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# Barriers to Household Waste Recycling: Empirical Evidence from South Africa

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**Abstract:** A small percentage of South Africans regularly recycle most of their recyclables, which was only 4% and 7.2% in 2010 and 2015, respectively. This empirical quantitative study, the first study on this scale in South Africa, aimed to ascertain the reasons why people do not recycle. This paper reports the results from a survey conducted among a representative sample of 2004 respondents in eleven of South Africa's large urban areas. Each respondent selected three main reasons why people do not recycle from ten possible options as well as the one main reason. The results show that (i) insufficient space, (ii) no time, (iii) dirty and untidiness associated with recycling, (iv) lack of recycling knowledge, and (v) inconvenient recycling facilities are perceived as the main reasons why people do not recycle. Non-recycling households (74% of the respondents) give high priority to time and knowledge. Low recyclers—those that sporadically recycle few items—and young South Africans give high priority to services (inconvenient facilities and no curbside collection). Lack of knowledge is an important factor for people from dense settlements as well as the unemployed looking for work. Improved recycling services such as regular curbside collections have the potential to overcome time and space barriers. Recycling services as well as recycling knowledge will have to improve to encourage the youth, the unemployed, and those living in informal areas to recycle and realize the opportunities locked in the waste sector. The perceptions of respondents from non-recycling households differ from those from recycling households. The larger representation of non-recyclers in developing countries emphasize the importance of understanding local evidence when comparing and implementing results from developed countries. The learning from this study could also assist other developing countries to encourage household participation in recycling initiatives.

**Keywords:** quantitative survey; empirical study; developing country; household recycling behavior; reasons; barriers

## 1. Introduction

The waste management hierarchy has been adopted into South African waste legislation [1] as a means to support sustainable development. However, in 2011, an estimated 90% of all waste generated was still being disposed of in landfills [2]. Diverting recyclables from landfills is a worldwide concern in the drive towards a circular economy that strives to keep resources in use for as long as possible through reuse, recycling, and recovery [3–5]. South Africa has successfully grown a recycling economy over the past three decades [6]. In South Africa, about half of all post-consumer packaging waste was recycled in 2012 [7]. However, as is the case in most developing countries, the contribution of the active informal sector is acknowledged in achieving the encouraging recycling figures [8,9]. Growing the circular economy provides opportunities to improve the livelihoods and working conditions of waste pickers as well as to improve the methods used to collect materials for recycling [10]. The South African National Waste Management Strategy (NWMS) set targets for diversion of 25% of recyclables from landfills by 2016 [11], but, due to a lack of accurate waste data, there is no evidence suggesting

that these targets were met. Agenda 2063, which is the 50-year strategic socio-economic transformation framework for Africa, set diversion targets for Africa [12]. The NWMS is in the process of being updated in line with the Agenda 2063 target of 50% diversion of waste from landfill by 2023 [12] and a target of 50% of households separating waste at source by 2023 [13]. For such ambitious targets to be reached, separation of recyclables at source becomes essential. In addition, separation at a household level is an opportunity to improve the quality of the recyclables as well as the working conditions of the informal sector.

Caution should be taken when comparing results from earlier studies when participation in recycling initiatives were mostly voluntary with results from later studies where curbside collection of “multiple materials” were more likely to be the norm [14] (p. 106). In South Africa, to date, household participation in recycling is still voluntary either by taking recyclables to buy-back or drop-off centers [15] or via street collection where such a recycling scheme is available. This voluntary household recycling resulted in 4.0% of South Africans living in the large urban areas recycling their paper and packaging on a regular basis in 2010 [16]. Although there was a decrease in the percentage households that do not recycle—from 74.0% in 2010 to 66.6% in 2015—only 7.2% of South African urban households reported in 2015 that they are dedicated recycling households, i.e., regularly recycling more than half of their recyclable waste [16].

This paper reports results from an empirical study conducted in 2010 on the reasons why households living in large urban areas think South Africans do not recycle. This study on a national level is a first for South Africa. The objective of this study is to ascertain the reasons why South Africans do not recycle, i.e., the barriers to recycling that they experience or perceive to experience. The results from this study will assist decision makers in the waste sector by pointing out possible interventions to encourage household participation in recycling initiatives to reach targets in line with national and African policy objectives.

## 2. Literature on Barriers to Household Recycling

Schultz and co-workers grouped variables having an effect on recycling behavior into personal and situational factors when they reviewed published empirical studies on recycling behavior [14]. Personal factors include attitude towards and beliefs about the environment, knowledge about recycling, taking responsibility, locus of control, and demographic variables (age, gender, income, education, etc.) [14]. Situational factors include the antecedents (e.g., collection method, goal-setting, normative factors, removing of any barriers, prompting) and consequence variables (e.g., rewards, feedback) [14].

Barr differentiated between environmental values, situational variables (which include the behavioral context such as recycling facilities and services, the socio-demographic variables such as age, gender, education, and income, and the knowledge and experience variables) and psychological factors (taking responsibility, altruism, intrinsic motivation, social norm, and self-efficacy or perceived behavioral control, which encompass time, space, and convenience among others) [17]. Results from Barr’s study in the United Kingdom showed that a combination of two psychological factors (perceptions of convenience and acceptance of recycling as a social norm) and two situational factors (curbside collection for recyclables and knowledge of recycling services) are the most likely to increase both intention to recycle and recycling behavior [17].

Godfrey et al. grouped factors with the potential to influence recycling behavior into socio-demographic factors (e.g., age, gender, level of education), recycling facilities and services (also called the behavioral factors), and psychological factors (e.g., values, attitudes) [18].

The examples above show how the clustering of variables that affect recycling behavior differs between studies. For the purpose of this study, reasons for non-recycling obtained from the published literature are grouped into four main issues known as: situational factors at a household level, situational (knowledge), situational factors related to recycling facilities and services, and psychological factors (Table 1).

**Table 1.** Variables or factors affecting recycling behavior.

Issues or Factors	Published Research Findings
Situational factors at a household level	
It takes time to recycle [19–26]	There is an issue of time associated with recycling especially when having to take recyclable materials to a drop-off site. People with more time is more likely to take recyclables to drop-off facilities. Working people have less time to recycle than retired individuals.
Insufficient storage space for recyclables [19–21,23,24,26–28]	Storage space both inside and outside homes becomes a logistical issue. Larger gardens provide more space for storing recycling bins and bags while apartment buildings mostly have a limited space for storing recyclables.
Unpleasant odors, the feeling of untidiness recycling [19,21,23,24]	Possibilities of unpleasant odors and feelings of untidiness is associated with recycling. Perceptions exist that only clean materials can be recycled.
Situational (knowledge)	
Not enough awareness or knowledge about recycling and recycling initiatives [17,20,24,25,27,29–31]	Knowledge of the recycling program, awareness of the location of recycling facilities, and knowing how to and knowing what materials are recyclable is needed. Well targeted communications, door-to-door promotions, regular information and feedback including “how to” messages is needed to improve recycling. The visibility of recycling bins reminds people to put recyclables out.
Situational factors related to recycling facilities and services	
Perceptions of recycling (in)convenience [17,20,24,26,32–35]	Collection of recyclables is perceived as the most convenient (“least-effort”) method for recycling and long distances to recycling centers discourage recycling. Simultaneously, binary sorting of waste is preferred to multi-sorting. Recycling schemes do not consider household preferences. Perceptions that it is inconvenient and requires effort to recycle [12,19,21] can be cancelled out by access to good recycling facilities.
Curbside collection [17,19,24–26,36]	Curbside collection motivates and encourages recycling. Preference for and higher participation rates obtained in collection schemes than in drop-off schemes, e.g., in Scotland, and in the Czech Republic. Curbside schemes counter the time it takes to recycle.
Lack of services/facilities [17,20,26,35]	Access to good recycling facilities encourages recycling behavior. A good recycling service is reliable, convenient, and easy to use. Improving recycling schemes to suit household preferences has greater potential to positively change householders’ recycling behavior than either incentives or penalties.
Psychological factors	
Sense of responsibility [19,29,37]	Both non-recyclers and recyclers feel that recycling is a local authority responsibility. Household waste recycling is everybody’s responsibility. Recyclers show a stronger sense of responsibility—attitudes of “duty”—towards recycling than non-recyclers. Feelings of responsibility is not influenced by the type of facility. It helps to foster recycling behavior if someone in the household constantly reminds everyone to recycle.
Disinterest/cannot be bothered [20,22,25]	Disinterest to recycle is a barrier to recycling and reported, amongst others, in London, Glasgow and Falkirk and Malaysia.
Doubts about whether it would make a difference [25,29,38]	Non-recyclers think it would not make a difference whether they recycle or not. Knowing a household’s recycling contribution makes a difference in the bigger scheme of waste management and encourages recycling behavior. Individuals who feel indifferent to recycling are unlikely to recycle. The challenge is to replace indifference with concern.

### 3. Materials and Methods

#### 3.1. Research Design

This paper ascertains the reasons why South Africans do not recycle. A descriptive quantitative research approach [39] with a fixed form survey [40] was followed. Recycling behavior of the household is obtained from self-reporting on questions relating to frequency, number of materials recycled, and a qualitative measurement of quantities recycled. The initial list of reasons why people do not recycle were obtained from literature (refer to Table 1).

### 3.2. Sampling Method and Data Collection

Ipsos was contracted to include a set of recycling behavior questions in their annual household survey. Using a standard random probability selection procedure, the survey targeted a representative sample of 2000 households in the large cities. Starting points were selected at random and a kish-grid was used to select individual respondents [41]. Due to the survey instrument and representative sample, the results can be generalized to the population [42].

### 3.3. Questionnaire Design

This study considered methods followed in previous studies. While some previous studies allowed respondents to formulate their own perceived barriers to recycling [28,43], others tested several situational and psychological variables, which are thought to have an effect on recycling behavior [17]. In another UK study, respondents indicated three reasons why they recycle or do not recycle and the reasons “ranked according to their popularity to allow comparisons to be made” [24] (p. 64). Kaciak and Kushner followed a qualitative approach to determine barriers to recycling by using open-ended questions such as: “*in your opinion, why do you think others don't recycle?*” [44].

Due to the envisaged sample size of 2000 respondents, the national quantitative survey followed the example of Barr et al. by providing 10 possible pre-selected reasons for non-recycling to choose from [17]. Following Kaciak and Kushner's example [44], the question “*what would you say are the reasons why people do not recycle?*” was phrased in an impersonal manner. First, to prevent a desirability bias which could be caused by feelings of guilt of non-recycling households and, second, to provide respondents that recycle the opportunity to also convey their perceptions about why they think non-recyclers do not recycle. It can be argued that those respondents that recycled at the time of the study would have noted difficulties with recycling they experience from day-to-day as well as the barriers they think others might experience.

The 10 reasons to include was selected as follows: First, a list of possible reasons for non-recycling was compiled from a review of international literature [17,21,28,45–47]. Second, a qualitative pre-study with open-ended questions was conducted [39] to identify gaps in the international literature, to test for relevance, and to adjust phrasing where appropriate for South African circumstances. Third, a set of 10 factors was tested in a pilot study ( $n = 59$ ) where respondents could tick any number of statements with which they agree and circle the most important ones. The results from the pilot study were difficult to analyze because some respondents ticked all 10 options and others ticked one only. This learning was taken forward and the main study was adapted accordingly.

Each respondent was presented with a “show card” on which the 10 possible reasons why people do not recycle were listed. The respondents had the opportunity to study the options before selecting the three main reasons [24] and indicating the most important reason from the selected three reasons. The order of the factors was rotated on the “show card” to ensure that the order of the statements does not bias the response. The structured format of the question with options allows for uniformity in responses from a large sample size within a short period of time [48].

Recycling behavior of the household is calculated from self-reporting on questions relating to frequency, number of materials recycled, and a qualitative measurement of quantities recycled (Appendix A). Demographic information was obtained from the questions included in the standard Ipsos questionnaire.

### 3.4. Data Collection

Face-to-face interviews were conducted in November 2010 at the homes of the respondents. Respondents that refused to participate in the study were substituted using the same probability selection procedure. The participants in the study received a briefing pamphlet, which stated the purpose of the study, how the information will be used, on whose behalf the survey is conducted, and contact details where further information could be obtained. The participants also received assurance

that they would stay anonymous. The data was captured in a manner that could not be linked back to the individual respondent.

### 3.5. Analyses

Each household's recycling behavior for paper and packaging waste is calculated by averaging the frequency of recycling (one variable) and how much of each of four recyclable materials, namely paper, plastic, glass, and metal (four variables), is recycled. The households are then grouped into clusters based on their recycling behavior [26,49]. One group comprises the households that reported no recycling behavior ( $B = 1$ ). The recycling households ( $B > 1$ ) are further grouped into three groups, according to their various levels of reported recycling behavior. Borrowing from both Thomas and co-workers' description of high, medium, and low recyclers [49] and Martin and co-workers' description of full (recycle five materials including plastic, paper, glass, cans, and cardboard), casual (recycle 1 to 4 materials), and non-recyclers (recycle no items) [26], for this study, the terms with definitions are adopted as follows:

- High recycling households with dedicated recycling activity: often or more regularly recycle more than half of their recyclables, i.e., behavior score greater than 4, up to and including 7, and selected to conform with results previously reported [16],
- Medium recycling households with casual recycling activity: the group between the sporadic and dedicated recycling households, i.e., behavior score of 2 to 4,
- Low recycling households with sporadic recycling activity: seldom or almost never recycle very little of one recyclable material only, i.e., behavior score greater than 1 but smaller than 2, and
- Non-recycling households with no recycling activity: never recycle i.e., behavior score of 1.

For the purpose of this paper, the segmentation into groups diverts from the Thomas et al. example [49] by also differentiating between the non-recyclers ( $B = 1$ ) and the low (sporadic) recyclers. These two groups were analyzed separately because the large number of non-recycling households would overshadow the responses from the sporadic-recyclers. The author's classification also differs from the Martin et al. example [26] by splitting off a group called the sporadic recyclers (the households that almost never/seldom recycle very little/some of one material) from the casual recyclers (those households that recycle more materials and more frequently than the casual recyclers but less than the dedicated recyclers).

Using MS Excel, the total number of times each reason for non-recycling was selected was calculated and expressed as a percentage of the total number of reasons mentioned. First, the total number of times an item was selected as the one most important reason was expressed as a percentage of the total number of responses. Second, each of the three most important reasons selected was totaled and each statement expressed as a percentage of the total number of reasons mentioned. These calculations were repeated for the total sample group ( $n = 2004$ ) as well as for each of the sub-groups as described above. According to the popularity of each selected reason, i.e., times selected, the factors were ranked [24] (p. 64).

### 3.6. Research Ethics

The impersonal phrasing of the question "what would you say are the reasons why people do not recycle?" has value in an ethical sense by not putting the respondents in a position where they feel guilty about their personal recycling behavior. It can also be argued that respondents would be more willing to share information and share it accurately with less desirability bias when a question is posed in a more impersonal manner. However, a more direct question: "why don't you recycle?" would have allowed a more confident comparison. Due to the impersonal phrasing of the question, interpretation of the results should thus be done with caution by keeping in mind that the results portrayed are the perceptions of the respective groups about the "people" and not their perceptions or knowledge about the specific group within which they are placed.

### 3.7. Assumptions

The assumption is made that the respondent as an individual (i) is an accurate proxy for his/her household’s recycling behavior and (ii) answered the question from the perspective of someone with the specific recycling behavior.

## 4. Results and Discussion

The demographic representation of the sample is shown in Appendix B.

### 4.1. Recycling Behaviour

The results show that 26.0% of South African households living in large urban areas recycle varying quantities of materials at varying intervals while 74.0% of households never recycle (Table 2). Additionally, 4.0% of the respondents come from high recycling households with a dedicated recycling behavior. The respondents from households with medium or casual recycling activity comprise 14.2% of the total sample and those with low or sporadic recycling activity comprise 7.8% of households tested. The majority (74.0%) of the respondents represents households not recycling any of their household waste (non-recycling households). These sub-groups are used to portray the results in the following sections.

**Table 2.** Descriptive statistics for the total sample and sub-categories.

Respondents from	Sample Size (n)	Percentage of Sample (%)	Recycling Behavior Score (B) *	x-Bar
All households	2004	100%	1–7	1.46
High recycling households (dedicated recycling activity)	81	4.0%	5–7	5.11
Medium recycling households (casual recycling activity)	284	14.2%	2–4	2.89
Low recycling households (sporadic recycling activity)	157	7.8%	>1–<2	1.48
Non-recycling households (no recycling activity)	1482	74.0%	1	1

\* for paper and packaging recyclables where 7 = best possible score for recycling activity and 1 = no recycling activity.

In the bottom group of recycling households—the low or sporadic recyclers—the behavior score band of between 1 and 2 is very narrow in comparison with the dedicated recyclers (5 to 7). This is because of the relatively small percentage of households that separate their recyclables in South Africa in comparison with many developed countries. For example, both the UK studies reported much higher percentages of recycling households [26,49] when compared to this South African study.

### 4.2. Perceived Barriers to Recycling—All Respondents

Results from the selected (i) one most important reason, and (ii) three main reasons why people do not recycle are discussed below.

#### (i) The One Most Important Reason

From 10 options, 28.1% of the respondents selected *no time* (ranked first) as the one most important reason why people do not recycle, followed by *a lack of knowledge* (14.0%, ranked second), *insufficient space* (12.5%, ranked third), *facilities inconvenient* (10.4%, ranked fourth) and *not responsible* (8.6%, ranked fifth) (Table 3). These five factors attracted almost three quarters (73.6%) of the responses. These results, drawn from a large percentage of the respondents, suggest that a combination of these five factors is required to enable households to recycle. The high percentage of respondents selecting *no time* as compared to the other factors shows that, although there are several barriers that could possibly prevent household recycling, the perception is that recycling is a time consuming activity.

This finding is not unique to this study, which suggests that factors deterring household recycling behavior are not country specific. In Bangladesh, where 25.6% of the respondents indicated that they recycle sporadically or more often despite not having a convenient recycling scheme, lack of time (38.49%) and no space in the home (37.2%) are the main reasons for not recycling [50]. A Malaysian study found that inadequate facilities (30.9% of the respondents), followed by inconvenience/no time (25.2%), lack of information (10.8%), too much effort needed (10.3%), and not interested (9.4%) are the main reason why people in Penang do not recycle [51].

**Table 3.** Perceptions why people do not recycle—order of priority (rank) of the one most important reason.

Reasons Why People Do Not Recycle: The One Most Important Reason	All Respondents (n = 2004)		Respondents from Recycling Households (n = 522)		Respondents from Non-Recycling Households (n = 1482)	
	%	Rank *	%	Rank *	%	Rank *
They do not have the time to recycle (no time)	28.1	1	24.3	1	29.4	1
They do not know what can and what cannot be recycled (lack of knowledge)	14.0	2	13.4	3	14.2	2
They lack space to keep the recyclables (insufficient space)	12.5	3	14.4	2	11.8	3
Recycling facilities are inconvenient (facilities inconvenient)	10.4	4	9.8	4	10.6	4
They are not responsible for recycling in their households (not responsible)	8.6	5	8.6	5	8.6	5
Keeping the materials until it is recycled is dirty and untidy (dirty and untidiness)	7.8	6	6.7	6	8.2	6
They do not have a curbside collection service for recyclables (no curbside service)	5.4	7	6.3	8	5.1	7
They think it will not make a difference whether they recycle or not (it makes no difference)	5.1	8	6.5	7	4.7	8
They cannot be bothered (not bothered)	4.8	9	5.9	9	4.4	9
Recycling services does not exist (no service)	3.3	10	4.0	10	3.0	10
Total percentage represented by the factors ranked 1 to 5	73.6	1–5	70.5	1–5	74.6	1–5

\* Ranked from 1 to 10 including from the highest to the lowest percentage of respondents selecting each option.

The low percentage (3.3%, ranked 10th) of respondents selecting *no service* suggests that recycling services exist, but this does not ignore the fact that recycling facilities are perceived to be inconvenient (*facilities inconvenient*, ranked fifth) or is not the kind of service respondents would prefer (e.g., *no curbside collection*, ranked seventh).

Due to the high percentage (74.0%, Table 2) of non-recycling households in South Africa, the results are dominated by perceptions originating from non-recycling households. However, the results show that the same five reasons were selected the most by the respondents from both recycling and non-recycling households. However, respondents from recycling households give higher priority to *insufficient space* (with 14.4% ranked second following *no time* 24.3%, ranked first) than to *lack of knowledge* (13.4%, ranked third). This could imply that recycling households already have the knowledge that enable them to recycle, but the space the recyclables take up and the time it takes to recycle is something they are confronted with on an ongoing daily basis.

(ii) The Three Main Reasons

The results from the three main reasons (Table 4) show that the three situational factors at household level, which includes *no space*, *no time*, and *dirty and untidy*, are the main reasons why people do not recycle. The priority given to these three factors suggest that in-house barriers carry much weight when it comes to the recycling of household waste. *Lack of knowledge* of what can and cannot be recycled and *inconvenient recycling facilities* are also important reasons why people do not recycle. The results from the quantitative national survey suggest that factors that would assist with in-house management of separation at the source combined with the necessary knowledge and a convenient recycling facility would encourage household recycling. This finding is in line with the findings of international studies where lack of space [28], no time [23], dirty and unhygienic [43], lack of knowledge [27,29], and inconvenient recycling facilities [26,35] were identified as barriers to household recycling.

**Table 4.** Perceptions why people do not recycle—order of priority (rank) of the three main reasons.

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	All Respondents Total Sample Group (n = 2004)		Respondents from Recycling Households (n = 522)		Respondents from Non-Recycling Households (n = 1482)	
	% **	Rank *	% **	Rank *	% **	Rank *
They lack space to keep the recyclables (insufficient space)	15.0	1	14.6	1	15.1	1
They do not have the time to recycle (no time)	14.9	2	14.2	2	15.1	1
Keeping the materials until it is recycled is dirty and untidy (dirty and untidy)	12.4	3	11.6	4	12.7	3
They do not know what can and what cannot be recycled (lack of knowledge)	12.3	4	11.8	3	12.5	4
Recycling facilities are inconvenient (facilities inconvenient)	10.8	5	10.8	5	10.8	5
They think it will not make a difference whether they recycle or not (makes no difference)	8.0	6	9.4	6	7.6	7
They do not have a curbside collection service for recyclables (no curbside collection)	7.9	7	7.8	7	7.9	6
They are not responsible for recycling in their households (not responsible)	7.0	8	6.5	9	7.2	8
They cannot be bothered (not bothered)	6.9	9	7.6	8	6.7	9
Recycling services do not exist (no service)	4.8	10	5.7	10	4.4	10
Total responses represented by the factors ranked 1 to 5	65.4	1–5	63.0	1–5	66.2	1–5

\* Ranked from 1 to 10 from the highest to the lowest percentage of responses for each option. \*\* The three selected reasons totalled and expressed as a percentage of the total responses (three per respondent).

The combined effect of the three main reasons (Table 4) has a moderating or tempering effect on the results and shows which factors, apart from the most important reason (Table 3), contribute to why households do not recycle. Thus, the results from the selected three main reasons show which reasons, apart from the one which dominates, act as important barriers to household recycling. The small difference between the highest and lowest percentages (15% – 4.8% = 10.2%) could also be an indication that these 10 statements are all relevant and valid reasons why people do not recycle and that barriers to recycling could be context-specific.



Considering the responses from the total sample group, *insufficient space* attracted 15% of the responses (ranked first), followed by *no time* (14.9%, ranked second), *dirty and untidy* (12.4%, ranked third), *lack of knowledge* (12.3%, ranked fourth) and *facilities inconvenient* (10.8%, ranked fifth).

Similar to the results from the one most important reason, the results from both the recycling and non-recycling households show the same five factors as the main reasons why people do not recycle but with slight variation in ranking order. The main difference is that *lack of knowledge* (11.8%, ranked third) appears to be a more important factor among recycling households than *dirty and untidy* (11.6%, ranked fourth) but only marginally.

A comparison between the results from the one most important reason and the three main reasons shows that: *dirty and untidy*, ranked sixth in selecting the one most important reason, moved to third place when the three main reasons are considered. *Not responsible* (ranked fifth) as one of the top five reasons why people do not recycle moved to eighth place. In both, *not bothered* (6.9%) and *no service* (4.8%) are selected the least (ranked 9th and 10th, respectively) except for recycling households who acknowledge more so than non-recycling households that somewhat of a “bother” is needed (with 7.6% of the respondents selecting this factor, ranked eighth).

The five reasons receiving highest priority in this study are similar to Perrin and Barton’s finding that inconvenience/no time, inconvenient or inadequate recycling facilities, storage/handling problems and lack of information were, in the absence of a curbside recycling scheme, the main reasons why people do not recycle [24]. Perrin and Barton conclude that convenience encompass several factors such as recycling scheme design, the level of knowledge a household needs to be able to participate in a recycling scheme, and the in-house handling of the recyclables [24]. All these convenience “barriers can be overcome with the introduction of a curbside recycling scheme which suits local circumstances” [24] (p. 65).

Personal responsibility normally motivates people to recycle more [52]. However, the data suggests that a sense of responsibility has a low priority among respondents from both recycling and non-recycling households in South Africa and, thus, is unlikely to be strong enough to overshadow the in-house difficulties as well as the difficulties experienced with services at this point in time in household recycling behavior in South Africa.

#### 4.3. Perceived Barriers to Recycling—Recycling Households

Results from the separate analysis of the three sub-groups (high/dedicated, medium/casual, and low/sporadic) representing the recycling households bring nuances to the foreground, which would otherwise have been lost. Differentiating between the various levels of recycling households, results from the selected (i) one most important reason why people do not recycle and (ii) the three main reasons are shown and discussed below.

##### (i) The One Most Important Reason

The results show *no time* as having priority by all sub-groups as the one most important reason why people do not recycle (Table 5). The main differences between the sub-groups are that low recycling households give higher priority to *lack of knowledge* (ranked second) and *facilities inconvenient* (ranked third) than both the medium and high recycling households (ranked third and fourth, respectively). *Sufficient space* moves to the fifth ranked position among the low recycling households, likely because they recycle so sporadically that space to keep recyclables is outweighed by the other more pressing factors, which hamper recycling behavior such as *no time*, *lack of knowledge*, *facilities inconvenient*, and *not responsible*. *Insufficient space* also shares the fifth ranked place with *it makes no difference* and *no curbside service*.

**Table 5.** Comparing perceptions why people do not recycle across varying recycling levels—order of priority (rank) of the one most important reason.

Reasons Why People Do Not Recycle: The One Most Important Reason	Respondents From							
	All Recycling Households (n = 522)		High Recycling Households (n = 81)		Medium Recycling Households (n = 284)		Low Recycling Households (n = 157)	
	%	Rank *	%	Rank *	%	Rank *	%	Rank *
No time	24.3	1	25.9	1	23.2	1	25.5	1
Insufficient space	14.4	2	21.0	2	15.9	2	8.3	5
Lack of knowledge	13.4	3	13.6	3	14.1	3	12.1	2
Facilities inconvenient	9.8	4	7.4	4	9.9	4	10.8	3
Not responsible	8.6	5	7.4	4	8.8	5	8.9	4
Dirty and untidy	6.7	6	6.2	7	7.0	6	6.4	9
It makes no difference	6.5	7	7.4	4	5.3	9	8.3	5
No curbside service	6.3	8	3.7	8	6.0	7	8.3	5
Not bothered	5.9	9	3.7	8	5.6	8	7.6	8
No service	4.0	10	3.7	8	4.2	10	3.8	10

\* Ranked from 1 to 10 from the highest to the lowest percentage of responses for each option.

These results suggest that, apart from the time and knowledge needed to be able to recycle, households’ understanding of the difference their recycling efforts can make and that they need to take responsibility for recycling are important factors to trigger or encourage household recycling. In addition, a curbside collection for recyclables or any other equally convenient recycling facility has the potential to motivate households that never or sporadically recycle to start to recycle or to recycle more regularly. The results also suggest that respondents from high and medium recycling households ascribe lower priority (rank) to *no curbside service*, which could be an indication that these respondents perceive their recycling facilities to be more convenient than the low recycling households.

(ii) *The Three Main Reasons*

*Facilities inconvenient* received a higher priority among the low recycling households (12.3%, ranked fourth) compared to both the medium (10.7%, ranked fifth) and high recycling households (8.2%, ranked eighth) (Table 6). Similarly, *no curbside service* received a higher priority among the low recycling households (9.8%, ranked fifth) compared to both the medium (7.4%, ranked seventh) and the high recycling households (5.4%, ranked ninth). Although ranked ninth, *no service* attracted 6.6% of the responses from the low recycling households. In total, the service/facility related factors received 28.7% of the total responses from the low recycling households compared to 17.3% from the high recycling households. The large difference in priority between the low and high recycling households of the service/facility factors is in line with findings from UK studies, which suggest that low recyclers are more likely to report problems related to recycling services [49] and high recyclers are more satisfied with their recycling schemes [26]. These findings suggest that an improved recycling service is one of the major interventions needed to improve recycling behavior in South Africa. Several international studies highlight the importance of convenient recycling facilities especially for the low-recycling and non-recycling households [43,53]. However, it is not only access to a curbside recycling service but also awareness of other recycling facilities and especially the perceptions held of the convenience of these facilities that determine people’s recycling behavior [17,54]. The reliability of a curbside scheme is important and especially the “lower-participating recyclers” prefer a weekly collection service, which could be a convenience preference or an indication of lack of space to store recyclables for longer periods [26] (p. 380).

While services received higher priority among the low recycling households, the results show that the combination of three factors known as *insufficient space*, *no time*, and *dirty and untidiness* attracted 44.1%, 42.1%, and 35.2% of the responses from the high, medium, and low recycling households, respectively. Thus, these in-house convenience factors appear to be more of an issue among the high recycling households. It is suggested that, as the low recycling households start to recycle

more regularly and at higher volumes, these in-house convenience factors will also become more of an issue and might overshadow other relevant barriers, which is seen in the results from the high recycling households.

**Table 6.** Comparing perceptions why people do not recycle across varying recycling levels—order of priority (rank) of the three main reasons why people do not recycle.

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Responses from Respondents Representing							
	All Recycling Households (n = 522)		High Recycling Households (n = 81)		Medium Recycling Households (n = 284)		Low Recycling Households (n = 157)	
	% **	Rank *	% **	Rank *	% **	Rank *	% **	Rank *
Insufficient space	14.6	1	14.8	2	15.4	1	13.2	1
No time	14.2	2	16.1	1	14.3	2	12.9	2
Lack of knowledge	11.8	3	12.3	4	11.0	4	12.9	2
Dirty and untidy	11.6	4	13.2	3	12.4	3	9.1	6
Facilities inconvenient	10.8	5	8.2	8	10.7	5	12.3	4
It makes no difference	9.4	6	8.6	6	9.7	6	9.1	6
No curbside service	7.8	7	5.4	9	7.4	7	9.8	5
Not bothered	7.6	8	9.1	5	7.1	8	7.9	8
Not responsible	6.5	9	8.6	6	6.1	9	6.2	10
No service	5.7	10	3.7	10	5.9	10	6.6	9

\* Ranked from 1 to 10 from the highest to the lowest percentage of responses for each option. \*\* The three selected reasons totalled and expressed as a percentage of the total responses (three per respondent).

Lack of knowledge attracted responses as follows: low recycling households, 12.9% (ranked second), medium recycling households, 11.0% (ranked fourth), and high recycling households, 12.3% (ranked fourth). Although there is a difference in the ranking which indicates priority, the percentage responses are similar and show that a lack of knowledge is perceived as an important reason why people do not recycle by all recycling sub-groups. This is in line with findings by Clarke and Maantay [55] who recorded the lack of knowledge of what is recyclable in both areas with low and high participation in recycling initiatives and, thus, suggests that both recycling and non-recycling households perceive a lack of knowledge as a barrier to recycling.

With *not bothered* (9.1%) ranked fifth, and *not responsible* and *it makes no difference* sharing the sixth rank (8.6%), the high recycling households appear to be very aware that being bothered, taking responsibility for recycling in the household, and an understanding that every household can contribute is needed to activate and improve recycling behavior. *It makes no difference* is ranked sixth by sub-groups. Although not among the first five, this factor (*it makes no difference*) attracted more than 9% of all the recycling household responses. Perceptions that a household’s recycling does not make a difference has the potential to be turned around with well-targeted communications to improve recycling behavior. The difference in the results between the recycling household sub-groups shows how people’s perceptions could change once they become involved in and have more experience in household recycling.

What stands out in the comparison between the sub-groups is the small difference of seven percentage points (13.2% – 6.2% = 7.0%) between the responses of the lowest and the highest ranked factors of the low recycling households when compared to more than 12 percentage points (16.1% – 3.7% = 12.4%) of the high recycling households. The group of medium recyclers is in-between the high and low recycling households with 9.5 percentage points (15.4% – 5.9% = 9.5%). This suggests that low recycling households find all 10 options more relevant as barriers to their recycling behavior and more so than the high recycling households. It also suggests that dedicated recycling households have managed to overcome these barriers that still prevent low recycling households to recycle more and do not perceive these as barriers to household recycling anymore.

#### 4.4. Demographic Variables and Perceived Barriers to Recycling

Considering the socio-demographics variables (Tables A1–A9 in Appendix C), analysis of the selected three main reasons why people do not recycle show that the same five factors known as *no time*, *insufficient space*, *dirty and untidiness*, *lack of knowledge*, and *facilities inconvenient* are selected the most. However, these five factors are not always in the same order of priority as the responses from the total sample group (as shown in Table 4) and there are a few exceptions where one of these five is replaced by another factor. While the data suggest that there is no major difference in perceptions about the reasons why people do not recycle, the largest deviations from the all respondents' order of priority are highlighted below.

- Age (Table A1): The respondents older than 60 appear to be, after *no time*, more concerned about the *dirty and untidiness* (ranked second) and *lack of knowledge* (ranked third), and less about *insufficient space* (ranked fourth). The age group 16–19 is more concerned about *facilities inconvenient* (ranked third) and less about the *dirty and untidiness* (ranked fifth).
- Gender (Table A2): The male respondents appear to be slightly more concerned about *insufficient space* (ranked first) and female respondents appear to be more concerned about the *time* and *knowledge* factors (ranked second and third, respectively).
- Type of dwelling (Table A3): The respondents living in flats are less concerned about *insufficient space* and *no time* (ranked third and fifth, respectively) and give higher priority to *lack of knowledge* (ranked first), *dirty and untidiness* (ranked second), and *facilities inconvenient* (ranked fourth). Those living in informal housing structures (squatter huts or shacks) also give higher priority to *lack of knowledge* (ranked second, after *insufficient space*, ranked first). The data suggests that those living in hostels, hotels, boarding houses, and compounds might not share the same perceptions as the majority, but the sample sizes of these groups are too small to be able to make meaningful deductions.
- Area type (urban formal and urban informal) (Table A4): Although these two groups share the same reasons among the five with the highest priority, the respondents from the urban informal areas appear to be more concerned about *insufficient space* (ranked first) and *lack of knowledge* (ranked second) and less about *no time* (ranked fourth) as reasons why people do not recycle.
- Employment status (Table A5): *Lack of knowledge* has higher priority among those working part-time (ranked second), the unemployed looking for work (ranked second), the housewives (ranked third), and the retired (ranked third). The unemployed not looking for work is more concerned about the *facilities inconvenient* factor (ranked third).
- Level of education (Table A6): The respondents without any schooling selected reasons why people do not recycle which, apart from the first three (*insufficient space*, *no time*, and *lack of knowledge*) differ from the order of priority of all the respondents. *Not bothered* and *it makes no difference* (both ranked fourth) have higher priority among those without any schooling. Among those with some primary schooling, *not responsible* has a higher priority (ranked fifth). Respondents with a completed diploma or degree ascribed less importance to *lack of knowledge* (ranked sixth) and gave higher priority to a *curbside service* (ranked fourth).
- Marital status (Table A7): The respondents that are single give higher priority to *lack of knowledge* (ranked third). *Lack of knowledge* is also a concern among those living together (ranked first). The widowed give higher priority to *no curbside service* (ranked fifth) while, among the divorced, both *facilities inconvenient* and *no curbside service* have higher priority (ranked second and fifth, respectively). Among the respondents that are separated, *no time* (ranked eighth) appears to be less of an issue, but they are more concerned about *it makes no difference* (ranked third). Whether the latter could be ascribed to a temporarily cynical outlook was not tested.
- Ethnic group (Table A8): Concern about the level of convenience appears to be the main difference between ethnic groups. The Indian/Asian and colored respondents give higher priority to the factor *facilities inconvenient*, (ranked second and fourth, respectively) while, among WHITE people,

*no curbside service* has a higher priority (ranked third). Being a representative sample, BLACK respondents makes up the largest percentage and thus dominate the order of priority of all the respondents.

- Occupation group (Table A9): The perception among those with a professional occupation is that *lack of knowledge* and *not bothered* are major factors that prevent people from recycling (both ranked third). Among the executives and managers, *lack of knowledge* appears to be less of an issue (ranked sixth) but *facilities inconvenient* and *no curbside service* have higher priority (ranked third and fourth, respectively). The semi-skilled are more concerned about *makes no difference* (ranked fifth). Among the unskilled respondents, on the ranking list, *lack of knowledge* shares the first place with *no time*. The factor *not responsible* also has higher priority (ranked fifth). The self-employed perceive *insufficient space* as less of a concern (ranked seventh) while *dirty and untidy* (ranked first) and *no curbside service* has higher priority (ranked fourth).

Given the rate of urbanization, the priority of *lack of knowledge* among those living in flats, informal housing structures, and in informal areas is an important finding. In addition, the data suggest that *not bothered* and *it makes no difference* as well as *not responsible* are factors that need attention among the unschooled and those with some primary school education. Oke and Kruijssen emphasize the need for the right kind of information [56], i.e., why it is important to recycle and why households should recycle in addition to the what, how, when, and where messages. The challenge would be to find alternative ways of communicating with the illiterate to get these messages across.

The *no time* factor is ranked the highest among the respondents working full-time and part-time. Kaciak and Kushner highlights the fact that inconvenience is a major barrier to recycling and that it has the ability to override the best personal intentions to recycle [44]. Therefore, in the absence of a street collection service and given the importance of time, the location and maintenance of recycling centers are crucial to encourage continued household recycling.

## 5. Conclusions and Recommendations

*No time* stands out as the one most important reason why people do not recycle, but analysis of the selected three most important reasons of the quantitative survey results show that (i) *insufficient space*, (ii) *no time*, (iii) *the dirty and untidiness* associated with recycling, (iv) *lack of knowledge*, and (v) *inconvenient recycling facilities* are the main reasons why people do not recycle. Being a representative sample of the South African urban population, the large percentage of non-recycling households dominates the results. Improved and more convenient services such as regular curbside collections might encourage low recyclers to recycle more while improved services could also be a solution for both the time and space problem that households currently either experience or envision to experience should they recycle.

The uniqueness of this study lies in the sample being representative of the South African population residing in large urban areas. Although desirability bias in answering the behavioral questions is possible, the chance of overrepresentation of recycling households is small in relation to compulsory postal or on-line surveys that focus on recycling behavior.

In the South African urban setting, household recycling is mostly voluntary and is even more so in rural areas. This empirical study highlights reasons why people do not recycle, which are useful for decision-making in South Africa. The fact that the findings of this study are in line with the findings from similar international studies underscores the value of this research for other countries especially developing countries that want to improve recycling participation.

The implication for developing countries is that recycling services as well as communications towards more knowledge will have to improve to get the buy-in from a larger percentage of the population to start recycling or to recycle more than they currently do. Knowledge about what is recyclable and the convenience of recycling facilities are important factors among the youth, the unemployed, and those in the informal urban areas. Thus, the waste sector has great potential to play a role towards job creation and poverty alleviation through recycling initiatives among the

youth and the unemployed and especially in the informal urban areas. Communications for the semi-skilled and unskilled as well as the unschooled and semi-schooled should focus on why it is important to recycle—that recycling can make a difference—and why it is important to care and to take responsibility for recycling.

Equality in waste recycling services is still something to strive for in South Africa. Until such time that all households have access to recycling services of comparable convenience, it is and will remain difficult to compare recycling behavior among South Africans, between South Africa and other developing countries, and between South Africa and countries with mature recycling services. Since caution should be taken to compare results between studies with varying recycling scheme maturity [14], caution should also be taken to implement results and conclusions from developed countries and results in developing countries.

It is recommended that this quantitative study is repeated in 2020 to ascertain any change in recycling behavior and to also expand the survey to include rural towns to determine whether similar perceptions about why people from South Africa do not recycle exist in the smaller centra. Expanding the list of factors would be an improvement to the survey. However, there is a trade-off between functionality and length of the list of factors to choose from.

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## Appendix A

### Questionnaire

Thinking of your household, would you say that your household recycles the recyclable materials from your household waste?	1. Never	1
	2. Almost never	2
	3. Seldom	3
	4. Sometimes	4
	5. Often	5
	6. Almost always	6
	7. Always	7
	8. Don't know (do not read out)	

### For Each of the Recyclable Materials, Choose the Statement that Best Describes How Much Your Household Recycles

Statements of How Much Is Recycled	Recyclable Material			
	Paper	Glass	Metal	Plastic
My household recycles <b>nothing</b>	1	1	1	1
My household recycles <b>very little</b> of what can be recycled	2	2	2	2
My household recycles <b>some</b> things that can be recycled	3	3	3	3
My household recycles <b>about half</b> of everything that can be recycled	4	4	4	4
My household recycles <b>most</b> of everything that can be recycled	5	5	5	5
My household recycles <b>almost all</b> of what can be recycled	6	6	6	6
My household recycles <b>everything</b> that can be recycled	7	7	7	7

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**Which of the Following Would You Say Are the Reasons Why People Do Not Recycle and Which One Is the Most Important Reason Why People Do Not Recycle? (Choose the 3 Most Important Reasons and Mark in Order of Importance with One Being the Most Important Reason.)**

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One Mention Per Number Only	1st	2nd	3rd
1. They do not have the time			
2. They are not responsible for recycling in their households			
3. They do not know what can and what cannot be recycled			
4. Recycling facilities are inconvenient			
5. They lack space to keep the recyclables			
6. Keeping the materials until it is recycled is dirty and untidy			
7. They think that it will not make a difference whether they recycle or not			
8. They cannot be bothered			
9. Recycling services are poor or do not exist			
10. They do not have a pavement collection service for recyclables			

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Note: order of options 1 to 10 is rotated on show cards.

**Appendix B**

**Demographic composition of the sample:**

Age: 16–19 y 7.6%, 20–29 y 24.2%, 30–39 y 23.9%, 40–49 y 19.0%, 50–59 y 11.3%, >60 y 13.7%.

Gender: male 50%, female 50%.

Type of dwelling: house/townhouse 60.5%, flat 4.2%, matchbox/RDP 17.4%, hostel 0.6%, hotel/boarding house <0.1%, compound 0.2%, room in backyard 2.8%, squatter hut/shack 13.8%, other 0.5%.

Area type: urban formal 84.0%, urban informal 15.9%, no answer/refused 0.1%.

Employment status: working full-time 33.2%, working part-time 11.6%, housewife 6.3%, student 9.9%, retired 11.6%, unemployed looking for work 24.0%, unemployed not looking for work 3.4%.

Education: no schooling 1.4%, some primary schooling 5.6%, primary school completed 5.7%, some high school 36.2%, Grade 12 33.8%, Artisans certificate completed 3.6%, diploma/degree completed 13.2%, other 0.3%.

Marital status: single 44.8%, married 36.5%, living together 8.8%, widowed 6.8%, divorced 2.2%, separated 0.9%.

Population: Black 66.8%, White 14.5%, Colored 12.7%, Indian/Asian 6.0%.

Occupation group: professional 2.5%, executive/managerial 3.8%, clerical/sales 12.0%, tradesman 7.1%, semi-skilled 8.4%, unskilled 6.9%, self-employed 2.2%, refused 1.8%, not answered (housewife/student/retired/unemployed) 55.2%.

Appendix C

**Table A1.** Reasons why people do not recycle as enumerated per age group (*n* = 2003 \*).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the Ten Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups											
	16–19 Years ( <i>n</i> = 154)		20–29 Years ( <i>n</i> = 486)		30–39 Years ( <i>n</i> = 478)		40–49 Years ( <i>n</i> = 381)		50–59 Years ( <i>n</i> = 228)		60+ Years ( <i>n</i> = 276)	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Insufficient space	14.7	1	16.1	1	15.0	2	15.3	1	14.9	1	12.6	4
No time	14.5	2	15.9	2	15.1	1	14.3	2	13.5	2	14.6	1
Dirty and untidy	11.5	5	12.7	3	12.3	4	11.7	3	12.7	4	13.5	2
Lack of knowledge	12.1	4	12.5	4	13.2	3	11.2	4	11.3	3	12.9	3
Facilities inconvenient	13.2	3	10.1	5	10.2	5	10.9	5	11.5	5	11.0	5
It makes no difference	9.5	6	7.9	6	7.7	9	8.8	7	7.9	7	7.0	9
No curbside collection	7.1	7	6.7	9	8.3	6	9.0	6	8.2	6	7.6	7
No responsibility	6.7	8	7.1	7	6.8	8	6.7	9	7.7	8	7.4	8
Not bothered	6.3	9	7.0	8	6.8	8	6.9	8	6.3	9	8.1	6
No service	4.3	10	3.9	10	4.6	10	5.2	10	6.0	10	5.3	10

\* One respondent refused age.

**Table A2.** Reasons why people do not recycle as enumerated per gender group (*n* = 2004).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups			
	Male ( <i>n</i> = 1002)		Female ( <i>n</i> = 1002)	
	%	Rank	%	Rank
Insufficient space	15.2	1	14.7	2
No time	14.8	2	14.9	1
Dirty and untidy	11.9	3	12.9	3
Lack of knowledge	11.8	4	12.9	3
Facilities inconvenient	10.8	5	10.8	5
It makes no difference	8.8	6	7.3	7
No kerbside collection	7.8	7	7.9	6
No responsibility	7.2	9	6.8	8
Not bothered	7.4	8	6.5	9
No service	4.2	10	5.3	10



**Table A3.** Reasons why people do not recycle as enumerated per type of dwelling (*n* = 2004).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups																	
	House/Cluster House/Townhouse ( <i>n</i> = 1213)		Flat ( <i>n</i> = 85)		Matchbox/Improved Matchbox/RDP ( <i>n</i> = 348)		Hostel ( <i>n</i> = 12) *		Hotel/Boarding House ( <i>n</i> = 1) *		Compound ( <i>n</i> = 3) *		Room in Backyard ( <i>n</i> = 57)		Squatter Hut/Shack ( <i>n</i> = 276)		Other (Mobile Home/Tent) ( <i>n</i> = 9) *	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Insufficient space	14.9	2	13.7	3	14.8	1	16.7	-	33.3	-	22.2	-	13.5	2	16.1	1	11.1	-
No time	16.1	1	11.8	5	11.9	2	16.7	-	0.0	-	22.2	-	20.5	1	13.0	3	7.4	-
Dirty and untidy	11.8	3	14.1	2	13.7	3	13.9	-	0.0	-	0.0	-	11.1	4	13.0	3	22.2	-
Lack of knowledge	11.1	4	14.9	1	13.5	4	8.3	-	0.0	-	11.1	-	12.9	3	15.5	2	11.1	-
Facilities inconvenient	10.7	5	12.5	4	10.8	5	2.8	-	0.0	-	22.2	-	9.9	5	11.1	5	11.1	-
It makes no difference	8.0	7	6.7	7	9.2	6	5.6	-	0.0	-	11.1	-	4.1	9	8.3	7	3.7	-
No curbside collection	8.1	6	9.8	6	7.3	7	22.2	-	33.3	-	11.1	-	5.8	8	6.3	8	11.1	-
No responsibility	6.6	9	6.3	8	7.2	8	5.6	-	0.0	-	0.0	-	9.4	6	8.6	6	3.7	-
Not bothered	7.4	8	6.3	8	6.6	9	5.6	-	0.0	-	0.0	-	9.4	7	5.2	9	7.4	-
No service	5.2	10	3.9	10	5.0	10	2.8	-	33.3	-	0.0	-	3.5	10	2.9	10	11.1	-

\* Too few data points to derive meaningful conclusions.

**Table A4.** Reasons why people do not recycle as enumerated per area type: urban formal or urban informal (*n* = 2002 \*).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups			
	Urban Formal ( <i>n</i> = 1684)		Urban Informal ( <i>n</i> = 318)	
	%	Rank	%	Rank
Insufficient space	14.7	2	16.4	1
No time	15.4	1	11.8	4
Dirty and untidy	12.1	3	13.9	3
Lack of knowledge	11.9	4	14.6	2
Facilities inconvenient	10.9	5	10.2	5
It makes no difference	7.8	6	9.3	6
No curbside collection	7.8	6	7.9	7
No responsibility	7.2	8	6.1	8
Not bothered	7.1	9	5.9	9
No service	4.9	10	3.9	10

\* Two respondents did not answer this question.

**Table A5.** Reasons why people do not recycle as enumerated per employment status group (*n* = 2004).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups													
	Working Full-Time ( <i>n</i> = 665)		Working Part-Time ( <i>n</i> = 233)		Not Working: Housewife ( <i>n</i> = 126)		Not Working: Student ( <i>n</i> = 199)		Not Working: Retired ( <i>n</i> = 232)		Unemployed: Looking for Work ( <i>n</i> = 481)		Unemployed: Not Looking for Work ( <i>n</i> = 68)	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Insufficient space	15	2	13.6	3	15.7	1	16.1	1	12.2	3	16.6	1	12.7	4
No time	16.8	1	14.8	1	12.8	2	13.6	2	15.7	1	13	3	14.7	1
Dirty and untidy	11.5	3	12.6	4	12.2	4	12.7	3	12.9	2	13	3	14.2	2
Lack of knowledge	11.2	4	14.2	2	12.5	3	12.4	4	12.2	3	13.2	2	10.3	5
Facilities inconvenient	10.5	5	11.2	5	10.6	5	10.9	5	10.6	5	10.7	5	13.2	3
It makes no difference	7.9	7	8.7	6	7.4	8	7.9	6	7.2	9	8.8	6	6.4	9
No curbside collection	8.8	6	7	8	9.3	6	7.2	8	7.8	7	6.9	8	7.4	8
No responsibility	6.8	9	5.6	9	5.1	10	7.4	7	7.6	8	7.8	7	9.3	6
Not bothered	7.4	8	7.4	7	6.4	9	6.9	9	8.3	6	5.5	9	7.8	7
No service	4.2	10	4.9	10	8	7	5	10	5.5	10	4.4	10	3.9	10

**Table A6.** Reasons why people do not recycle as enumerated per education of the respondent (*n* = 2004).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups															
	No Schooling ( <i>n</i> = 29)		Some Primary School ( <i>n</i> = 113)		Primary School Completed ( <i>n</i> = 115)		Some High School ( <i>n</i> = 725)		Grade 12 ( <i>n</i> = 678)		Artisans Certificate Completed ( <i>n</i> = 73)		Technicon Diploma/University Degree Completed ( <i>n</i> = 265)		Other ( <i>n</i> = 6) *	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Insufficient space	17.2	1	13.0	1	15.7	1	15.2	1	15.1	2	16.9	1	13.8	2	11.1	-
No time	13.8	2	12.4	3	13.4	3	14.5	2	15.3	1	14.6	2	16.4	1	16.7	-
Dirty and untidy	9.2	6	13.0	1	14.8	2	12.4	4	12.1	3	11.9	5	12.6	3	11.1	-
Lack of knowledge	11.5	3	12.4	3	13.1	4	13.5	3	11.5	4	13.7	3	10.5	6	16.7	-
Facilities inconvenient	6.9	8	9.1	6	10.5	5	10.7	5	11.2	5	12.8	4	10.7	5	5.6	-
It makes no difference	10.3	4	8.8	7	7.6	7	8.4	6	7.8	7	8.2	6	7.3	7	5.6	-
No curbside collection	9.2	6	8.8	7	6.4	8	6.4	9	8.4	6	6.4	8	10.9	4	5.6	-
No responsibility	5.7	9	9.7	5	6.4	8	6.9	8	7.4	8	6.8	7	5.8	9	11.1	-
Not bothered	10.3	4	7.7	9	8.1	6	7.0	7	6.6	9	5.9	9	6.6	8	11.1	-
No service	5.7	9	5.0	10	4.1	10	5.0	10	4.5	10	2.7	10	5.4	10	5.6	-

\* Too few data points to derive meaningful conclusions.

**Table A7.** Reasons why people do not recycle as enumerated per marital status (*n* = 2004).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups											
	Single ( <i>n</i> = 898)		Married ( <i>n</i> = 732)		Living Together ( <i>n</i> = 176)		Widowed ( <i>n</i> = 137)		Divorced ( <i>n</i> = 44)		Separated ( <i>n</i> = 17)	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Insufficient space	15.5	1	14.7	2	13.9	2	13.9	2	11.4	3	23.5	1
No time	15.3	2	15.0	1	11.2	4	15.6	1	18.2	1	3.9	8
Dirty and untidy	12.7	4	11.6	3	13.1	3	13.4	3	11.4	3	19.6	2
Lack of knowledge	12.9	3	11.2	4	15.4	1	12.2	4	6.8	8	11.8	4
Facilities inconvenient	10.9	5	11.1	5	10.6	5	7.5	8	15.2	2	7.8	5
It makes no difference	8.0	6	7.8	7	8.7	6	8.0	7	6.8	8	17.6	3
No curbside collection	7.1	7	9.0	6	6.5	9	9.0	5	9.8	5	0.0	10
No responsibility	6.9	8	6.6	9	8.0	7	8.8	6	8.3	6	3.9	8
Not bothered	6.6	9	7.6	8	6.1	10	7.1	9	7.6	7	5.9	6
No service	4.0	10	5.3	10	6.6	8	4.6	10	4.5	10	5.9	6

**Table A8.** Reasons why people do not recycle as enumerated per population/ethnic group (*n* = 2004).

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups							
	Whites ( <i>n</i> = 290)		Blacks ( <i>n</i> = 1338)		Indian/Asian ( <i>n</i> = 121)		Colored ( <i>n</i> = 255)	
	%	Rank	%	Rank	%	Rank	%	Rank
Insufficient space	13.2	2	15.0	1	14.6	1	16.6	2
No time	17.3	1	13.7	2	13.8	3	18.7	1
Dirty and untidy	10.5	4	13.3	3	12.4	4	10.2	5
Lack of knowledge	9.7	6	13.1	4	11.9	5	11.4	3
Facilities inconvenient	10.1	5	10.6	5	14.1	2	10.8	4
It makes no difference	6.9	8	8.0	6	9.9	6	8.6	6
No curbside collection	10.6	3	7.7	8	6.6	8	6.4	8
No responsibility	5.8	10	8.0	6	4.4	10	4.4	10
Not bothered	9.7	6	6.1	9	7.5	7	8.2	7
No service	6.2	9	4.5	10	4.7	9	4.6	9

**Table A9.** Reasons why people do not recycle as enumerated per occupation group (*n* = 898) \*\*.

Reasons Why People Do Not Recycle: Select the Three Main Reasons from the 10 Options	Times Selected Expressed as a Percentage of the Total of Each of the Respondent Groups															
	Professional ( <i>n</i> = 49)		Executive/Managerial ( <i>n</i> = 77)		Clerical/Sales ( <i>n</i> = 241)		Tradesman ( <i>n</i> = 143)		Semi-Skilled ( <i>n</i> = 168)		Unskilled ( <i>n</i> = 139)		Self-Employed: ( <i>n</i> = 45)		Refused ( <i>n</i> = 36)	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Insufficient space	17.7	1	15.2	2	14.8	2	16.8	1	15.9	1	12.0	4	8.1	7	11.4	2
No time	12.9	2	17.7	1	18.0	1	16.1	2	15.7	2	13.7	1	13.3	2	22.9	1
Dirty and untidy	11.6	5	11.3	4	11.6	4	11.0	4	11.7	3	12.5	3	14.8	1	11.4	2
Lack of knowledge	12.2	3	10.4	6	11.5	5	12.1	3	11.7	3	13.7	1	13.3	2	10.5	4
Facilities inconvenient	7.5	6	13.0	3	12.2	3	10.3	5	8.9	6	10.1	6	11.9	5	10.5	4
It makes no difference	6.8	9	7.4	7	7.9	6	7.0	8	11.1	5	6.7	9	8.9	6	7.6	7
No curbside collection	7.5	6	11.3	4	7.5	7	8.9	6	7.0	8	8.2	8	12.6	4	9.5	6
No responsibility	4.1	10	5.2	8	4.8	9	6.1	9	7.6	7	10.3	5	7.4	8	4.8	10
Not bothered	12.2	3	5.2	8	7.5	7	8.4	7	6.0	9	8.6	7	5.2	9	5.7	8
No service	7.5	6	3.5	10	4.3	10	3.5	10	4.4	10	4.3	10	4.4	10	5.7	8

\*\* The respondents who selected not working (the housewives, students, retired) or unemployed (refer to Table A5) did not answer this question.

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