., 1995; Tonglet et al., 2004; Sidique et al., 2010). However, conspicuously absent from this analysis is the role of ethnicity and race in affecting behavior – two factors not traditionally associated with being drivers of household recycling. While there exists a rich discourse exploring ethnic variation in environmental belief and behavior (see studies by Jonhson et al., 2004; Stern et al., 1995), comparatively few have considered the role of ethnicity and race in affecting household participation in waste management initiatives such as recycling.

As such, it seems prudent at this juncture to include an ethnographic dimension to recycling research, revisiting the assumptions surrounding "What makes a recycler?" to reflect the rapidly changing demography and composition of North American cities. Using a combination of survey and interview data collected from seven provincial municipalities, this research examines the recycling habits and behaviors of South Asian recyclers in Ontario, Canada. Specifically, this research examines differences in self-reported recycling behavior, attitudes and responses to recycling promotion and education (P&E) initiatives between first and second generation South Asian immigrants. This was done to gauge whether generational (in the context of immigration) gaps in recycling behavior exist between South Asians born in Canada, and those born abroad (India, Bangladesh, Pakistan, etc.). This study also explores potential linkages between past recycling experiences and current recycling behavior for first generation South Asians. Differences in past recycling experiences and levels of acculturation between first and second generation South Asians may, in part, explain differences in recycling behavior and attitudes toward recycling.

This research is of particular importance, in that the "face" of recyclers in Ontario is changing. In Ontario, the South Asian population makes up 11% of the province's total population, a figure which has more than doubled between 2001 and 2011 (Statistics Canada, 2011). This necessitates that waste management policies engage and encourage South Asian households to participate in recycling activity. However, a review of Ontario's residential recycling (Blue Box) promotion and education initiatives suggests that few provisions are made for engaging South Asian (or other minority) communities. Communications are often disseminated in English,

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with a once size fits all approach to waste management messaging. This study examines how first and second generation South Asians perceive and respond to recycling P&E literature/initiatives presently employed in the province. Tangent to this line of inquiry, much of Ontario's South Asian population come from areas that may not have well-articulated waste management infrastructure. Thus, there may not be a precedence for South Asians to participate in household recycling and may only do so in Ontario because of a legal obligation to source separate recyclables.

A thorough understanding of the motives and barriers to recycling for South Asians in Ontario is critical in ensuring that their participation in recycling schemes is encouraged. It is only a relatively recent phenomenon that conservation behavior has been expanded to consider affective factors in the prediction of ecological behavior (Vining and Ebreo, 2002). As noted by Carrus et al. (2008) and Fornara et al. (2011), attitudes, normative influences and past behavior are important predictors of pro-environmental behavior such as recycling. No longer is recycling behavior defined solely along socio-demographic variables – cultural values, practices and levels of acculturation may, in part, explain why people may or may not recycle. Given the changing demography of recyclers in Ontario, we cannot assume what has worked in the past will continue to work moving forward. A one size fits all approach to recycling promotion, education and engagement no longer seems appropriate given variation in attitudes toward recycling both across and within ethnic groups. Communication, messaging and methods to increase household recycling awareness need to be updated and refined. A failure to design policies that are both culturally sensitive and relevant may impede provincial recycling rates, particularly in light of Ontario's burgeoning South Asian population.

1.1. Literature review

There is a relative paucity of literature that specifically examines the role of race and ethnicity as antecedents to recycling behavior. This may be in part due to the sensitivity of attempting to explain behavior using racial and ethnographic variables. Particularly with a topic such as recycling, where participation is seen as a pro social activity, explaining differences in behavior along racial/ethnic lines may leave some groups vulnerable to criticism or abuse. With this in mind, there have been studies that have attempted to expand the existing literature on the profiles of recyclers to include racial and ethnic dimensions. Perry and Williams (2007a,b) specifically examine recycling behavior of ethnic minorities in the United Kingdom. Of note, this study found that variation in attitudes toward the environment and stated recycling behavior exist among ethnic groups, with certain minority groups (namely British Indians) expressing higher levels of recycling participation (despite lower levels of stated environmental concern) relative to the "white" British community (Perry and Williams, 2007a,b). This is in direct contrast to the findings by the Market and Opinion Research International group (MORI), which found that black and ethnic minority groups are less likely to recycle when compared to white Britonians (2002). Perry and Williams (2007a,b) also found that ethnic minorities felt that they were not being effectively engaged by the local authority (municipalities). Interview results from the study suggest that recycling participation among ethnic minorities could be encouraged by increasing household awareness about "what you can put in the box" and "increasing the frequency of recyclable collection" (Perry and Williams, 2007a,b). Study participants also expressed a desire for the local authority to communicate information in their native language (i.e. Hindi, Gujarati, Italian, etc.). Studies by Owens et al. (2000), Zen et al. (2014), and Meneses and Palacio (2005) have also included racial variables in their examinations of the socio-demographic profiles of recyclers. While these studies were not designed to specifically explore variation in recycling participation among racial groups, the general consensus is that race is a less important predictor of recycling behavior relative to other factors (such as income and education). Furthermore, there tends to be considerable co-linearity among race and other explanatory variables (i.e. race and income, and race and education), so it is often difficult to isolate the effects of race on recycling participation.

Despite the apparent dearth of scholarship examining the role of race/ethnicity and recycling, there is a significant body of work that investigates ethnic and racial variation in environmental belief and behavior. As noted by Whittaker et al. (2005), there have been two theories used to explain racial/ethnic variation in attitudes toward the environment. The first is rooted in socio-economic standing, where in minorities (who are assumed to be less affluent than "whites") prioritize day to day needs over more abstract ideas such as environmental protection/concern (Whittaker et al., 2005, p. 435). In direct opposition to this view is environmental deprivation theory, which posits that concern for the environment is a direct function of exposure to environmental degradation. Given that minorities often live in communities most impacted by environmental issues, they would express greater levels of environmental concern (Whittaker et al., 2005, p. 435). With this in mind, studies exploring variation in environmental concerns and attitudes of ethnic minorities have had varied findings. While early literature (see Hauser, 1962) found that Afro-Americans expressed lower levels of environmental concern relative to Caucasian groups, subsequent studies by Newell and Green (1997), and Uyeki and Lani (2000), Parker and McDonough (1999) found no significant differences in perception of environmental issues among Afro-American and Caucasian groups. Mixed results with respect to conformity in perception and attitudes toward the environment among Latinos were also found in studies examining Latino environmentalism (see Lynch, 1993; Dwyer, 1994). While most of the existing discourse has generally characterized environmental concerns among minority groups as being less than, or at best, equal to, Caucasians, Whittaker et al. (2005) found the opposite to be true. In an analysis of California polling data, there was significant empirical support for growing levels of environmental concern among minority groups.

However, as noted by Jonhson et al. (2004), research examining differential environmental beliefs and behavior among immigrating groups is still very much in its conceptual infancy. Despite the interest in understanding ethnic variation in environmental concern, few studies have examined how attitudes and perceptions toward the environment change among immigrant populations. Understanding whether attitudes/concern toward the environment change when ethnic minorities move to a new country is an area that requires additional investigation. Furthermore, identifying whether there are differences in stated levels of environmental concern and perceptions among first and second generation immigrants is also of particular importance. If there are observed differences in environmental concern between first and second generation immigrants, it may point to behavior being a function of "new" cultural assimilation. Conversely, if there is little variation in stated levels of environmental concern between first and second generation ethnic immigrants, it would suggest to behavior being influenced by retained "old" cultural values. Both Ouellette et al. (1998) and Bamberg et al. (2003) have identified the critical role that past behavior plays in informing existing attitudes, intentions and practices. It should be noted that Perry and Williams (2007a,b) found significant differences between the attitudes and participation of first and second generation ethnic minorities with respect to recycling, with the latter expressing greater levels of stated concern for the environment and awareness surrounding recycling initiatives. However, Carr and

Williams (1992) found that environmental perception and behavior among Latino groups was a function of the level of acculturation to "white" value systems. Attitudes toward the environment and pro social environmental behavior among second and third generation Latinos was influenced by the practices of their parents/grandparents.

This study builds on the existing research, and can largely be seen as a "next step" in understanding how ethnic and intergenerational dimensions affect attitudes toward the environment and recycling behavior. As far as can be ascertained, this is the first study of its kind to gauge how South Asians (both first and second generation), respond to promotion and education initiatives undertaken by municipalities. Despite the studies focus on South Asian ethnic groups, it is the hope of this research to make a meaningful contribution to recycling discourse, specifically examining how/if municipalities should tailor recycling promotion and education initiatives to address the needs of minority groups.

2. Materials and methods

2.1. Description of study site

Ontario is Canada's most populous province, situated between 41°85′ N and 51°28′ N and 95°48′ W and 74°74′ W, with a total land mass of 1,076,395 km^2. Ontario remains at the forefront of recycling initiatives and legislation, recognized as one of the only three provinces in Canada to implement an extended producer responsibility scheme (EPR) for household recyclables. Residential and commercial waste diversion programs exist for MHSW (Material Hazardous or Special Waste), WEEE (Waste Electrical and Electronics Equipment), automobile tires, and printed paper and packaging (Blue Box) materials. Each of these programs exist under the oversight of Waste Diversion Ontario (WDO), a non-crown corporation created under Ontario's 2002 Waste Diversion Act (Waste Diversion Ontario, 2012). The WDO was established to develop, implement and manage waste diversion programs for stakeholders from both private and public sectors (Waste Diversion Ontario, 2012). Stewardship Ontario is the industry funded organization designated by the WDO to collect fees on behalf of packaging producers to finance the operation of the Blue Box program (Waste Diversion Ontario, 2012).

South Asian Ontarian's are defined as individuals who were either born in or can trace all or part of their ancestry to South Asia. These include the following nations: India, Pakistan, Bangladesh, Sri Lanka and Nepal. It should be noted that individuals of South Asian descent from Guyana, Trinidad, Uganda and Kenya are also classified as South Asian. As of the 2011 Statistics Canada census, there were 1,003,180 individuals who identified as being South Asian living in Ontario. Of this number, 74% said they were East Indian, while 8% were Pakistani, 6% Sri Lankan and 12% other (Nepalese, Bangladeshi, etc.) (Statistics Canada, 2011). The majority of South Asians living in Ontario were born abroad (54.1%), however, this number has decreased by 12% over the past decade. This indicates that an increasing proportion of Ontario's South Asian population is being made up of second and third generation immigrants.

2.2. Survey data

4 geographical regions (as specified by Waste Diversion Ontario) were targeted to complete questionnaires pertaining to daily household recycling activity. Geographic regions are defined by population density, geographic location and collection type (curbside collection vs. depot systems).

These groups included:

(1) Large Urban (Toronto, Brampton, Mississauga, York Region)
(2) Urban Regional (Ajax)
(3) Medium Urban (Sarnia)
(4) Rural Regional (Peterborough)

These groups were selected on the basis that they provide an adequate geographic representation of the province, and provide the greatest opportunity to interview South Asians who have settled in these areas. The communities selected report having the highest number of South Asians relative to other provincial municipalities (Statistics Canada, 2011).

Survey questions were organized into five main areas: (1) attitudes toward recycling; (2) self-reported recycling behavior; (3) perception of existing recycling promotion and education campaigns; (4) past recycling experiences and (5) demographic information related to age, ethnicity, education and income. Questionnaires were pre-tested and refined prior to conducting the official survey. The pre-test allowed for wording refinements and changes to the ordering of the questions. The finalized survey was conducted over an eight week period beginning in March 2014 and running through April 2014. Teams of two enumerators and one site supervisor were sent to each municipality for a period of four days each, spending 6 h at each survey site.

Questionnaire "booths" were set up in spaces with high foot traffic (namely malls, arenas and public commons areas). Enumerators were asked to approach members of the public (specifically targeting South Asians), explain who they were and the purpose of the study, and request approximately 10–15 min of the participant's time to complete the survey. A mix of convenience and quota sampling was employed to ensure that survey participants reflected the relative proportions of all South Asians in Ontario (both with respect to their country of origin and proportion of first and second generation South Asians). Initially, enumerators included any individuals who identified as being South Asian and were amenable to participating in the survey. As the study progressed (and the sample size increased), enumerators were asked to ensure that additional study participants reflected the relative demographic breakdown of South Asians in Ontario. Specifically, South Asian's from outside the Indian subcontinent were targeted toward the latter half of the study to ensure that they were represented in the overall sample. Survey responses were recorded by hand and by tape recorder by the enumerator, and later electronically archived and analyzed using Provalis Word Stat, Microsoft Excel and Microsoft Word.

Respondents were asked to answer questions using a combination of Likert scales and open ended statements. Respondents were read questions and asked to mark their responses on the survey with the assistance of the enumerator. Upon completion of the written survey, respondents were asked a series of open ended questions related to their attitudes toward recycling and past recycling experiences. The interview was recorded and later transcribed in full. Teams of two enumerators would administer

Table 1
Summary statistics of first and second generation South Asian immigrants.

Variable	First generation	Second generation
Median age	41.7 years	33.6 years
Median income[a]	$45,000–$60,000	$45,000–$60,000
Education[b]	61.4%	64.5%
Gender[c]	49.2%	53.5%

[a] Respondents were asked to select from ranges of income that best represents their earnings, not actual values.
[b] Percentage of respondents with college education or higher.
[c] Percentage of respondents who identified as being male (else female).

Table 2
General attitudes toward recycling (first generation immigrants) $N = 197$.

Survey statement	Strongly agree (5) (%)	Agree (4) (%)	Neither agree nor disagree (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	Mean	Standard deviation
I think recycling is important	13.8	19.4	35.4	26.1	5.3	3.1	1.21
Recycling is good for the environment	14.8	16.4	26.9	23.5	18.4	2.9	1.25
Recycling helps prevent wasteful behavior	21.1	18.5	27.3	16.6	16.5	3.1	1.23
Recycling makes the world a better place	8.8	12.7	39.4	22.6	16.5	2.9	1.18
Recycling is a waste of time	7.5	11.6	25.8	25.9	29.2	2.47	1.26

Table 3
General attitudes toward recycling (second generation immigrants). $N = 144$.

Survey statement	Strongly agree (5) (%)	Agree (4) (%)	Neither agree nor disagree (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	Mean	Standard deviation
I think recycling is important	26.4	23.5	19.9	18.1	12.1	3.34	1.26
Recycling is good for the environment	24.2	30.5	20.7	13.1	11.5	3.43	1.28
Recycling helps prevent wasteful behavior	28.4	33.6	20.9	10.4	6.7	3.67	1.25
Recycling makes the world a better place	23.8	28.1	22.4	15.4	10.3	3.4	1.20
Recycling is a waste of time	7.7	9.5	21.8	31.5	29.5	2.34	1.29

Table 4
Differences in general attitudes toward recycling between 1st and 2nd generation South Asians (unpaired t test).

Survey statement	t	p	DF	Std error of difference
I think recycling is important	1.778	0.076	339	0.135
Recycling is good for the environment	3.828	0.002*	339	0.138
Recycling helps prevent wasteful behavior	4.197	0.001*	339	0.136
Recycling makes the world a better place	3.837	0.001*	339	0.130
Recycling is a waste of time	0.9316	0.3522	339	0.140

* 95% confidence interval.

the survey, one tasked with taking interview/field notes and the other working with respondents to complete the survey. Enumerators were proficient in several languages, allowing the survey to be administered in the language respondents were most comfortable with (in most instances, this was either Hindi, Punjabi or Farsi). A total of 898 recyclers were approached and asked to participate in completing the survey. Of those approached, enumerators managed to successfully complete 341 of the surveys, for a response rate of 37.9%.[1] Table 1 provides the summary statistics for both first and second generation South Asian survey participants.

3. Results

Survey data surrounding self-reported recycling habits and attitudes of South Asian recyclers is summarized based on the answers provided by respondents. This section is organized into five main areas: (1) general attitudes toward recycling; (2) statements regarding self-reported recycling behavior; (3) perception of existing recycling promotion and education literature; (4) experiences with recycling and waste management in country of origin and (5) open ended statements regarding the perceived benefits of recycling and past experiences with recycling.

A five point Likert scale was used to measure respondent's answers (Strongly Disagree, Somewhat Disagree, Neither Agree or Disagree, Somewhat Agree, Strongly Agree). Responses from first and second generation immigrants were recorded separately, and then compared to elucidate any potential differences in attitudes toward recycling and recycling behavior. Of note, survey questions and open ended questions regarding past recycling experiences in a participants country of origin were not given to second generation respondents. Given that these individuals reported as being born in Canada, these questions did not apply. Tables 2 and 3 describe the statements that were used in the survey to elicit respondent's general attitudes toward recycling, as well as the respective distribution of Likert scale responses. An unpaired t-test was performed to compare the means of the two groups (1st and 2nd generation South Asians) and test to see whether there was a statistically significant difference in survey responses. These results are summarized in Table 4.

3.1. General attitudes toward recycling

3.1.1. Survey statement (1) "I Think Recycling Is Important"

While differences were observed in participant responses regarding the importance of recycling (between first and second generation South Asian immigrants), by conventional criteria, differences in responses were found to be non-statistically significant at the 95% confidence interval (p value of 0.0763). Approximately 50% of second generation immigrants either agreed, or strongly agreed with the statement "I think recycling is important". This compares to only 33.2% of first generation immigrants who expressed the same sentiment. On average, both groups expressed similar levels of disagreement with the statement (either disagree or strong disagree), with responses of 31.2% and 30.4% respectively. Of note, a significant number of first generation immigrants expressed a neutral attitude toward the statement, selecting "neither agree nor disagree" at almost twice the rate of second generation participants.

3.1.2. Survey statement (2) "I think recycling is good for the environment"

Statistically significant differences were observed between first and second generation immigrants when read the statement "I think recycling is good for the environment". The majority of

[1] Given the approximately 810,000 South Asians over the age of 18 living in Ontario, it was estimated that a sample size of 381 participants was required to ensure that the sample was representative (at a 95% confidence level and 5% margin of error). Unfortunately, enumerators fell just short of this number due to timing, resource and participation constraints.

second generation South Asians either agreed, or strongly agreed with the statement (54.7%), with only 24.6% of responders expressing disagreement. Conversely, first generation South Asians actually disagreed that recycling was good for the environment more often than they agreed (41.9% disagreed vs. 31.2% agreed).

3.1.3. Survey statement (3) "Recycling helps prevent wasteful behavior"

While both first and second generation South Asian immigrants generally agreed with the statement "Recycling helps prevent wasteful behavior", second generation responders tended to express higher levels of agreement (62% vs. 39.6%). Differences in stated attitudes toward recycling and wasteful behavior were found to be statistically significant at the 95% confidence interval. An interesting anecdote observed by enumerators is that a number of first generation responders felt that re-use, and not recycling prevented waste. On six separate occasions, survey participants provided additional commentary (separate from their open ended responses) indicating that reusing items (bottles, jars, textiles, etc.) was a more appropriate strategy for minimizing waste when compared to recycling. As shown in Section 3.4 (analysis of open ended responses), reuse was reported as a popular waste management strategy employed by first generation South Asians in their country of origin.

3.1.4. Survey statement (4) "Recycling makes the world a better place"

This particular question underwent several revisions (originally phrased as "Recycling makes a difference"), as pre-tests of the question revealed that respondents found the question too ambiguous, i.e. "What constitutes a difference", "Does it have to be a positive or negative difference?" As such, the question was subsequently changed to "Recycling makes the world a better place". First generation South Asians tended to take a more neutral stance on the statement, with 39.4% of respondents neither agreeing nor disagreeing with the statement. This is in stark contrast to second generation South Asians, with more than half (51.9%) of all respondents agreeing with the statement. Differences in survey responses were also noted in the percentage of respondents who disagreed (or strongly disagreed) with the statement (39.1% for first generation responders and 25.7% for second generation responders).

3.1.5. Survey statement (5) "Recycling is a waste of time"

Unlike other survey statements that gauged participant's attitudes toward recycling as a social good, this question asked participants to comment on whether they felt recycling was a waste of time. This was included as a survey statement for two reasons: (1) It gathers useful information on whether South Asian recyclers in Ontario think of recycling as an effective/ineffective waste management strategy and (2) It serves to "cross check" previous responses regarding the perceived efficacy and importance of recycling. For example, if the majority of respondents indicated that recycling was a waste of time, but also reported that recycling was good for the environment, there would be an incongruency that requires additional investigation. Both first and second generation South Asians disagreed or strongly disagreed with the statement, reporting similar response scores (55.1% and 61% respectively). Less than 20% of all study participants indicated that recycling was a waste of time (19.1% of first generation South Asians and 17.2% of second generation South Asians).

3.2. Self-reported recycling habits of first and second generation south Asians in Ontario

This section explores the self-reported recycling habits of South Asian recyclers (both first and second generation) in Ontario. Unlike Section 3.1 which asked survey participants to respond to questions using a 5 point Likert scale, respondents were read a series of statements regarding recycling behavior, and were then asked to select the statement that best applied to their situation. Table 5 describes the statements that were used in the survey (for both first and second generation responders), as well as the respective distribution of survey responses. A 2 sample *z* test was conducted to determine whether there were statistically significant differences in self-reported recycling behavior between first and second generation South Asians. These results are summarized in Table 6.

Table 5
Self-reported recycling habits of first and second generation South Asians.

Survey Statement	% of Respondents who selected yes (first generation)	% of Respondents who selected yes (second generation)
I recycle because it is good for the environment	7.8	40.6
I recycle because my community expects me to (neighbors, friends and family)	14.5	20.9
I recycle because I am legally required to do so	58.6	9.5
I recycle because it makes me feel good	3	23.6
I recycle for reasons other reasons not listed	16.1	5.4

Statistically significant differences in self-reported recycling behavior were observed between first and second generation South Asian recyclers. First generation South Asian's responded that they primarily recycle because of a legal obligation (58.6%). This was in stark contrast to second generation South Asians, with only 9.5% of respondents selecting legal obligation. Second generation respondents most often selected "Good for the environment" (40.6%) when asked to identify motives for recycling. Conversely, only 7.8% of first generation South Asians made the same selection. Self-fulfillment ("Recycling makes me feel good") and social norms/peer enforcement ("my neighbors/friends/family expect me to recycle") were also listed as drivers of recycling behavior for second generation South Asians (scores of 23.6% and 20.9% respectively). Of note, social norms/peer enforcement was the third most popular selection for first generation responders (14.5%), which ranked higher than measures of both intrinsic motives and altruism (the combined score for "I recycle because it makes me feel good" and "I recycle because it is good for the environment" was 10.8% for first generation South Asians).

Table 6
Differences in Self-reported recycling habits of 1st and 2nd generation South Asians (2 sample *z*-test).

Survey Statement	*z*-Value	*p*-Value
I recycle because it is good for the environment	7.3	<0.0001*
I recycle because my community expects me to (neighbors, friends and family)	1.5	0.1219*
I recycle because I am legally required to do so	9.2	0*
I recycle because it makes me feel good	5.8	<0.0001*
I recycle for reasons other reasons not listed	3	0.0023*

* 95% Confidence Interval

3.3. Perception of recycling promotion and education initiatives

This section examines how first and second South Asians perceive and respond to provincial recycling promotion and education initiatives (P&E). P&E campaigns are designed to raise levels of consumer awareness regarding municipal recycling programs. While P&E campaigns vary depending on the intended message and the target audience involved, there is a consensus that communications should clearly specify: (1) why consumers should recycle, including the environmental, economic and community benefits, and (2) how consumers should recycle, including all of the relevant details (what, where, and how) of the program (McKenzie-Mohr, 1995). Research by Callan and Thomas (2006) and Sidique et al. (2010) have shown that areas which invest directly in P&E programs achieve higher levels of waste diversion than those who fail to make such provisions. Given the assumed effectiveness of P&E in promoting recycling, the province of Ontario has characterized P&E investments as a recycling best practice, reimbursing municipalities $1 per household for all P&E related expenses (Stewardship Ontario, 2007).

Recycling P&E initiatives are also seen as "first step" in educating households regarding Blue Box and other provincial recycling initiatives. In 2013, municipalities in Ontario spent in excess of 8 million dollars on recycling promotion and education (Waste Diversion Ontario, 2014).

Study participants were asked a series of questions related to their awareness and response to municipal recycling P&E initiatives. These results have been separated into responses provided by first and second generation South Asians, and are summarized in Tables 7–9 respectively.

3.3.1. Awareness

(1) "I am aware that the city has recycling promotion and education campaigns"
(2) "I see signs, flyers, advertisements, etc. telling me to recycle regularly"

Survey results indicate that household awareness regarding municipal P&E campaigns for both first and second generation South Asians is low. Only one quarter of all respondents agreed (or strongly agreed) with the statement "I am aware that the city has recycling promotion and education campaigns". Of these, 22% of first generation and 27% of second generation respondents recalled seeing flyers, advertisements and other P&E material telling them to recycle. Despite significant investments on the part of municipalities in promoting recycling initiatives (particularly in densely populated urban areas), the results from the survey suggest that the outreach and delivery of P&E messaging needs to be revisited and refined as a means to increase household awareness.

3.3.2. Results and Effectiveness

(3) "I recycle more because of the promotion and education initiatives under taken by the city"
(4) "I think recycling promotion and education campaigns are an effective way to get me to recycle more"

Results from the survey suggest that only a very small percentage (8.2% first generation and 22.2% second generation) of respondents recycle more as a result of municipal promotion and education initiatives. This could be, in part, due to the lack of awareness regarding P&E initiatives on the part of survey respondents. Of note (and in direct contrast to the findings from the preceding survey statement), majority of survey respondents felt as though recycling P&E was an effective tool for promoting waste diversion.

Fig. 1. Mobius loop.

43.6% of first generation and 70.2% of second generation respondents agreed (or strongly agreed) with P&E being a (potentially) effective method for getting them to recycle. This is a somewhat unexpected result, particularly in light how first generation South Asians responded to sample promotion and education literature in Section 3.4. It would appear that while South Asian households recognize the importance of being educated about recycling initiatives (i.e. where to recycle, what constitutes appropriate recyclable material, etc.), they are not being effectively engaged by municipalities – necessitating that municipalities re-evaluate how P&E initiatives are designed and delivered. While statistically significant differences were reported in the responses of first and second generation South Asians, they were "directionally" the same, i.e. both groups agreed that P&E could be an important tool for encouraging diversion, but second generation South Asians tended to agree more strongly.

3.4. Response to sample P&E signage/literature

This section examines how first and second generation South Asians respond to sample P&E literature used by municipalities. Respondents were shown each of the four figures, and asked to answer a series of questions with respect to the following:

(1) Recognition
(2) Clarity
(3) Ability to increase awareness
(4) Ability to change recycling behavior

Fig. 2. Sample household blue bin.

Table 7
Perception and awareness of P&E initiatives (first generation).

Survey statement	Strongly agree (5) (%)	Agree (4) (%)	Neither agree nor disagree (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	Mean	Standard deviation
I am aware that the city has recycling promotion and education campaigns	10.4	15.2	18.4	37.1	19.9	2.23	1.14
I see signs, flyers, advertisements, etc. telling me to recycle regularly	9.7	12.3	15.7	40.9	21.4	2.09	1.28
I recycle more because of the promotion and education initiatives under taken by the city	2.4	5.8	22.4	47.2	22.2	2.02	1.19
I think recycling promotion and education campaigns are an effective way to get me to recycle more	19.2	24.6	14.6	18.5	23.1	3.11	1.37

Table 8
Perception and Awareness of P&E Initiatives (second generation).

Survey statement	Strongly agree (5) (%)	Agree (4) (%)	Neither agree nor disagree (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	Mean	Standard deviation
I am aware that the city has recycling promotion and education campaigns	14.6	12.1	11.5	32.4	29.4	2.11	1.31
I see signs, flyers, advertisements, etc. telling me to recycle regularly	13.4	14.2	15.8	35.7	20.9	2.04	1.26
I recycle more because of the promotion and education initiatives under taken by the city	12.4	9.8	20.4	26.7	30.7	2.03	1.21
I think recycling promotion and education campaigns are an effective way to get me to recycle more	37.1	33.1	12.6	9.4	7.8	3.49	1.36

Table 9
Differences in perception of P&E initiatives between 1st and 2nd generation South Asians (unpaired *t* test).

Survey statement	*t*	*p*	DF	Std error of difference
I am aware that the city has recycling promotion and education campaigns	0.901	0.368	339	0.133
I see signs, flyers, advertisements, etc. telling me to recycle regularly	0.358	0.720	339	0.139
I recycle more because of the promotion and education initiatives under taken by the city	0.076	0.939	339	0.131
I think recycling promotion and education campaigns are an effective way to get me to recycle more	2.537[a]	0.011	339	0.150

[a] 95% confidence interval.

Figs. 1–4 are sample P&E advertisements/symbols that are currently used by municipalities in Ontario. Fig. 1 is a variation of the "Mobius loop/strip" and is the primary logo used for all residential recycling programs in Ontario. All containers and carts provided to households for printed paper and packaging recyclables are branded with a picture of the Mobius loop (shown in Fig. 2). Figs. 3 and 4 are pamplets that are dessiminated to households (normally as flyer inserts) that provide households with detailed instructions regarding what constitutues appropriate recyclable material. It should be noted that each municipality has discretion over how this material is provided to households (if at all) and may vary in design and wording. Respondent feedback (for both first and second generation South Asians), including a comparison of results, have been summarized in Tables 10–13.

Survey Statement: Do you recognize this symbol (*show participant* Fig. 1)?

Table 10
Recognition of Mobius loop among first and second generation South Asians.

First generation South Asians (197) ("*Do you recognize this symbol*?")	Second generation South Asians (144) ("*Do you recognize this symbol*?")
59 – Yes (29.9%) 138 – No (70.1%)	140 – Yes (97.2%) 4 – No (2.8%)
If yes (59) ("*What do you most associate it with*?")	If yes (140) ("*What do you most associate it with*?")
42 – Reduce/Reuse/Recycle 13 – Environment 4 – Other	127 – Reduce/Reuse/Recycle 13 – Environment

Fig. 3. Sample P&E advertisement #2 (what goes in the recycling bin).

Table 11
First generation South Asian response to P&E signage.

Survey statement	Strongly agree (5) (%)	Agree (4) (%)	Neither agree nor disagree (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	Mean	Standard deviation
The information presented in this advertisement is clear and easy to understand	9.6	11.3	10.5	28.7	39.9	2.16	1.27
The information presented in this advertisement raises my awareness about what should go in my recycling bin	10.8	12.7	6.8	31.8	37.9	2.18	1.24
I am more likely to recycle because of the information contained in this advertisement	7.7	9	13.5	40.5	29.3	2.04	1.38

Table 12
Second generation South Asian response to P&E signage.

Survey Statement	Strongly agree (5) (%)	Agree (4) (%)	Neither agree nor disagree (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	Mean	Standard deviation
The information presented in these advertisements is clear and easy to understand	34.6	22.8	10.5	17.4	14.7	3.46	1.30
The information presented in these advertisements raises my awareness about what should go in my recycling bin	25.4	37.9	13.3	18.8	4.6	3.71	1.28
I am more likely to recycle because of the information contained in these advertisements	30.7	23.3	15.8	19.5	10.7	3.34	1.25

Table 13
Differences in response to P&E signage between 1st and 2nd generation South Asians (unpaired *t* test).

Survey statement	*t*	*p*	DF	Std error of difference
The information presented in these advertisements is clear and easy to understand	9.243[a]	0.0001	339	0.141
The information presented in these advertisements raises my awareness about what should go in my recycling bin	11.10[a]	0.0001	339	0.138
I am more likely to recycle because of the information contained in these advertisements	8.937[a]	0.0001	339	0.145

[a] 95% confidence interval.

If yes, what do you most associate it with?

(1) Reduce/Reuse/Recycle
(2) Environment
(3) Sustainability
(4) Other

Of note, statistically significant differences were observed between perception of and attitudes toward P&E initiatives among first and second generation South Asians in Ontario. While Section 3.3 noted that both groups expressed similar levels of awareness regarding existing municipal P&E initiatives, when presented with sample P&E literature, first generation South Asians reported lower levels of recognition, understanding and willingness to respond to P&E messaging. As shown in Table 10, more than 70% of first generation South Asians did not recognize the Mobius loop or associate it with recycling/environmental activity. Within the context of P&E planning, this is a particularly concerning result – the Mobius loop is ubiquitous in recycling P&E messaging and in certain instances, it is used as a "stand alone" symbol reminding people to recycle. The city of Toronto (Ontario's largest municipality) has used P&E campaigns that consist of the Mobius loop with the accompanying text "Please get with the program" – there is no additional context provided to the reader/viewer. Given that the majority of first generation South Asians do not associate the Mobius loop with recycling activity, the intended purpose of the message is lost on the audience (it is also worth noting that more than 13% of Toronto's population is comprised of first generation South Asians, and as such, a failure to increase recycling awareness could negatively impact recycling rates) (Statistics Canada, 2011).

Similar results were observed when first generation South Asians were asked to comment on how clearly and effectively municipal P&E messaging informed them about what constitutes appropriate Blue Bin material. More than 2/3rds of first generation respondents disagreed (or strongly disagreed) with the statements "this advertisement is clear and easy to understand" and "this advertisements raises my awareness about what should go in my recycling bin". Anecdotes provided during the survey suggested that too much information was being presented at once. Several respondents indicated that the advertisements were too cluttered and that certain terms were difficult to understand, i.e. "what are spiral wound containers and rigid plastic packaging?" In contrast to these findings, second generation respondents indicated that they would be more likely recycle to as a result of P&E messaging (58% of respondents agreed, or strongly agreed with the statement "I am more likely to recycle because of the information contained in this advertisement").

This disconnect between the intended function and perception of P&E initiatives among first and second generation South Asians highlights a critical issue with P&E design in Ontario. Existing initiatives undertaken by municipalities largely go unnoticed by South Asian households (for both first and second generation respondents) – whether this is a general issue among all households or specific to the South Asian community remains unclear and requires additional investigation. However, what is evident is that existing approaches toward recycling P&E in Ontario do not effectively engage or resonate with first generation South Asians. Study participants felt that the sample P&E literature was unclear and did not encourage them to alter existing waste management behavior (or raise levels of recycling awareness). While the P&E examples shown to study participants represent only a small subset of a much broader range of P&E initiatives (that vary in both design, medium and delivery), it does highlight that special provisions and considerations need to made when designing P&E campaigns for first generation ethnic minorities. What is currently in place in Ontario currently goes either unnoticed (as shown in Tables 7 and 8) or is poorly received (as shown in Table 11).

Table 14
Country of origin for first generation South Asian study participants.

Country of Origin	# of respondents
India	134
Pakistan	31
Sri Lanka	13
Bangladesh	7
Other	12

3.5. *Self-reported recycling habits of first generation South Asians in country of origin*

This section examines the self-reported recycling behavior of first generation South Asians in their country of origin. Second generation survey participants were not read this section of the survey, as their experiences with recycling are largely in a Canadian/North American context. This section is of particular interest to this study, as it is hypothesized that current recycling participation of first generation South Asian's is, in part, a function of past recycling experiences. Table 14 summarizes the respective breakdown of first generation South Asian's country of origin.

This study did not attempt to find differences in self-reported recycling experiences among different South Asian

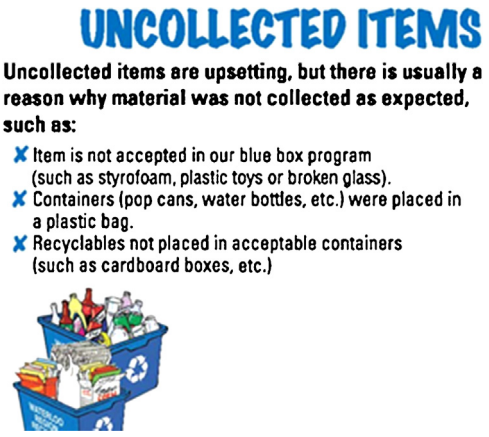

Fig. 4. Sample P&E advertisement #3 (what goes in the recycling bin #1).

Table 15a
Self-reported recycling habits of first generation South Asians in country of origin.

Survey statement	Strongly agree (5) (%)	Agree (4) (%)	Neither agree nor disagree (3) (%)	Disagree (2) (%)	Strongly disagree (1) (%)	Mean	Standard deviation
My city used to offer recycling services back home	5.8	8.5	12.1	38.5	35.1	2.11	1.36
I source separated recyclables back home	6.9	10.5	15.3	36.8	30.5	2.27	1.32
Recycling was mandatory back home	0	0	10.5	56.6	32.9	1.81	1.40
The first time I recycled my waste was in Canada	18.5	21.1	33.7	16.9	9.8	3.22	1.27

groups. Table 15a summarizes the survey statements and distribution of Likert responses provided by survey participants. An open ended question asking participants to comment on how waste was managed in their country of origin also accompanied the survey. These results are discussed in Section 3.5.

3.5.1. Survey statement (6) "My city used to offer recycling services back home"

In several instances, survey participants required clarification about what constituted "recycling services". Enumerators would often accompany this statement with an example, i.e. "My city would collect recyclables from my house ever week" or "My city had designated bins for me to drop off my recyclables". Majority of survey participants indicated that they disagreed (or strongly disagreed) with this statement (73.6%). Only 14.3% of respondents indicated that their home city offered recycling services in some capacity. Of note, several participants provided unsolicited anecdotes regarding the role of the informal waste sector in conducting recycling activity (in lieu of the city offering these services). This topic is explored further in Section 3.5.

3.5.2. Survey statement (7) "I source separated recyclables back home"

Much like survey statement #6, enumerators often accompanied this statement with an example "I used to separate my recyclables from my garbage, i.e. taking out plastic bottles from the garbage bin". Once again, few first generation South Asians reported source separating recyclables in their country of origin. Only 17.4% of participants expressed some level of agreement with the statement. Conversely, 67.3% of participants disagreed (or strongly disagreed) with having source separated recyclables "back home". As discussed in Section 3.4, those that did indicate having separated recyclables from the waste stream often did so for monetary reasons, i.e. they would receive money for returning empty bottles and cans to a buyback center.

3.5.3. Mandatory recycling in country of origin

3.5.3.1. Survey statement (8) "Recycling was mandatory back home". No survey participant indicated that recycling was mandatory in their country of origin. Approximately 90% of all first generation South Asian's disagreed (or strongly disagreed) with this statement. This is consistent with our understanding of recycling programs in South Asian countries. In a review of waste management programs across municipalities in South Asia, there were no reports of mandatory or legislatively required source separation programs for households.

3.5.4. Experiences with recycling for the first time

3.5.4.1. Survey statement (9) "The first time I recycled was in Canada". This survey statement generated the most unsolicited feedback from survey participants, in that there were incidents in which respondents disagreed over what was meant by recycling. Within the context of this study, participation in recycling activity involves households source separating recyclables from the waste stream and putting it out for municipal collection or dropping it off at a recycling depot/transfer station. Many of the respondents felt that this definition was too narrow, and that reuse also constituted recycling activity (as noted in survey statement #3). To address this issue, enumerators were instructed to define what was meant by recycling to study participants, and requested that respondents keep this definition in mind when answering the structured section of the survey. Respondents were told that they would be able to comment freely on past recycling/reuse and other waste management practices in the open ended section of the survey.

Using the above definition of recycling, 39.6% of respondents agreed (or strongly agreed) that the first time they recycled was in Canada. 33.7% of respondents neither agreed nor disagreed with the statement, while 26.7% disagreed (or strongly disagreed).

3.6. Open ended analysis

For open ended survey questions, all survey responses were recorded, transcribed and reviewed to identify thematic categories and codes. Respondents were asked to answer three open ended questions related to recycling habits, attitudes and past experiences: (1) Do you think recycling is a good thing? Please explain your answer, (2) Would you still recycle if recycling wasn't mandatory? Please explain your answer, and (3) How was waste managed back home (in your country of origin). Please explain your answer. Respondents were asked to answer freely, and did not receive any additional input or instructions from the enumerator (beyond issues of clarification). Second generation South Asians were not asked question #3, as their experiences with recycling are Canadian/North American specific.

To better facilitate comparisons between first and second generation South Asians, their responses have been coded separately. A total of 197 open ended surveys were conducted with first generation responders, with the remaining (144) participants identifying as being second generation South Asians. These findings have been summarized in Tables 15b and 16. Codes have been organized into two additional container categories indicating positive/negative attitudes toward recycling and self-reported recycling behavior.

3.6.1. Open ended statement (1) "Do you think recycling is a good thing"

A "best fit" approach was utilized to categorize respondent's answers. For example, "It makes people throw away less garbage" was coded under the stops wasteful behavior category. As shown in Tables 7 and 8, the majority of survey respondents (both first and second generation) expressed positive attitudes/feelings toward recycling. When asked "Do you think recycling is a good thing?", respondents often responded yes, citing reasons such as "It's good for the environment", "It prevents wasteful behavior" and "Less garbage goes to the landfill". Of note, while second generation respondents made up a proportionally smaller share of open ended responses, they expressed positive attitudes more frequently, and provided a more diverse set of reasons for why recycling was a good thing (i.e. "Conserves Resources", "Promotes sustainability and wellbeing for future generations"). First generation South Asians also expressed negative attitudes toward recycling more often than second generation responders, although both groups cited the same reasons for why they felt recycling was not worthwhile (i.e. "Waste

Table 15b
Coded Responses (First Generation South Asians).

Do you think recycling is a good thing?	
Positive attitudes (yes)	Negative attitudes (no)
"Good for the environment" – 58	"Waste of time" – 39
"Less garbage goes to the landfill" – 24	"Doesn't make a difference" – 22
"Reduces litter" – 18	"Don't care" – 12
"Stops wasteful behaviour" – 46	
Would you still recycle if recycling wasn't mandatory?	
Positive attitudes (yes)	Negative attitudes (no)
"It's the right thing to do" – 54	"Saves me time" – 15
"It's good for the environment" – 29	"Don't care" – 12
"It's become habit" – 14	"Confusing" (regarding what is and isn't recyclable) – 19
"Sets a good example" – 12	
How was recycling managed back home in your country of origin?	
Waste pickers – 76	
Incineration – 44	
Open Dumping – 16	
Private Contractors/Waste Collectors – 29	
Buy Back/Deposit Return – 38	
Reuse/composting – 61	
Curbside Collection – 8	

of time", "Doesn't make a difference" and "Don't Care"). Interestingly, more second generation responders indicated that recycling "Didn't make a difference" relative to first generation responders. This was an unexpected result, given that on the whole, second generation South Asian's tended to view recycling more favorably and indicated higher levels of self-reported recycling participation.

3.6.2. Open ended statement (2) "Would you still recycle if recycling wasn't mandatory"

Both first and second generation South Asian recyclers indicated that they would continue to recycle if recycling was not mandatory. Of the 341 total participants, only 42 indicated that they would stop recycling if Ontario's legal mandate was removed (26 first generation, 16 second generation). "It's the right thing to do", "It's good for the environment" and "It sets a good example" were reasons for continued recycling participation common to both first and second generation respondents. Second generation respondents tended to cite "It's good for the environment" at a higher frequency than first generation South Asians. Second generation respondents also expressed intrinsic motives (i.e. "It makes me feel good") as a reason for continuing to recycle. Conversely, first generation South Asians reported habitual intentions (i.e. "It has become habit") as a reason for continued recycling. Similarly to the first open ended statement, second generation South Asians indicated that they would could continue to recycle in the absence of a legal requirement at a higher frequency than first generation South Asians (despite making up a smaller % of total respondents).

"Don't care" and "Doesn't make a difference" were the most common reasons given by second generation South Asians for declining to participate in recycling activity. First generation South Asians who answered no to this question also reported "Doesn't make a difference" as a reason, as well as "Saves me time" and "Confusing" (regarding what constitutes recyclable material). This latter point is of particular interest, in that 19 respondents indicated that they did know what materials were appropriate to place in the Blue Bin. Anecdotes provided by respondents suggested that their municipality/region did not communicate this information to them, and at times, they would dispose of potentially recyclable material in their garbage bin if they could not readily recognize said items as being recyclable. These results reinforce the findings from the review of municipal recycling promotion and education literature – most municipalities do not make a significant effort to communicate the why, what and where of recycling to minority communities.

Table 16
Coded responses (second generation South Asians).

Do you think recycling is a good thing?	
Positive attitudes (yes)	Negative attitudes (no)
"Good for the environment" – 68	"Waste of time" – 19
"Less garbage goes to the landfill" – 36	"Doesn't make a difference" – 26
"Reduces litter" – 35	"Don't care" – 7
"Conserves Resources" – 19	
"Stops wasteful behaviour" – 58	
"Promotes sustainability/future generations" – 29	
Would you still recycle if recycling wasn't mandatory?	
Positive attitudes (yes)	Negative attitudes (No)
"It's the right thing to do" – 38	"Don't care" – 12
"It's good for the environment" – 78	"Doesn't make a difference" – 16
"Reduces litter" – 27	
"It makes me feel good" – 35	
"Sets a good example" – 42	

3.6.3. Open ended statement (3) "How was waste managed back home" (in your country of origin)

In this section of the interview, first generation South Asian immigrants were asked to comment openly on waste management experiences in their country of origin. Specifically, the question asked respondents to provide information on how waste was managed "back home". 7 coding categories were identified after a review of the interview transcripts, with the frequency of reported waste management options being (in descending order): Waste Picking (76), Reuse/Repurposing (61), Incineration (44), Buy Back/Deposit Return (38), Private Contractors/Waste Collectors (29), Open Dumping (16) and Curbside Collection (by city) (8).

3.6.4. Waste picking

It is estimated that approximately 1% of the urban population in South Asian countries survive by salvaging recyclables from the residential waste stream (Contreau, 2006). Waste workers supplement, or in some instances, supplant municipal waste collection, collecting materials of value from homes, streets and landfills for the purposes of resale to a recycler (Medina, 2007). Many waste pickers belong to vulnerable or marginalized group, i.e.: recent migrants, the unemployed, the disabled, women, children, and the elderly (Muller, 1998). They survive in a hostile social environment and are sometimes rejected and ostracized by society. Survey respondents indicated that waste picking was prevalent in their countries of origin. Anecdotes provided by respondents indicated that waste pickers would sort through their garbage looking for bottles, cans, tetrapaks and other items of value. In several instances, survey respondents told enumerators that they would source separate recyclables with the specific intention of giving it to local waste pickers/scavengers.

3.6.5. Reuse

Reuse was the second most popular form of waste management employed by first generation South Asians in their country of origin. As noted in Section 3.1, many survey participants failed to distinguish between reuse and recycling, often using the terms interchangeably. When initially read the statement "I recycled "back home" (the original phrasing of survey statement #7)" during the survey pretest, majority of respondents expressed some form of agreement. However, when this phrase was changed to "I source separated my recyclables "back home",

the answers changed significantly, with more than 75% disagreeing (or strongly disagreeing) with the statement. During the open ended section of the survey, respondents indicated that they would commonly reuse recyclables (namely plastic bottles, glass jars and metal/aluminum cans). Participants also provided anecdotes about reusing/repurposing/refurbishing other durable household items (i.e. waste electronics, white goods, etc.). However, a review of non-printed paper and packaging materials was outside the scope of this study.

3.6.6. Incineration and buy back/deposit return

Incineration and Buy Back/Deposit Return systems were the third and fourth most frequently coded responses. Incineration, within the context of the survey responses provided by first generation South Asians, referred to household combustion of organic waste. This is not to be confused with large scale thermal incineration and energy recovery systems that are commonly found in developed markets. Survey respondents reported burning organic and paper based waste as a means to save space and avoid paying for contracted garbage collection. Of note, for items that could not be readily burned (i.e. plastics, metals and glass), some respondents indicated taking these items to designated buy back or deposit return points.

3.6.7. Privately contracted waste collection

Private/contracted waste/recyclable collection was also a popular response provided by survey participants. Unlike Ontario, where municipalities are obligated to provide waste/recycling collection services to households (where these services are financed through property taxes, extended producer responsibility schemes, or some combination thereof), most South Asian cities require residents to pay for waste collection services. Survey respondents told enumerators that a monthly (or in some instances, weekly) fee would be paid to privately owned waste contractors to collect waste from specially designated waste containers/bags set out by households. Of note, respondents indicated that they were not required to source separate recyclables. Contracted waste companies would collect all waste generated by households and respondents were unsure as to whether these items were sorted at a later point.

3.6.8. Open dumping

A small portion of survey participants indicated that they disposed of material in open dumps. Open dumping is common in certain developing areas, particularly when cities are unable or unwilling to offer waste management services. Open dumps are often vectors for disease and vermin, and pose acute health concerns to those living in proximity (Melosi, 1981). Survey respondents who admitted to open dumping often rationalized their choices to enumerators, saying things like "Nobody cared", "The city never did anything to get rid of the waste". These statements were often accompanied by negative reflections on their past waste management experiences, such as "It was very dirty/unclean" and "I'm glad I/we left". Interestingly, 6 of the 16 respondents who participated in open dumping also expressed feelings of regret and remorse, saying that they would never do it again. These anecdotes were unsolicited and seemingly suggest that respondents recognized open dumping as being an unsustainable/undesirable waste management practice.

3.6.9. Curbside recyclable collection

The least frequently coded response extracted from the open ended surveys was curbside recyclable collection. While the majority of survey participants told enumerators that municipal curbside recyclable collection was unavailable in their area, 8 respondents indicated that municipalities collected both recyclables and garbage from their homes. Unfortunately, due to the way in which the survey was structured, enumerators were unable to ask follow up questions requesting that respondents to elaborate on their answer. What was not clear from the responses recyclers is whether households were required to source separate recyclables at the point of generation, or whether material was collected as a commingled stream (waste + recyclables).

It is important to highlight that the waste management options coded during the open ended interviews were not mutually exclusive. For example, some respondents reported that a combination of waste management strategies (i.e. waste picking, reuse, private collection and incineration), were employed back home. This is consistent with previous findings from the literature, in that a combination of waste management options are often used, even within the same geographic area (Melosi, 2000).

4. Discussion and conclusion

This study examined differences in self-reported recycling behavior and attitudes toward recycling between first and second generation South Asians in Ontario. Differences were observed between the two groups, with second generation respondents viewing recycling more favorably, as well as indicating higher levels of recycling awareness and recycling participation. In most instances, differences in self-reported recycling behavior were significant – for example, second generation respondents agreed with the statement "I think recycling is important", twice as often as first generation responders. With these results in mind, this study sought to explore why these differences exist, specifically examining whether past recycling/waste management experiences influence current attitudes toward recycling. It is important to note that is was not possible to empirically isolate the effect of past recycling experiences on current recycling participation. Due to the nature in which the survey was designed, only inferences can be drawn from analyzing survey and interview data. It is possible (although unlikely) that differences in self-reported recycling behavior between first and second generation South Asians are explained by differences in age, education, or income. However, when reviewing the summary statistics of the two groups (see Table 1), reported median age, income and educational attainment were not sufficiently different so as to readily explain differences in recycling perceptions and behavior.

As noted in Section 3.5, conventional curbside recycling and source separation were not common waste management practices in first generation respondents' country of origin. Waste picking, reuse, incineration and open dumping were all reported at a higher frequency than curbside recyclable collection. More than 39% of all first generation respondents agreed (or strongly agreed) with the statement "The first time I recycled was in Canada" (using the studies definition of what constituted recycling). One may posit that without a habitual precedent for participating in recycling activity, the intent/desire to engage in recycling would be diminished. This assumption is not principally inconsistent with our understanding of Ajzen's theory of planned behavior, where in behavioral intent is a function of attitudes toward the behavior, normative belief (social pressures from society, family and friends) and perceived levels of behavioral control (perceived ease or difficulty in performing the behavior).

Within the context of first generation South Asian recyclers, there are significant barriers to the antecedents to recycling behavior (as characterized by Ajzen, 1985). In most South Asian countries, recycling (source separation at the point of generation) is neither encouraged, nor expected. As noted by Medina (2007), sorting recyclables is almost a societal taboo, as it is generally considered a subsistence activity carried out by the informal sector. There are also fewer opportunities to recycle due to a lack of

mature integrated waste management infrastructure. The social and legal pressures to recycle that exist in Ontario are absent in most South Asian countries. As such, when first generation South Asians immigrate to Ontario, there may be a "cultural lag" with respect to recycling behavior. Until there is significant acculturation with respect to provincial waste management practices, first generation South Asians may express less concern for recycling, resulting in lower levels of recycling participation. While this study could not definitely conclude that acculturation (with respect to recycling) will occur over time, a review of surveys/interviews with second generation South Asians lends credence to this hypothesis. As discussed in Section 3.1, second generation South Asians who were born and raised in Ontario expressed higher levels of recycling awareness and participation relative to first generation South Asians. Exposure to and participation in Ontario's Blue Box recycling program may enforce positive attitudes toward recycling and establish household recycling as a habitual behavior.

This study also highlights the needs to effectively engage first generation South Asians to ensure their participation in household recycling. Assuming that there are barriers to recycling participation resulting from retained attitudes toward waste and recycling, municipalities need to design policies that specifically overcome said barriers in a way that is culturally relevant. Communicating why recycling is important, what constitutes appropriate recyclable material and increasing awareness about existing waste management services is crucial in promoting recycling among all households. However, the mediums and methods in which this information is communicated needs to be specifically tailored to South Asian (and other minority) communities. Identifying what types of promotion and education initiatives are most effective in encouraging recycling participation among first generation South Asians is a topic worthy of additional academic investigation.

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