Recycling Behavior among Urban South Africans: The Role of Race and Social Status

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Draft
March, 2013

Abstract

Of continuing interest to social scientists and waste management officials are factors influencing household recycling behavior, one of which is the social context in which this activity occurs. Provision in South African constitution of the right to a safe environment, extensive legislation to implement this right and the transition to a multi-racial society underway there provide a special setting in which to examine the effect of race, socio-economic status and demographic factors on recycling by urban South African households. Observed differences in recycling among these households suggest that the lower tendency of African households to recycle has a basis in the continuing effects of experiences of Africans under apartheid.

Keywords: recycling, apartheid, social context, race

Acknowledgements: We wish to acknowledge the assistance and helpful comments from Paul Mohai and Raymond de Young, University of Michigan School of Natural Resources; Mosidi S. Nhlapo, Statistics South Africa; Peter Kok, formerly of the Human Sciences Research Council; Barry Rabe, Gerald R. Ford School of Public Policy, University of Michigan; and Howard Kimeldorf, Alfred Young and Karyn Lacy, Department of Sociology, University of Michigan.

Support was provided by Statistics South Africa, Human Sciences Research Council (South Africa), and by the National Institute of Child Health and Human Development Grant HD41028 to the Population Studies Center, University of Michigan.

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Introduction

Among the more important global environmental challenges is the rising tide of solid wastes generated by the rapid industrialization and urbanization now underway worldwide. (Magram 2011; UNEP 2010; Vergara and Tchobanoglous 2012). This growth in solid wastes has led to shortages of land available for the disposal of these materials and to increases in emanations of methane gas which contribute to global warming from existing landfills (Hoornweg, Sugar and Gomez 2011; Humer and Lechner 1999; Suttibak and Nitvattaroun 2008; US Environmental Protection Agency 2006; UNEP 2010). While the industrial and commercial sectors generate a majority of these wastes, those produced by households are substantial and expected to grow, making the recycling of household wastes a key part of efforts developed to meet this environmental challenge (Arsova et al. 2008; Barr, Gilg and Ford 2001; OECD 2008; US Environmental Protection Agency 2010).

Household recycling requires that at least one household member collect, sort, store, and in some cases, transport waste materials to recycling centers (Bruvoll, Halvorsen and Nyborg 2002; Hage, Soderholm and Berglund 2009; Sidique, Lupi and Joshi 2010). Why individuals adopt and persist in these behaviors is an important question not only for the development and conduct of recycling programs but also an issue to which social scientists have devoted considerable attention (Berger 1997; Breichen 1999; De Young 1985-86; De Young 1993; Dunlap and York 2008; Folz 1991; Inglehart 1995; Marquart-Pyatt 2007; Oskamp et.al.1991; Schultz, Oskamp and Mainieri 1995; Stern 2000; Vining and Ebreo 1990; Van Liere and Dunlap 1980).

Directly related to matters addressed in this paper is the work concerning the influence of social context in the shaping of environmental attitudes and behaviors. Derksen and Gartrell (l993) observed that not only did the social context have a strong and independent “effect on recycling behavior” (Derksen and Gartrell 1993: 439), but that the link between attitudes and behavior was dependent on establishing a connection between “the individual and a particular

social context" (Derksen and Gatrell 1993: 440). Olli and colleagues found that the contextual factor of participation in environmental organizations was a stronger explanation of pro-environmental behaviors, like recycling, than any other correlates of environmental behavior, including demographic characteristics and attitudes concerning environmental issues (Olli, Grenstad and Walleback 2001). A study of recycling in European societies noted that "conservation behavior is greatly influenced by the context of ecological mobilization in which it occurs (Guerin, Crete and Merecier 2001: 213). Blake (2001) observed that environmental attitudes and behaviors in British Columbia "…may be context dependent. What people are concerned about can be affected by their actual experience of environmental conditions. Additionally, environmental action can encompass different kinds of behaviors, which themselves may be shaped by context" (Blake 2001: 719). Sarigollu (2009) found that differences in environmental attitudes and behaviors between Turkey and Canada had a basis in the cultures of those two societies. Variations in the environmental motives and behaviors between European and Asian New Zealanders were related to particular ethno-cultural characteristics of these populations (Milfont, Duckitt and Cameron 2006). Situational factors such as curbside collection of waste, availability of space for storage of recyclable materials and the presence of accessible recycling centers have all been identified as influencing recycling rates (Corral-Verdugo 2003; DeYoung 1985-86; Statistics Canada 2010; Vining and Ebreo 1990).

Also relevant is the work dealing with the rise of interest in environmental issues worldwide. At issue is the extent to which environmental awareness is a phenomenon of developed societies, reflecting a shift from materialist to post-materialist values, as suggested by Inglehart (1995), or a perspective present in all societies. White and Hunter (2009) concluded from their study of environmental perceptions and behaviors in coastal Ghana that "Although some scholars have argued that prioritizing concern with environmental issues represents a post-materialist value, the analyses presented here suggest that residents of less-wealthy nations also often prioritize environmental issues" (White and Hunter 2009: 24). Schellhus and Pfeffer (2005) argued that

environmental concerns are not only global, but also "particularized" (Schelhas and Pfeffer 2005: 389), reflecting the interaction between local conditions and global influences. Hunter and colleagues concluded from a study of environmental perceptions in rural South Africa that concerns about the environment are an "international phenomenon with diverse roots" (Hunter, Strife and Twine 2010: 539). An analysis of environmental awareness in Turkey led to the observation that "…different environmental problems may mean different things to people (and that) geographical proximity of environmental problems may be one dimension along which such differentiation occurs" (Gosken et al, 2002: 629). Brechin (1999) suggested that "…environmentalism is most likely a complex social phenomenon, a mixture of social perceptions, local histories realities, international relationships and influences, and unique cultural and structural features of particular countries and regions" (Brechin 1999: 799).

Suggested by these various studies is the proposition that although concerns with environmental conditions are present throughout the world, differences in how these matters are viewed and dealt with are heavily shaped by historical, social and cultural factors specific to a given place and people. This leads us to contend that the observed differences in the recycling behavior of urban South African households reflect the continuing influence of the apartheid period during which South Africans were separated into four distinct population groups (White, Asians (mostly East Indian), Coloured (mixed race) and African), which were differentiated by race. These groups differed greatly in a variety of rights, including access to public and other services.

The South African Context

The pattern of racial segregation that constituted apartheid did not originate with the National Party assumption of power in 1948, but had deep roots in South African history (Thompson 2001). The pass laws and customs, which restricted access by Africans and other non-whites to urban places, set aside specific occupations for each of the population groups and forbade members of the other groups from engaging in these occupations, were features of late

17th century life in the Cape Colony. Despite the formal removal of these rules and regulations in 1994 South Africa is still a country of two parallel societies (Lumby 2005). One of these, composed largely of the White and Asian population, enjoys economic, political and social amenities equal to those found in the developed world; while the other, consisting essentially of the African and Coloured population, live under circumstances comparable to those found in the developing world.

Another element in the South African setting is the elevated position given environmental matters in the post 1994 constitutional and legal framework. The South African Constitution not only established the basis for a multi-ethnic democratic state, but also created a constitutional right to a clean and healthy environment (Republic of South Africa, 1996: Constitution of South Africa, Chap. 2 Sect. 24). While this did not immediately obligate the South African government to provide each person with a safe and healthy environment, it established a clear governmental responsibility to provide for these conditions. Nor has this Constitutional provision been considered as wholly rhetorical. This is evident in provisions of the National Environmental Management Act of 1998 (NEMA) which stated "...that waste is to be avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible or otherwise disposed of in a responsible manner" (Republic of South Africa, 1998: Chapter 1: 2. Principles (4) (a) (iv). A White Paper on Waste Management (Republic of South Africa 2000) led to the Polokwane Declaration on Waste Management in which the goals of a 50% reduction in waste and a 30% growth in the recycling industry by 2012 were established (Republic of South Africa 2001). The subsequent establishment of a National Waste Strategy Implementation Project Initiative (Republic of South Africa 2011b), adoption of comprehensive regulations on production and use of plastic bags (Nhamo 2008; Republic of South Africa 2003) and issuance of domestic waste collection standards requiring sorting of waste at the source (households) in all metropolitan and secondary cities are further evidence of the high priority given to environmental matters in South Africa (Republic of South Africa 2011a)

Also important in the South African context is the impact on the African and other non-White populations of the dismantling of the apartheid system. With the promulgation of the new constitution in 1996 these groups were immediately faced with the formal responsibilities of governance and the related obligations and opportunities, both of which were absent from their previous existence. They were now required to shed not only their opposition - both covert and overt - to governmental institutions and actions, but also the associated attitudes and behaviors concerning public program and services. Flowing from these changes were also increased expectations concerning availability and accessibility of public services stimulated by provision of a constitutional right of access to food, water, housing and social security (Republic of South Africa 1996: Constitution of South Africa, Chap 2 Sects. 24 & 27; Koelbe and LiPuma 2010) and the African National Congress promises of better living standards for all (African National Congress 1994). These factors and their interplay constitute the social setting in which the influence of context on the shaping of recycling behaviors by urban South African households is examined.

Data

Data for this analysis of recycling by urban South Africa households are from the 2003, 2005 and 2006 General Household Surveys conducted by Statistics South Africa. These surveys are the second, fourth and fifth in a series of annual household surveys initiated in 2002 as a replacement for the annual October Household Surveys which Statistics South Africa had conducted from 1993 through 1999. Each was a national stratified random sample of households and contained identical items dealing with perceptions of water pollution, land degradation, air pollution and littering as well as household behaviors in response to these perceived conditions. The environmental items in the 2004 survey were different from those contained in 2003, 2005 and 2006 and are why data from that survey are not included in this study. Only those items

pertaining to perceptions of littering as a community problem, whether a household recycled, reasons for recycling, and the presence of recycling programs or facilities are used in this paper.

The analysis is also restricted to urban households. While the recycling behavior of rural South Africans is an important question, the general absence of organized trash collections and recycling centers in these areas means that an analysis of recycling in rural South Africa requires a different study.

In none of the surveys was it indicated which household member answered the survey. While households engage in behaviors such as recycling, individuals, rather than households, have perceptions as to whether a condition such as littering is a community problem. Instructions to the interviewers required that the person answering questions for the household be a "responsible adult". Although we do not know the personal characteristics of the actual respondent, we do know the group identity, educational attainment and age of the head of household. This information is used in the following analyses.

Analysis

The focus of this study is on the influence of race, socio-economic status and contextual factors on differences and similarities among urban African households, urban White or Asian households and urban Coloured households in perceptions of littering as a community problem and the decision to recycle.

A key contextual factor is the continuing effect of the apartheid system on levels of living among population groups. Figure 1 shows the differences in access to facilities and services associated socio-economic status among households headed by members of the different population groups. A White or Asian household is far more likely to have tap water and a flush toilet in its dwelling and to use electricity for cooking than either a Coloured or African household. The advantage of Coloured households over African households in the availability of

these amenities is also clear. The very small differences between the While and Asian households led us to combine the responses from these two groups in the following analyses.

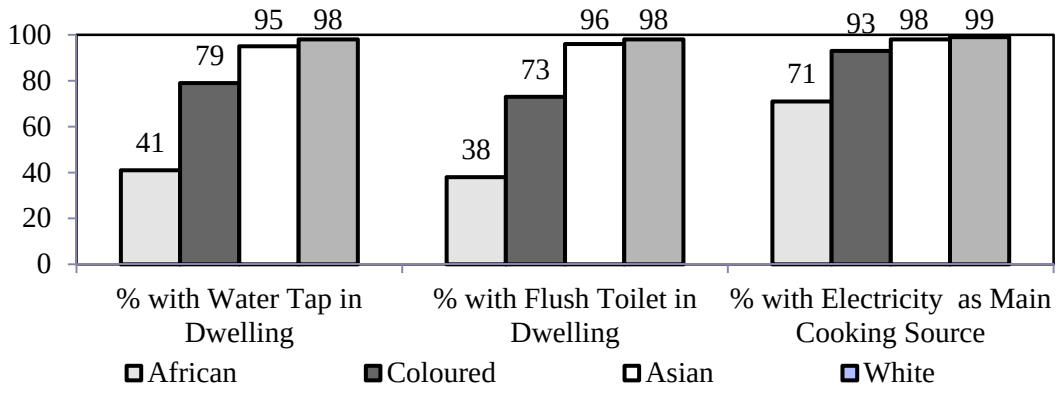

Figure 1: Characteristics of Urban Households by Population Group of Household Head, 2003, 2005 and 2006

The differences among these households in the perception of littering as a community problem and the proportion of these households which recycle are shown in Figure 2. Two items stand out. First is the low proportion of households that recycle, across all groups. Second is that while African households were most likely to see littering as a community problem, they were also least likely to recycle.

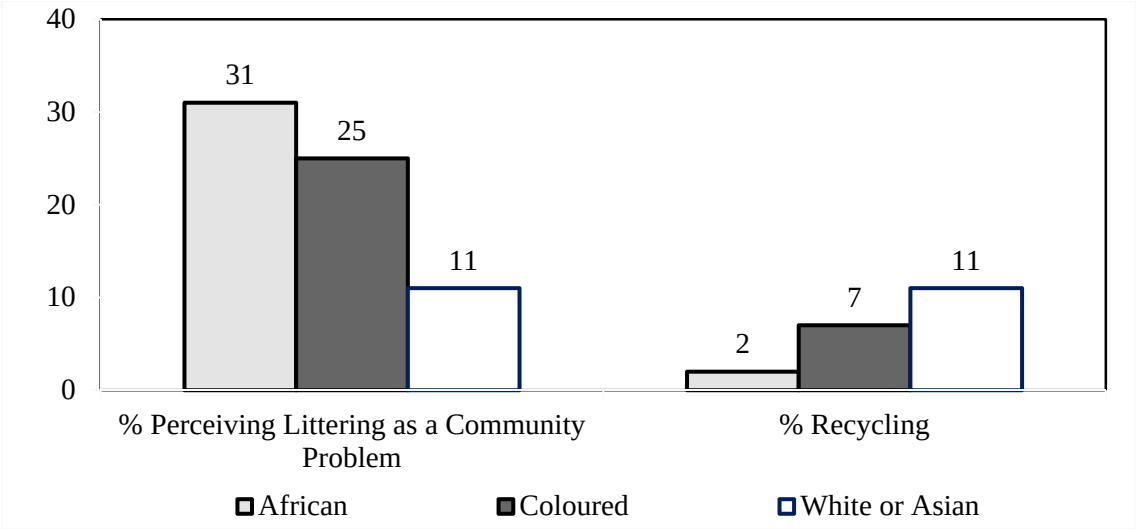

Figure 2: Percent of Urban Households Perceiving Littering as a Community Problem and Percent Recycling by Population Group of Household Head, 2003, 2005 and 2006

The association between recycling and the perception of littering as a community problem is also interesting (Figure 3). Within every group, those households that view littering as a problem are more likely to recycle than households that do not view littering as a problem. However, the recycling tendency to recycle varies within categories of views of littering as a problem, being lowest for African households, slightly higher for Coloured households and the highest for White or Asian households.

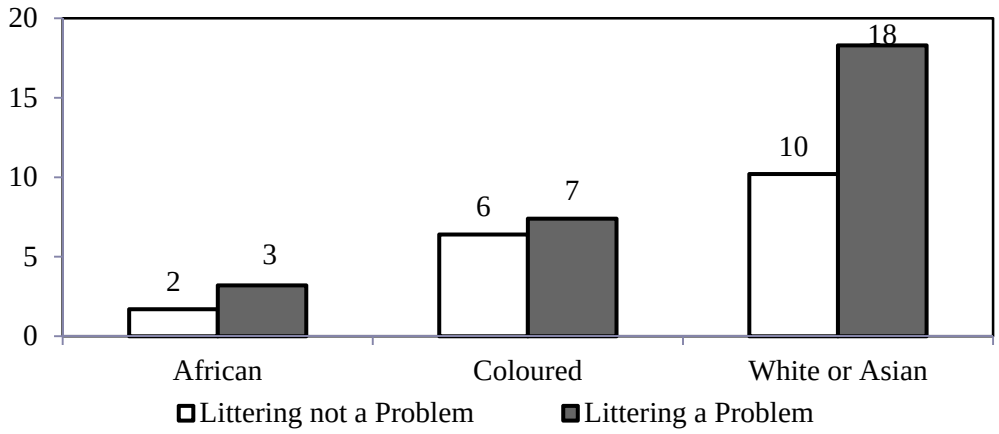

Figure 3: Percent of Urban Households Recycling by Whether Littering is Seen as a Community Problem, 2003, 2005 and 2006

This lack of a relationship between the perception among African households that littering is a problem and recycling as a response to that situation contrasts with findings of a study in which the relation between perceptions of water pollution as a community problem and actions taken to deal with that condition was examined. African households in that study were not only more likely than non-African households to see water pollution as a community issue, but also were more likely to treat their water (Anderson et al. 2007). One explanation for this difference is that treating one's water supply was seen as a direct solution to the problem of unclean water, while recycling as a response to the perceived problem of littering is less obvious. We will return to this matter later in the paper.

It was not clear whether the relationships shown in Figures 2 and 3 would hold in a multivariate analysis that included selected socio-economic and contextual factors. Table 1

shows all of the variables included in the analyses in this paper. Socio-economic variables and variables related to the social context were coded so that the highest value reflects greater awareness of environmental concerns or greater access to facilities or resources that might facilitate recycling. Variables are also included in analyses indicating the year in which the data were collected, and the population group of the household head.

Table 1: Variables in Multivariate Analysis

Variable	Coding
Household recycles	0=Household does not recycle 1=Household recycles
Education of household head	1=None 2=Grades 0-4 3=Grades 5-8 4=Grades 9-11 5=Matric/STD 10 6=BA or more
Littering a problem	0=Littering not a community problem 1=Littering a community problem
Local recycling program	0=No community/school recycling program 1=Has a community/school recycling program
Local buyback program	1=No buyback program 2=DK if there is a buyback program 3=Is a buyback program, DK distance to program 4=10+ kilometers 5=5 - <10 kilometers 6=1 - <5 kilometers 7=200m – 1 kilometer 8=100m – 199m 9=<100 m
Elementary/Secondary school child in household	0=No schoolchild in household 1=Schoolchild in household
Age of household head	Age in years
White or Asian household	0=Household head is not White or Asian 1=Household head is White or Asian
Coloured household	0=Household head is not Coloured 1=Household head is Coloured
Dummy 2005	0=Data not from 2005 survey 1=Data from 2005 survey
Dummy 2006	0=Data not from 2006 survey 1=Data from 2006 survey

Table 2 presents the results of this analysis. The results in Column 1 show that for all households recycling is positively associated with educational attainment, the perception of littering as a community problem, the presence of a community or school recycling program and access to a buy back center. Column 2 again includes all households but also includes dummy

variables for the population group of the household head. White or Asian households and Coloured households were significantly more likely to recycle than African households, even when other variables have been taken into account. When population group of household head is included, education of household head loses its statistical significance.

Columns 3, 4, and 5 of Table 2 show the results of the analysis separately by race. Particularly important is the relationship between recycling and the educational level of the head of household. For all households, as well as White or Asian and Coloured households, this relationship was significant and positive; for African households, however it was both negative and significant. A correlation analysis of this association showed a similar pattern (Spearman Rho: White pr Asian: =.138**; Coloured: =.48**; African: Spearman Rho: -036**). Also among White or Asian and Coloured households the proportion which recycled increased with each additional increment in the educational level of the head of household, but in African households the proportion which recycled remained constant until the head of household has a baccalaureate degree or higher, at which point the percent rose slightly.

Table 2: Logistic Regression of Whether a Household Recycles, 2003. 2005 and 2006

*p<.05, **p<.01	All	All	African	Coloured	White or Asian
	(1)	(2)	(3)	(4)	(5)
Education	.291**	.045	-.194**	.155**	.520**
Littering a problem	.238**	.536**	-.596**	.206	.668**
Local recycling program	1.827**	1.724**	1.322**	1.533**	2.067**
Local buyback program	.253**	.256**	.304**	.187**	.252**
White or Asian household	----	1.589**	----	----	----
Coloured household	----	.695**	----	----	----
Dummy 2005	-.245**	-.261**	.064	-.192	-.486**
Dummy 2006	-.749**	-.787**	-.516**	-.389**	-1.150**
Constant	-5.371	-5.065	-4.504	-4.401	-5.865
X^2	2965.2**	3668.5**	813.8**	294.2**	1608.4*
d. f.	6	7	6	6	6
n	45,757	45,757	30,183	7,480	8,028

Households which recycled were asked why they recycled. Several choices were provided, among which was whether the household recycled for monetary or altruistic reasons. A correlation analysis was done of the relationship between recycling for money and non-monetary reasons and the educational level of the head of household. For all households recycling for

altruistic reasons and education was positive and significant (Spearman Rho: White or Asian = .144**; Coloured =.109**; African =.014**). For African and Coloured households the relationship between recycling for monetary reasons and education was both significant and negative, but positive and not significant for White or Asian households (Spearman Rho: African: = -.052; Coloured: = -.069; White or Asian: = .012).

Presented in Table 3 are results of a logistic regression analysis of factors related to recycling for non-money reasons by race of the head of household using the independent variables identified earlier (Table 2). Except for the non-significant relationship of the perception of littering as a problem for the African and Coloured groups, the relationships between the other factors and the behavior of the households are similar. However, the coefficients for the relationship between education and recycling for the non-African households are larger than for the African households.

Table 3: Logistic Regression of Household Recycling for non-Money Reasons, 2003, 2005 and 2006

*p<.05, **p<.01	African	Coloured	White or Asian
	(1)	(2)	(3)
Education	.120*	.510**	.612**
Littering a problem	.205	.084	.756**
Local recycling program	1.625**	1.826**	2.083**
Local buyback program	.111**	.119**	.219**
Dummy 2005	.489**	-.022	-.315**
Dummy 2006	-.839**	-.239	-.956**
Constant	-6.255	-6.293	-6.590
X^2	170.3**	260.8**	1608.4*
d. f.	6	6	6
n	30.183	7,480	8,028

A logistic regression analysis of the association between these factors and recycling for money shows that the behavior of the African households continues to differ from that of the other households (Table 4). While for African households there is a positive and significant relationship between the perceptions of littering as an issue, availability of a local recycling program and availability of a buyback program, there continues to be a negative and significant relationship between education and recycling for monetary reasons. Neither education nor the view of littering as a problem is important for the White or Asian households and for only the

Coloured households is there the same negative and significant relationship between education and recycling for money purposes as for African households.

Table 4: Logistic Regression of Household Recycling for Money Reasons, 2003, 2005 and 2006

*p<.05, **p<.01	African	Coloured	White or Asian
	(1)	(2)	(3)
Education	-.311**	-.361**	.015
Littering a problem	.744**	.380	-.049
Local recycling program	1.169**	.910**	1.201**
Local buyback program	.365**	.277**	.264**
Dummy 2005	-.138	-.333	-.903**
Dummy 2006	-.406**	-.499*	-1.369**
Constant	-4.726	-3.765	-4.744
X^2	761.3**	113.1**	198.5**
d. f.	6	6	6
n	30,183	7,480	8,028

An African South African scholar with whom we shared these findings noted that when she was growing up in a township most residents collected materials both for reuse and for redemption for money. She and her husband are now both successful professionals with Master's degrees and do not think about recycling. They recycle only is when there is a paper drive at their son's school. She further noted that her son is taught that behaviors, such as wearing seat belts and recycling, are desirable. He frequently reminds her to fasten her seat and, when he does, she complies.

Motivated by her observations, we decided to look at two additional factors. First was whether the presence of a child in elementary or secondary school was related to recycling by a household on the assumption that the presence of a schoolchild would increase the likelihood of recycling. Second was age of the head of household on the assumption that older Africans were more likely to have experienced the need to recycle and reuse items during apartheid and that households headed by them might recycle less than those with a younger head. Added to the variables in Table 2 were the age of household head and the presence in the household of a child in either elementary or secondary school coded as: 0=no child; 1=child present.

Table 5: Logistic Regression of Whether a Household Recycles, 2003, 2005 and 2006

*p<.05, **p<.01	All	African	Coloured	White or Asian
	(1)	(2)	(3)	(4)
Education	.631**	-.218**	.232*	.569**
Littering a problem	.325**	.602**	.235	.688**
Local recycling program	1.779**	1.304**	1.500**	2.077**
Local buyback program	.253**	.307**	.184**	.250**
Child in elementary/secondary school	-.048	.321**	.111	-.057
Age of household head	.024**	-.006	.017**	.017**
Dummy 2005	-.243**	.057	-.204	-.499**
Dummy 2006	-.760**	-.518**	-.411*	-1.172**
Constant	-6.765	-4.321	-5.533	-6.920
X^2	3183.8**	835.7**	308.0**	1660.6**
d. f.	8	8	8	8
n	45,682	30,130	7,476	8,011

Table 5 shows that the presence of an elementary or secondary school child in the household is positively related to recycling for African households and has an insignificant relationship for White or Asian and Coloured households. In contrast, the age of the head of households is positively related to recycling by the non-African households and insignificantly related to recycling for African households.

Table 6: Logistic Regression of Household Recycling for non-Money Reasons, 2003, 2005 and 2006

*p<.05, **p<.01	African	Coloured	White or Asian
	(1)	(2)	(3)
Education	.152*	.603**	.657**
Littering a problem	.243	.137	.775**
Local recycling program	1.579**	1.779**	2.111**
Local buyback program	.120**	.115**	.215**
Child in elementary/secondary school	.477**	.029	-.196*
Age of household head	.006	.022**	.019**
Dummy 2005	.482**	-.042	-.331**
Dummy 2006	-.813**	-.276	-.990**
Constant	-6.906	-7.692	-7.659
X^2	.183**	276.6**	1443.5**
d. f.	8	8	8
n	30,130	7,476	8,011

More important is the effect of the presence of a school age child and the age of the head of household on recycling for non-monetary reasons. For African households the presence of a school child is both positive and significant (Table 6). It is significant and negative for the White or Asian households and not significant for Coloured households. The age of the head of household, however, is insignificant for African households, but positive and significant for both White or Asian households and Coloured households.

Table 7 presents the results of analysis of the age of the head of household and the relation ov presence of a school-age child in the household to recycling for monetary reasons. As in the case of recycling for non-monetary reasons, the relation of presence of a school age child to recycling by African households for monetary reasons is both positive and significant. This relationship, however, is not as strong as that for recycling for non-money reasons. There is a similar and more positive relationship for White or Asian households and no relation to the behavior of Coloured households. Age of the household head is significantly negatively related for African households and is not significant for the White or Asian households.

Table 7: Logistic Regression of Household Recycling for Money Reasons, 2003, 2005 and 2006

*p<.05, **p<.01	African	Coloured	White or Asian
	(1)	(2)	(3)
Education	-.358**	-.346**	.033
Littering a problem	.735	.137	-.052
Local recycling program	1.159**	1.779**	1.152*
Local buyback program	.364**	.115**	.264**
Child in elementary/secondary school	.236*	.029	.463**
Age of household head	-.011**	.022**	.004
Dummy 2005	-.140	-.042	-.901**
Dummy 2006	-.414**	-.276	-1.352**
Constant	-4.210	-7.692	-5.150
X^2	76.5**	276.6**	205.7**
d. f.	8	8	8
n	30,130	7,476	8,011

These results show that the presence of an elementary or secondary school student has a positive influence on recycling by African of households. They support the contention that African parents have a strong desire to set a good example for their children and to cooperate with the school to help their children's status with the school. It refutes the interpretation that more recycling by African households may be related the need for additional income when there a school age children in the household. Not clear, however, is why the coefficient for the presence of a student in the White or Asian households was negative and significant for recycling for altruistic reasons and positive and significant for recycling for economic reasons.

Discussion

The small proportion of urban South African households which viewed littering as a

community problem as well as the low proportion of households which engaged in recycling suggest that the emphasis assigned environmental matters in the South African Constitution and expressed in subsequent governmental actions has had little, if any, effect on household recycling. There is, however, a substantial recycling industry in South Africa (Collect-A-Can 2012; Karani and Jewasikiewitz 2007: Nampak 2009; Oelofse and Strydom 2010a). South Africa in 2007 recycled more than 26% of glass bottles, 51% of paper and 67% of all metal cans (Collect-A-Can, Glass Recycling Company 2007-2008; Nampak 2009). These rates compare favorably with those in the United States where in 2010 71.6% of paper and cardboard; 67.0% of beverage cans and 33.4% for glass containers were recycled (US Environmental Protection Agency 2010).

Additionally there are considerable scavenging and picking activities like that elsewhere in the world (Ahmed and Ali 2004; Oelofse and Strydom 2010b; Wilson, Velis and Cheeseman 2006: Zia and Devadas 2008). A common sight on the streets of South African cities on the days municipal trash collections occur are individuals with push carts who scour the bins for cardboard, paper, glass and metal for recycling (Oelosfe and Strydom 2010b). While households were asked if any member of the household depended on recycling as a primary source of income, it was not possible to determine from the data the extent to which household members were involved in these activities.

There remain, however, questions about why recycling by South African households is low and what accounts for differences in the perceptions of littering as a community problem and in the proportion of households that recycle. Almost a third of African households and a quarter of the Coloured households saw littering as a community problem compared to slightly over 10% of the White or Asian households (Figure 2). African households were also least likely to recycle even though there was a direct association among all households between the perception of littering as a community problem and recycling (Tables 2 and 3).

The relationship between educational level of the head of a household and recycling by that household is an additional difference. For all households, as well as for White or Asian and Coloured households, the higher the level of educational attainment of the head of household the more likely it was that household recycled. Among African households this association was significant and negative (Table 2). Moreover, when recycling was for non-economic reasons the proportion of White or Asian and Coloured households that recycled rose with increases in the educational level of the head of household, but remained constant in African households until the head of household held a BA or higher degree. Also for African households the relationship between the age of the head of household and recycling was not significant, while for other households it was significant and positive (Table 6).

A possible explanation for these differences is the continuing influence of apartheid on attitudes and behaviors of the non-white population South Africa. The comment by our South African colleague on her household's recycling behavior provides support for this contention. Further is the consideration that participation in recycling, like many pro-environmental behaviors, reflects acceptance of the premise that this activity involves both a contribution to the common good and benefits that are neither immediate nor personal (Berglund and Matti 2006; Praterelli 2010). It also requires trusting that the institutions of the larger community to which these benefits accrue will act in good faith (Brekke, Kipperburg and Nyborg 2010; De Young 1985-86; Rothstein 2000). None of these conditions existed for the non-white populations during apartheid. Moreover, the relationship between these populations and governmental institutions and programs was contentious, characterized then and now by the boycotting of governmental activities and withholding of payment for public services such as utilities, as proxies for political protest (Fjelstad 2004; Naidoo, P. 2007; Ruiters 2007; Von Schnitzler 2008). The persistence of these behaviors from those who had been excluded from the larger community and denied benefits associated with membership in that community is not strange, especially when expectations for a better existence have been slow to be met.

Also operative here may be a cohort effect in which attitudes and behaviors are shaped by the common experiences of those of similar age (Davis 1990; Putnam 2000). Hallin (1995) found that individuals who lived through the depression of the 1930's in the United States were more inclined to engage in conserving behaviors, like recycling, than those of other generations and that their actions on environmental issues were shaped this common experience rather than a concern about the environment. Perry and Williams (2006) noted that the first generation of Indian immigrants to Great Britain was more likely to reuse and recycle items because of need and not from identification with environmental concerns. The younger generation, which had a greater commitment to environmentalism, reused and recycled less. Corral-Verdugo (2003) found a similar pattern in Mexico in the reuse and recycling behaviors of different generations. A case study of waste management practices in a municipality in Kwa-Zulu Natal also noted that attitudes formed during apartheid contributed to the lack of recycling by residents (Naidoo 2009).

Countering this argument are the results of the logistic regression analysis presented earlier. That analysis identified two variables that were significantly and positively associated with recycling by households, regardless of category (Table 2). The first is the availability of a nearby buy back center. The presence of such a facility and its positive influence on recycling by urban South Africans is similar to findings from other studies in which high rates of household recycling occurred when this activity was facilitated by such things as curbside pickup, single bins, easily accessible drop-off centers and no requirement to sort items (Corraliza and Berenguer 200; Ewing 2001; Gamba and Oskamp 1994; Martin, Williams and Clark 2006; Oskamp et al. 1991; Vining and Ebero 1990)

The existence of a school or community recycling program was the second variable in which the relationship to recycling was not only significant and positive among all households, but also was the strongest among all the variables used in the study (Table 2). Implicit is the consideration that the presence of these programs provides a source of information about the need for recycling and its importance, both of which have been cited as distinguishing between those

who recycle and those who do not (Derksen and Gartrell 1993; Gamba and Oskamp,1994; Naido 2009; Vining and Ebero 1990). The anecdotal information from our African colleague about not recycling except when her children needed papers as part of a school recycling program is further testimony to the influence of this factor on recycling behavior by urban African households.

It can also be argued is that the different household recycling behaviors simply reflect differences in socio-economic status among the households. The persistence of the differential access to tap water, electricity and sanitation among households (Figure 1) indicates that changes in the socio-economic status of the population categories post-apartheid have been marginal. Thus, the grouping of households for purposes of analysis by the population group membership of the household head leads to variations in recycling behavior that are associated with socio-economic status, rather than ethnicity. This would suggest that as conditions improve the differences in rates of recycling by the household categories will become less.

The recycling behavior of the White or Asian households provides support for this position. By almost every measure, the behavior of these households conforms to what Inglehart (1995) argued as the reason for the emergence environmental concerns among developed societies. Support for this position is also found in the results of the logistic regressions set out Tables 2, 3, and 4). The coefficients for the White or Asian households show a stronger positive relationship between the variables supporting the proposition that environmental involvement is associated with higher socio-economic status than do the coefficients for either of the other household categories.

There is some evidence that these differences will lessen as more African households have safe water, electricity, good sanitation and other items associated with better living standards. In a study of perceptions, attitudes and behaviors regarding water pollution in South Africa a multivariate analysis was done comparing the African households whose living conditions were comparable to those of non-African households. That analysis found that African households with living conditions comparable non-African households behaved like their

non-African counterparts, indicating that the immediate living circumstances of the African households were perhaps more important in explaining differences than race (Anderson et al. 2007). A 2007 study found that 61% of South African households which had access to curbside collection of waste were in affluent and urban areas (Republic of South Africa, DEAT 2011a). The presence of these services, coupled with the importance of easy access to collection of recyclable materials, could be the explanation for the differences rather than the ethnicity of the household.

Not explained by these observations, however, is the impact of the presence of a schoolchild on the recycling behavior of African households. Nor is the lower level of recycling by African households where the head is older explained by these considerations. It is these two observations that lead us to suggest that the lingering effect of the apartheid experience on the African population, and to a lesser degree the Coloured population, is an important element explaining why the pattern of recycling behavior by African households differs markedly from that of the White or Asian and Coloured households. A people whose previous life experience was one of deprivation and in which the idea of civic responsibility was service to a "privileged ruling class", will have difficulty undertaking activities for the "common good" when the relationship between the required action and the purpose to be served is more abstract than immediate. It is only when the benefit - such as helping their child at school - is it clear that there is a willingness to engage in the activity requested. Also is the consideration that African households with older heads tend to recycle less. Each of these instances suggests that something beyond socio-economic status is influencing this behavior. Determining the degree to which this explanation holds over time requires further exploration not only with reference to recycling but also with respect to other aspects of the civic and political roles required of all population groups in new society being constructed in South Africa.

There is still the consideration that the level of recycling by urban South African households is low. Increases in recycling would contribute in no small way to the overall

objective of the South African government to achieve the goals of cleaner environment for all its citizens. This analysis suggests at least two policy thrusts which could lead to more recycling by South African households. The clear relationship between ease of recycling represented by the presence of buy-back centers and recycling behavior suggests that one strategy would be the establishment additional such centers. The continued and expanded attention of schools to recycling as an important civic responsibility is another.

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