

*Comparing Recyclers and Nonrecyclers in N/NE
Portland: Implications for Increasing Participation
in the Curbside Program*

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Executive Summary

Background

While Portland leads the nation in the amount of household waste that is recycled each year, there are several areas of the City where the rate of participation in the curbside recycling program has been consistently low. These areas are clustered in the North and North-East sections of the City.

This study was designed to investigate the differences between the Recycling and Nonrecycling households in this area. It was hoped the findings would provide insights on how to more effectively promote recycling among the relatively large number of nonparticipating households in the area.

Method

A brief telephone survey was administered to an adult resident of 110 Recycling households and 105 Nonrecycling households located in N/NE Portland. The survey focused on household recycling practices, recycling knowledge, and evaluation of the City's curbside program.

Findings

1. Consistent with previous research, Recyclers in the N/NE areas of Portland were far better informed about recycling than Nonrecyclers. This was clearly the most salient finding of this study. It is reflected in the Recyclers superior knowledge of trash collection, curbside recycling procedures and the relationship between these two. Further, recycling knowledge was the strongest predictor of whether or not a household participated in the City's Curbside Program.
2. Two situational variables also played a large role in the recycling activity of the households in the Target Area. First, Nonrecycling households were far more likely than Recycling households to need recycling bins. Second, both groups

indicated they would recycle more or begin doing so, if a greater range of materials were collected.

3. Finally, two classes of Nonrecycling households were identified in the N/NE area. The first does not participate in the curbside program and apparently no where else. The second, approximately 43% of the original Nonrecycling sample, also does not participate in the curbside program but does recycle a considerable amount of their household waste at nearby drop-off centers.

Implications

These findings have at least three direct implications for improving the overall level of recycling in the Target Area.

- **Develop a continuously focused information campaign**

We recommend the development of an educational program to overcome this information deficit among a sizeable number of Nonrecycling households. By making recycling less of a mystery, households might be more likely to try the activity for the first time and, once they learn *how* to carry it out, continue to practice it in the future.

- **Insure that each household has two recycling bins**

The results of the current study revealed there were a considerable number of households that did not have the bins required to participate in the curbside program. Even when they know why it is important to recycle and know how participate in the curbside program, they will never be able to do so without such bins. Accordingly we recommend periodic bin distribution programs in the area and mailings that inform households how to obtain replacement bins.

- **Consider expanding the range of collected materials.**

The collection of a wider range of materials was one of the most commonly voiced suggestions by the respondents in both groups. The items most often

mentioned in this regard were plastics, hazardous waste and packing materials, especially Styrofoam. In spite of their limited market value, we recommend that serious consideration be given to including them in the curbside program because of the "spill over effect" that collecting them would have on initiating recycling in non-participants and increasing it ever further in participants.

Conclusion

Additional approaches supported by previous research and theory might be also be useful in promoting recycling in the Target Area. They include neighborhood-based campaigns, informational feedback, and community based social marketing techniques. Taken together with suggestions derived from the current study, these approaches indicate there are a number of interventions that might be effectively employed to increase participation in the City's curbside program throughout the N/NE area of Portland.

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Comparing Recyclers and Nonrecyclers in N/NE Portland: Implications for Increasing Participation in Curbside Program

Introduction

Background

In 1999 more than 230 million tons of municipal solid waste were produced in this country. That was almost twice the amount (121 million tons) it was in 1970. The amount of waste produced in 1999 was equivalent to approximately 4.6 pounds of waste per person per day, up from 2.7 pounds per person per day in 1960 (EPA, 2002).

While vigorous efforts have been made to encourage individuals, businesses and institutions to reduce their production of waste materials, at the present time the United States recycles only 28 percent of its waste. Clearly we have a long way to go before achieving more acceptable levels of diversion. Some West European countries, for example, are reported (Khator, 1993) to recycle almost 60% of their solid waste

The City of Portland has shown it is possible to approach this level of diversion. For example, in 1999 the recovery rate for Portland's waste stream reached 53.6% (City of Portland, Office of Sustainable Development (OSD), 2000). According to the latest OSD figures the average Portland household recycles 672 pounds of recyclable materials per year. This compares with the national average of 472 pounds. As a corollary, the average Portland household disposes far less solid waste (1,444 pounds per year) than the national average (2,257 pounds per year).

Problem

The City's Curbside Recycling Program is largely responsible for achieving recovery levels of this magnitude. Portland is said to lead the nation in the amount of household materials collected by local haulers. However, there are still several neighborhoods that fall well below the City-wide average. Concurrently, the households in these areas dispose far *more* solid waste than the high frequency recycling neighborhoods.

The relatively low level of recycling in these areas has been a consistent trend since the inception of the curbside program in Portland. In addition, it has persisted, in spite of the fact that the same, highly supportive recycling program is provided in all areas of the City. This program consists of the following major components:

- Weekly curbside service
- Provision of two recycling 14 gallon recycling bins¹
- Extensive informational and marketing materials.
-Commingling program, with minimal separation required²
- Variable trash rates depending on garbage container size
- Bi-weekly yard debris collection

The current curbside program has led to substantial levels of recycling in most neighborhoods in the City. However, in seven neighborhoods, hereafter known as the Target Area, the rate of curbside participation has been consistently low. These areas are clustered in the North and North East sections of the City. Table 1 identifies the Target Area neighborhoods and lists representative demographic features for each one.

¹ One bin is for paper: newspapers, magazines, brown paper and small pieces of cardboard. Scrap paper, paper milk cartons and junk mail are to be placed in a paper bag for inclusion in this bin. The other bin is for plastic bottles, aerosol cans and scrap metals which can be placed loose in the bin. Glass bottles and jars are to be placed in a paper bag for inclusion in this bin.

² Prior to adopting a commingling program, a fair amount of sorting was required of participants in Portland's curbside program. During the first six months of the new commingling program, there was a 14.8% increase in the amount of recycled materials compared to the same period the year before.

Table 1
Low Recycling Target Areas

Area	Population	Houses	Own (%)	Rent (%)
Boise	3,427	1,254	61	39
Humboldt	4,914	2,074	43	57
King	5,766	2,205	54	46
Piedmont	6,458	2,613	64	36
Vernon	2,973	1,096	51	49
Sabin	3,262	1,314	64	36
Woodland	5,246	1,975	53	47

Data provided by City of Portland Office of Sustainable Development

The relatively low recycling levels displayed by households in these 7 N/NE neighborhoods pose two questions:

1. What accounts for the low participation rates in these areas?
2. How can participation be increased and maintained over the long term?

We suggest there is a close relationship between these two questions. Knowing how to more effectively promote recycling in the target N/NE areas will depend largely on a greater understanding the factors governing current patterns of participation.

Accordingly, the present study is conceived as a two-phase project in which future interventions designed to address this problem are preceded by a qualitative survey of households in each area.

Overview

The Phase 1 survey is intended to learn more about why the residents in the target areas are not participating more actively in the curbside program. We know it cannot be attributed to the lack of an effective recycling program because, as noted above, haulers in the Target Area deliver the same program there as they do throughout the City.

Perhaps, then the residents of the Target Area households differ in some respects from those who participate at higher levels elsewhere in the City. In an interesting study of the

differences between recyclers and nonrecyclers Vinning and Ebreo (1990) report that recyclers were in general more *aware* of publicity about recycling and more *knowledgeable* about recyclable materials than nonrecyclers. While both groups were motivated by concerns for the environment, nonrecyclers appeared to be more concerned with financial incentives and rewards for recycling, as well as matters of personal convenience. It is also important to note that Vinning and Ebreo did *not* find any major demographic differences between recyclers and nonrecyclers. These findings are consistent with Simmons and Widmar's (1990) report that a positive conservation ethic does not necessarily lead to recycling behavior if individuals are poorly informed about the recycling program in their area.

The following study was designed to determine if this relationship holds for the households in the target N/NE areas of Portland. It also sought to identify other factors that distinguish recyclers from nonrecyclers and that might also suggest techniques for increasing participation in the City's curbside recycling program.

Method

Sample

The participants were selected by directly observing whether or not they participated in the curbside program during the first part of March 2002. The observations were made during the course of three hauler routes in the N/NE Target Area of Portland.

Households that placed at least one recycling bin at the curb constituted the Recycling group. They were matched with the nearest nonparticipating household to form the Nonrecycling group. The survey was administered to an adult member of 110 Recycling (R) households and 105 Nonrecycling (NR) households.

Procedure

The telephone number of each household was obtained from the Reverse Street Directory of the Target Area. When contacted by a male interviewer³ from Public Policy Research, the adult responsible for the household's recycling activity was asked if he or she would be willing to participate in a short, five minute survey that the "City's Recycling Department" was conducting. Once consent was obtained, the respondent was administered the survey and thanked for their assistance.

Survey

The respondents in each group were asked the same set of general questions at the start of the interview (See Appendix A). These questions sought a limited amount of background information about the household, including whether or not they participated in the City's curbside program. Those who said they placed at least one yellow two bin at the curb for the recycling hauler were then given the questions from the Recycling (R) Form shown in Appendix B. Those who said they did not put out any bins were given the slightly modified Nonrecycling (NR) form shown in Appendix C.

³ James Leyba is specially thanked for his skillful conduct of the telephone interviews and numerous contributions to the study.

Both forms of the survey focused on the following topics:

- Recycling behavior
- Availability of recycling bins
- Knowledge of collection procedures
- Awareness of service rates and bin size
- Principal sources of recycling information
- Barriers to participation in curbside program
- Recycling motivation
- Factors that would increase rate and volume of recycling
- Recommendations for service improvement

Most of the questions required simple categorical responses--yes or no. They were designed to assess the respondent's knowledge of the curbside program and factors that governed their participation or nonparticipation. There were also several open-ended questions which the interviewer prompted with alternative responses when an answer was not forthcoming. These questions sought the respondent's general opinion about the curbside program and suggestions for improving it.

Results

A clear difference between the two groups emerged from the very beginning of the telephone survey. Compared to Recyclers, the Nonrecyclers were much less willing to be interviewed. As a result, it took far more time to reach the target sample of Nonrecyclers than the Recycling sample. In addition, once they did agree, they were less responsive and provided shorter answers than the Recyclers.

On the whole the Recyclers were very supportive of the curbside program, eager to talk about their recycling behavior and often expressed a degree of pride in the City's curbside program. In contrast, while the Nonrecyclers were generally friendly, they were much more direct and hurried in answering the survey questions than the Recyclers.

Finally, it is important to note that not all respondents answered each question, especially those with an open-ended structure. This will explain why the number of respondents for each question does not always equal the size of the original sample, as well as clarifying the meaning of the data that is missing on some of the questions.

Household Characteristics

While no effort was made to identify respondents in terms of specific neighborhoods or demographic variables, the Reverse Street Directory made it possible to divide the households in terms of the North or Northeast section of the City.

Table 2
Household Characteristics by Recycling Status

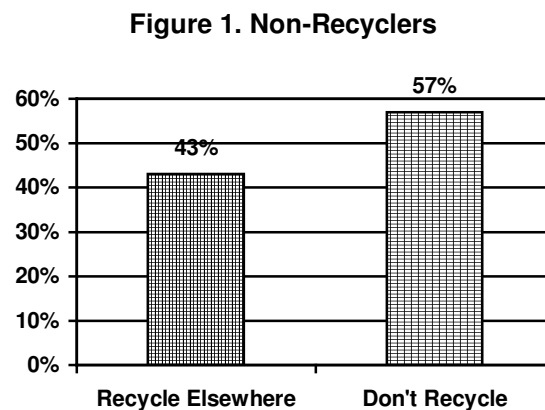
Characteristic	Recyclers (n=110)	Non-Recyclers (n=105)
Geographic Location		
North East	76%	76%
North	24%	24%
Household		
Own	71%	68%
Rent	29%	32%
Average Number in Household		
	2.7	2.6

As shown in Table 2, there were no differences between Recyclers and Nonrecyclers from these two areas nor was there a difference between renters and owners. We also asked how many people lived in the home and found no significant differences as a function of the size of the household.⁴

Recycling Activity

Three-fifths of the recycling households (60%) reported that they participated in the City's curbside program by putting out two bins, with 40% indicating they usually put out one bin. A sizeable majority (86%) said they normally did so each week. Almost all (95%) reported they uniformly separated the materials in each of the bins.

Even though the respondents in the Nonrecycling group reported they did not participate in the City's curbside program, as shown in Figure 1 an unexpectedly large number (43%) said they did recycle materials elsewhere, most commonly at a nearby Drop-Off center. Of this group, the majority (67%) said they used the Portland/Denver Drop-Off center. A smaller number (13%) said they used a supermarket (Safeway or Fred Meyer) while the remaining said they used other Drop-Off locations. We had not expected that such a large number of Nonrecyclers would, in fact, be recycling in this fashion.



Thus, while a household may not be participating in the City's curbside program, it may, nevertheless, be diverting a fair amount of material from the waste stream. We further probed these respondents to learn why this method of recycling was employed rather than

⁴ Prior research has indicated that few demographic characteristics distinguish recyclers from nonrecyclers. (see Vining & Ebreo, 1960).

the City's curbside program. Several respondents noted that they objected to having their recycled materials being taken or looked over at the curb. Others mentioned they did not have trash service. Reasons for recycling elsewhere included:

- A single trip to the drop-center simplifies recycling a large collection of materials
- Drop-Off centers take more materials than the curbside program
- It does not require sorting at the household level
- It is convenient because it is on the way to work or near house
- It is a family activity

Recycling Bins

While seemingly of minor importance, there were several striking differences between Recyclers and Nonrecyclers in the *availability* of recycling bins. The Nonrecycling group was significantly ($p = .03$) more likely than the Recycling group to report that they did not have any recycling bins.⁵ Approximately one-third (33%) of the Nonrecycling households said they did not have any bins--a surprisingly large number. While only a few (16) Nonrecyclers responded to the question "What would cause you to recycle more materials?" those who did ranked their need for more bins as the number one factor. Finally, at the conclusion of the survey the respondents were routinely asked if they had any more questions. Compared to the Recyclers, twice as many Nonrecyclers (22 vs. 11) said they wanted to obtain additional bins.

Trash Service

The survey included four questions designed to assess the respondent's knowledge of their trash service and its relationship to recycling. For example, we wanted to know if the respondents were aware of the size of their trash container. Table 3 shows the size of container for the Curbside Recyclers, Drop-Off Center Recyclers, and Nonrecyclers.

⁵ The statistical significance of a finding refers to the likelihood that it could have occurred by chance. This is normally expressed by giving the probability level (p value) of the outcome that can be calculated by means of a number of different statistical techniques. In the current report we will cite the p value of all statistically significant outcomes. A result will be considered statistically significant if the probability level is *less* than 5 in 100 (.05) that it might be due to chance factors rather than the independent variables (e.g. group differences) that were investigated

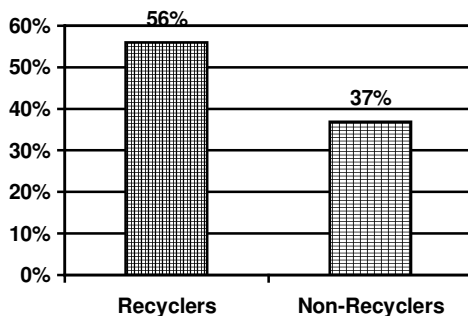
Table 3
Knowledge of Container Size by Recycling Status

Container Size	Curbside Recyclers (n=110)	Drop-Off Recyclers (n=45)	Non-Recyclers (n=60)
20 Gal	13%	0%	2%
30-35 Gal	46%	56%	38%
60-90 Gal	2%	3%	0%
Don't Know Size	39%	41%	60%

The evidence indicated that the Recyclers were more likely than the Nonrecyclers to know the size of their trash container. Approximately 60% of the Nonrecyclers said they did *not* know the size of their trash containers compared to 40% of the two groups of Recyclers. These latter two groups of Recyclers were significantly ($p = .03$) more likely to know the size of their trash container than the Nonrecyclers. In addition, these data show that 13% of the Curbside Recyclers reported they used a 20 Gal container. On this measure the Curbside Recyclers differ significantly ($p = .01$) from the two other groups.

We also asked the respondents if they were aware that their monthly trash collection fee depended on the size of their trash container (Question 8). Seventy three percent of the

Figure 2. Recycling Can Reduce Trash Fee



Recyclers answered correctly that they were aware of this fact, compared to 66% of the Nonrecyclers. The groups did not differ significantly on this question. In addition, they did not differ significantly when asked if they knew there was no fee for collecting their recycling materials (Question 10), with 83% of the Recyclers and 89% of the Nonrecyclers answering correctly. However, as indicated in

Figure 2, they did differ significantly ($p = .01$) in knowing that recycling can reduce their trash fee (Question 9), with 56% of the Recyclers answering correctly compared to only 37% of the Nonrecyclers.

In summary, Recyclers were, on the whole, more knowledgeable than Nonrecyclers about the size of their trash container and the relationship between their monthly garbage fee and the size of their container. On the other hand, both groups were equally aware that recycling *could* reduce the cost of their trash fee and that the hauler did not levy a separate fee for picking up recycled materials. These findings indicate that Nonrecyclers may be less well informed than Recyclers about certain key aspects of recycling activity which, in turn, may explain why they do not participate in the City's curbside program.

Recycling Knowledge

To further explore how the groups differed in their knowledge of recycling, we asked the respondents a series of factual questions about the acceptability of certain materials by the recycling hauler (see Survey Questions 11 a - h). Table 4 depicts the percentage of the two groups giving the correct answer on whether or not each of the seven items could be recycled.

Table 4
Knowledge of Recyclable Materials by Group

Materials	Percent Correct Responses	
	Recyclers (n=110)	Non-Recyclers (n=105)
Cardboard Boxes*	98%	89%
Tin Cans*	95%	80%
Magazines*	88%	65%
Scrap Paper/Junk Mail*	88%	67%
Frozen Food Boxes*	62%	43%
Margarine Tubs	46%	45%
Aerosol Cans	22%	26%

* Recyclers and Non-recyclers differed significantly on these items (p < .01)

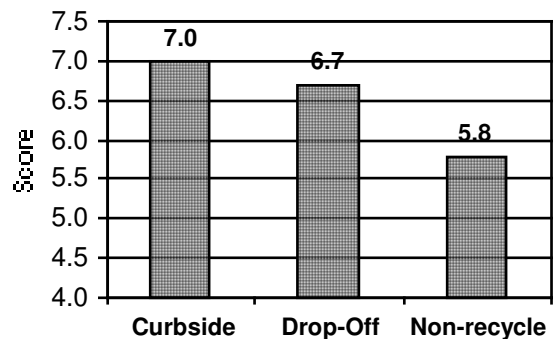
Five of the items (magazines, scrap paper/junk mail, aerosol cans, tin cans and cardboard boxes) are accepted by the hauler, while two (margarine tubs and frozen food boxes) are not.

These findings clearly indicate clearly that Recyclers are much better informed than the Nonrecyclers about the materials accepted in the City's curbside recycling program. With the exception of Aerosol Cans, where the groups do not differ significantly, the percentage of Recyclers who were correct is consistently greater than the Nonrecyclers. On the 5 starred items (magazines, scrap paper/junk mail, tins cans frozen food boxes and cardboard boxes), the difference in favor of the Recyclers is statistically significant. Even in the case of cardboard boxes, where most respondents answered correctly, the difference between the two groups was sufficiently large to reach statistical significance ($p < .01$).

These data were further analyzed by constructing a composite score of the seven items listed in Table 4. In addition, the Nonrecyclers were divided into two groups--those who used the Drop-Off centers and those who didn't. Comparing the groups on this measure indicated that both the Recyclers and the Drop-Off Center recyclers were significantly more knowledgeable than the Nonrecyclers ($p = .0002$). Further comparisons employing this composite measure of recycling knowledge revealed that:

- Respondents who knew the size of their trash container were also more knowledgeable about the acceptable and unacceptable recycling materials.
- Respondents with a higher knowledge index score were more likely to have a 20 gallon trash container.
- A higher score on the knowledge index was significantly ($p = .02$) associated with an increasing likelihood of recycling activity.

Figure 3. Recycling Knowledge



Source of Trustworthy Information

In the interests of learning how to more effectively disseminate information about the City's Recycling Program, we asked the respondents to identify the source of information that they regarded as most trustworthy. Table 5 lists the percentage of respondents who cited each source, as prompted by the interviewer.

Table 5
Most Trustworthy Source of Information

Source	Recyclers (n=106)	Non-Recyclers (n=102)	All Respondents (n=208)
Newspaper	33%	37%	35%
Television	36%	20%	28%
Radio	11%	20%	15%
Friends/Neighbors	9%	9%	9%
Government	5%	7%	6%
Special Interest Group	4%	1%	3%
Other	2%	6%	4%

This evidence indicates that the media in the most general sense is considered the most trustworthy source of information for the majority of respondents. Taken together, the vast majority (78%) responded by citing the newspaper (35%), television (28%), or radio (15%) as their most trustworthy source of information, with the newspaper considered the most trustworthy. While other sources of information were also mentioned, in no case was the percent greater than 10%.

Recycling Motivation

At the conclusion of the survey we asked the respondents to tell us why they did or did not participate in the City's Curbside program. Table 6 depicts the most common reasons the Recyclers gave for participating in the curbside program ranked terms of the most to least frequently cited reason.

Taken together, about half of the Recyclers (51%) reported they were largely motivated by the environmental consequences of their recycling activity. Recyclers said they participated in the curbside program because it reduces waste (27%), preserves the

environment (20%), or conserves resources (3%). The remaining Recyclers (46%) identified personal reasons such as “I like to do it” (26%) and “It’s part of my lifestyle” (20%).

Table 6
Reasons Recyclers Participate in Curbside Program

Reasons	Recyclers (n=110)
Reduces waste, conserves resources, preserves the environment	51%
I like to do it, part of my lifestyle	46%
Other	3%

We posed the alternative form of this question to the Nonrecyclers by asking them to explain why they did *not* participate in the curbside program. Table 7 reveals the Nonrecyclers responses to this question, again, in terms of the prompting categories suggested by the interviewer.

Table 7
Reasons Nonrecyclers Don’t Participate in Curbside Program

Reasons	Nonrecyclers (n=104)
Not enough materials, lack of storage space	31%
No time, don’t feel strongly about it	23%
Don’t understand the program	8%
Other, no response	39%

The Nonrecyclers varied considerably in their response to this question, with almost two-fifths (39%) either uncertain about their reasons or not giving one at all. But of those who did respond, 31% offered reasons relating to their household situation either not having enough materials (21%) or lacking enough storage space (10%). About one-quarter (23%) cited personal reasons such as having no time (16%) or not feeling strongly about the curbside program (7%).

We also asked the Nonrecyclers to tell us what factors, if any might motivate them to begin participating in the City's curbside program. Their responses to this question are shown in Table 8.

Table 8
Factors Promoting Nonrecyclers Participation

Factor	Nonrecyclers (n=104)
More information, more materials	33%
Financial incentive, trash fee reduction	15%
Permit recycling without trash service	2%
Nothing would make a difference	28%
Other, no response	22%

Once again, the Nonrecyclers indicated they were largely influenced by the lack of recyclable materials or recycling information. About one-third (33%) cited these as the major factors that would motivate them to begin participating in the curbside program. However, almost as many (28%) said there wasn't much of anything that would cause them to begin recycling, while 15% indicated they could be induced to participate with a suitable financial incentive or reduction in their trash fee.

We concluded this section of the survey by asking the respondents in both groups what they considered the hardest part of recycling in terms of the categories prompted by the interviewer. Since the groups did not differ significantly in their responses to this question, we have combined them in Table 9.

Table 9
Hardest Part of Recycling

Hardest Part	All Participants (n=177)
Nothing	71%
Too confusing	9%
Limited space/storage	7%
Hard to remember pick-up day	5%
Too much effort	3%
Other, no response	5%

There was a clear consensus (71%) among both Recyclers and Nonrecyclers that there really wasn't anything specific about recycling that made it a difficult task or that it was hard for them to engage in the activity or to start doing so, if they were not already participating. While a few cited the effort involved, the limited space they had, or the fact that it was too confusing, in each case their number was relatively small. This indicates that there is nothing inherently difficult in the curbside program's *procedures* that are preventing many people from participating.

Program Improvements

The final section of the survey asked the respondents to tell us how the City's curbside program could be improved. We asked this question in a very general way and then more *specifically* in terms of how the program might be modified so that they would begin participating or increase their participation even further. Table 10 depicts the responses of both groups to the general form of this question.

Table 10
Suggestions for Improving the Program

Suggestions	Recyclers (n=54)	Non-Recyclers (n=46)	All Respondents (n=100)
Collect more items, such as plastics, Styrofoam or hazardous waste	46%	33%	40%
Simplify procedures by eliminating sorting and label removal	13%	15%	14%
Easy way to get more bins when bins are stolen, bins need lids	11%	13%	12%
More information about recycling procedures	6%	13%	9%
Clarify yard debris procedures, collect on same day, don't charge	9%	9%	9%
No suggestions -- pleased with service and/or use drop-off center	15%	17%	16%

Collecting a greater variety of items is far and away the most frequently recommended improvement for both the Recyclers and the Nonrecyclers. Plastics, hazardous waste and Styrofoam were the most commonly mentioned items that respondents wished to be included in the curbside program. Other suggestions included simplifying procedures to reduce the need for sorting and an easier way to get new bins when they are stolen. Table 10 also indicates that most respondents did not suggest any specific program improvement, which in all likelihood means they are reasonably pleased with the program and its current procedures.

Several from the recycling group (N=8) commented on the litter that is apparently left on the streets and sidewalks on recycling days. Although it is difficult to determine if this is associated with any particular hauler, this concern was voiced from time to time during the course of the interviews.

We also asked the respondents for their specific suggestions on how the program might be improved in a way that would either facilitate their participation or lead them to start

recycling. Only about half of the Recyclers who had responded to the previous question on program improvement also responded to this question. Of these Recyclers:

- 54% indicated they would recycle more materials if the City were to collect other trash, such as plastic, Styrofoam and/or hazardous waste,
- 13% suggested providing a rebate when people recycled,
- 12% suggested reducing the trash collection fee for recycling, and
- 21% suggested a variety of other approaches, such as trying harder themselves, or have better service for Senior and disabled clients.

Thus, for Recyclers, expanding the range of acceptable materials has the greatest potential for facilitating their participation in the curbside program.

In contrast, most of the Nonrecyclers who responded to this question said they would participate if they had bins. Of these Nonrecyclers:

- 25% said they couldn't recycle because they didn't have any bins,
- 17% needed more information about recycling,
- 16% wished that the procedures were simpler, and
- 42% 21% suggested a variety of other approaches, such as trying harder themselves, or have better service for Senior and disabled clients.

The need for bins was also voiced at the end of the survey when we asked all the respondents if they had any further questions. Eleven Recyclers and 22 Nonrecyclers said they needed bins, while 6 respondents in each group asked for the City's Recycling Hotline phone number. These findings suggests there may be a fairly large number of households in the Target Area that do not participate in the curbside program for the simple reason that they do not have the required yellow bins and do not know how to obtain them.

Discussion

Major Findings

This study was designed to assess the differences between households in the N/NE area of Portland that participated in the City's curbside recycling program and those that did not. It was hoped that the findings would provide insights on how to more effectively promote recycling among the relatively large number of nonparticipating households in this area. This section of the Report summarizes the ten most noteworthy findings of the survey and explore their implications for increasing recycling in the Target Area.

Recycling Activity

1. 43% of the original group of Nonrecyclers reported they recycled at drop-off centers.

This unexpected finding indicates that a sizeable number of households in the Target Area are diverting materials from the waste stream, even though they do not participate in the City's curbside program.

2 Nonrecyclers were significantly more likely than Recyclers to report they did not have any yellow bins.

This finding may explain why some households are not participating in the City's curbside program. This interpretation is consistent with the finding that a fair number of Nonrecyclers said they would begin recycling once they had such bins.

Trash Service

3. Recyclers are much more likely than Nonrecyclers to know the size of their trash container.

4. Recyclers are significantly more likely than Nonrecyclers to have a small, 20 gallon trash container.

These two observations suggest that Recyclers are more aware of the relationship between their recycling behavior and waste production than Nonrecyclers. They know they will have less need for a large trash container the more they are able to recycle and that this will, in turn, reduce their monthly trash fee. More than half (56%) of the Recyclers indicated they were aware of this relationship compared to 37% of the Nonrecyclers.

Recycling Knowledge

5. Recyclers are significantly more knowledgeable than Nonrecyclers about the materials accepted in the City's curbside program.

This important finding was true for *both* the original group of Recyclers and the group of Nonrecyclers that reported they recycled at local drop-off centers. This provides additional support for the belief that failure to participate in the curbside program does not always indicate a Nonrecycling household.

6. The more knowledgeable a household is about recycling the more likely it is to engage in recycling activity.

This finding underscores the powerful relationship the recycling knowledge and behavior. A household that is well informed about recycling is more likely to recycle their waste materials than one that is ill informed. As we will note in the next section, this finding has a number of implications for increasing recycling behavior among the nonparticipating households in the Target Area.

7. The media, including television, radio and the newspaper are considered the most trustworthy sources of information by the households in the Target Area.

While there are many factors that govern an individual's acceptance of information, this finding indicates that the media, especially newspaper and television, are regarded as the most trustworthy source of recycling information by the households in the Target Area.

Recycling Motivation

8. Recyclers report their recycling behavior is largely motivated by environmental concerns.

This finding suggests that a pro-environmental theme is likely to be an effective approach in encouraging even greater recycling among the Recyclers. It is reasonable to infer that, when supplemented by specific recycling information, it might also be effectively employed in motivating Nonrecyclers to begin participating in the curbside program.

9. Both Recyclers and Nonrecyclers report their recycling activity would be facilitated and/or initiated if the City's curbside program accepted a greater variety of materials.

This finding was observed consistently at several points during the administration of the survey. Plastics, hazardous waste materials and Styrofoam were the most frequently mentioned materials that respondents wanted to see incorporated in the curbside program.

Program Improvements

10. The collection of a greater range of materials was also the most frequently mentioned recommendation for program improvement by the respondents in both groups.

Recyclers also emphasized this point in identifying specific factors that would be most likely to facilitate their participation in the curbside program. The implications of this widely voiced comment will be considered in following section.

Summary of Findings

- Consistent with previous research, Recyclers in the N/NE areas of Portland were far better informed about recycling than Nonrecyclers. This is clearly the most salient finding of this study. It is reflected in the Recyclers superior knowledge of trash collection, curbside recycling procedures and the relationships between

these two. Further, recycling knowledge is the strongest predictor of whether or not a household will participate in the City's Curbside Program.

- Two situational variables also played a large role in the recycling activity of the households in the Target Area. First, Nonrecycling households were far more likely than Recycling households to need recycling bins. Second, both groups indicated they would recycle more or begin doing so, if a greater range of materials were collected.
- Finally, it is clear there are two classes of Nonrecycling households in the N/NE areas of Portland. The first does not participate in the curbside program and apparently no where else. The second, approximately 43% of the original Nonrecycling sample, also does not participate in the curbside program but does recycle a considerable amount of their household waste at nearby drop off centers.

Promoting Target Area Recycling

These findings have at least three direct implications for improving the overall level of recycling in the Target Area.

Develop a continuously focused information campaign

The Nonrecycling households exhibited a considerable lack of knowledge about how to recycle. It is fair to assume that many were completely in the dark about how to begin recycling and what materials are and are not accepted by the hauler. Accordingly, an educational program should be developed to overcome this information deficit. By making recycling less of a mystery or hassle, households might be more likely to try the activity for the first time and, once they learn *how* to carry it out, continue to practice it in the future.

We acknowledge that there is a good deal of evidence indicating that information campaigns are not sufficient by themselves to promote the adoption of recycling behavior. On the other hand, recent advances in social cognition and social marketing

have identified a variety of conditions that can enhance the impact of information programs. For example, information campaigns through the media have been found to be much less effective than face-to-face communications. This is especially true if individuals are asked to engage in a *new* behavior for the first time. The findings from this area of research, as well as other basic principles of social marketing, should be given careful consideration in planning and implementing an information campaign for the households in the Target Area.

Insure that each household has two recycling bins

The results of the current study revealed there were a sizeable number of households that did not have the bins required to participate in the curbside program. Even when they know why it is important to recycle and know how to participate in the curbside program, they will never be able to do so without these bins. That means that every household should have two yellow bins and know how to obtain replacements if they are lost or stolen.

This could readily be accomplished by having periodic neighborhood distribution programs or timely mailings with stamped return postcards enabling a household to request bins. Further, the recycling hauler might be asked to distribute a note explaining how to obtain additional or replacement bins, especially when a household is observed to be a consistent nonparticipant in the curbside program.

Consider expanding the range of collected materials.

The collection of a wider range of materials was one of the most commonly voiced recommendations by the respondents in both groups. The items most often mentioned in this regard were plastics, hazardous waste and packing materials, especially Styrofoam. We did not probe the respondents to find out if they were aware that these items currently have little economic value and, therefore, cost more to collect than they are worth.

However, in spite of their limited market value, an argument can be made for incorporating these materials in the curbside collection system. Since most households have a considerable amount of these materials, once the City begins collecting them, it is likely that recycling behavior will *generalize* to the other, acceptable materials. This may induce Nonrecyclers to begin participating in the program and may also lead Recyclers to recycle more. This potential "spill over effect" should not be ignored in considering whether or not the collection of currently "unprofitable" materials might, on analysis, turn out to be cost effective.

Additional Considerations

Although none follow as directly from the survey evidence as the preceding three suggestions, there are several other approaches, supported by considerable research and theory (Porter, Leeming & Dwyer, 1995; Oskamp, 1995), that might be also be useful in promoting recycling in the Target Area. They include monetary incentives, goal setting, feedback (Katzev, & Mishima, 1992) and community based social marketing (McKenzie-Mohr & Smith, 1999).

The current author has also approached this and other environmental problems from a social influence perspective. On this account, social conditions play a crucial role in governing recycling. This behavior, like most other actions, almost always takes place in a complex social matrix and the social forces generated by these situations exert considerable influence on behavior. They can transform what otherwise be a relatively weak *impersonal* public information campaign into one that becomes a powerful source of change. This has been widely recognized by investigators who have studied the impact of neighborhood groups and individuals (Burns, 1991) on spreading the adoption of new behaviors. The same is true of public commitment procedures which have been demonstrated to be extremely effective in promoting recycling behavior (Katzev & Pardini, 1987-88).

Conclusion

Taken together with the results of the current study, these approaches suggest there are a number of interventions that might be effectively employed to increase participation in the City's curbside program throughout the N/NE area of Portland. The costs of these low-technology techniques are usually minimal and should, therefore, turn out in the long run to be cost effective. The evidence also suggests that once individuals begin recycling under these conditions, they usually continue doing so on a long-term basis.

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