
Who will be more active in sustainable consumption? Evidence from China

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Abstract: Economic growth in China improves the quality of life and income-driven levels of consumption. However, environmental behaviours with regard to water and energy consumption, as well as wastes produced, which have significant impacts on sustainable cities, have scarcely been studied. A survey is conducted to interview about 300 residents in Nanjing, capital of Jiangsu Province, China. Analysis of both household consumption behaviour and the effectiveness of environmental policies shows a rough pattern of sustainable consumption of Chinese urban residents. This paper concludes that income level is a very significant variable for various sustainable consumption behaviours. The research results will contribute to the study of both sustainable consumption and environmental policy. Policy makers will benefit from the research results as well.

Keywords: sustainable consumption; environmental behaviours; environmental policy; policy effectiveness.

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1 Introduction

The household sector plays a major role in energy use, water consumption, as well as wastes produced, which have significant impacts on sustainable cities. Thirty-two percent of energy consumption in the UK is accounted for by domestic usage (RCEP, 2000). There is no exception in China. For example, more than 50% of wastewater is domestic wastewater in China (SEPA, 2003).

Given that final goods consumption takes place at the household level, the household decision about energy use and materials recycling is central to any society's private environmental decision making (Yi and Shawna, 1999). From an urban or metropolitan area ecosystem perspective, the volume of waste generated and the disposal methods employed can affect land use (through the locations of temporary storage and permanent landfill facilities) as well as local air quality (through incineration of wastes or extensive trucking to peripheral disposal sites). Public efforts to promote recycling are expanding, but their success depends on household decisions about sustainable consumption behaviours.

However, government policies aimed at reducing energy use have focused on technical elements rather than changes in behaviour. For example, the publication of the Performance and Innovation Unit's (PIU, 2002) report on energy policy in the UK demonstrated the neglect of behavioural strategies to increase energy conservation in the home and made little reference to the need for households to reduce energy consumption and adopt alternative behavioural strategies to conserve energy (Barr et al., 2003). On the other hand, moderating the way in which lights and appliances are used can achieve significant savings in some instances (e.g. running washing machines at lower temperature programmes). In general, this does not seem to be a viable or effective policy goal (Stern and Gardner, 1981). The ecological crisis to some extent is not a technical problem, but a crisis of inappropriate behaviour (Maloney and Ward, 1993).

Targets aimed at reducing the rate of global warming illustrate the need for a renewed focus at the household level (Barr et al., 2003). Hence, research on people's attitudes towards sustainable consumption behaviours and factors that influence sustainable consumption behaviours provides information to governments and conservationists who wish to change the public's current behaviour patterns. Many programmes have been launched with empirical evidence of the factors actually shaping the individual decision on whether or not to commit the needed effort. But the role of individual characteristics factors in differentiating between alternative levels of sustainable consumption behaviours is equivocal.

This paper takes a step towards a systematic examination of the sustainable consumption behaviours in Nanjing, capital of Jiangsu Province, China. The research had three main objectives: firstly, identify people's attendance of sustainable consumption behaviours; secondly, understand the influence of individual characteristics factors on people's sustainable consumption behaviours and who will reduce energy use and prefer recycling and finally, evaluate current policy that seeks to encourage sustainable

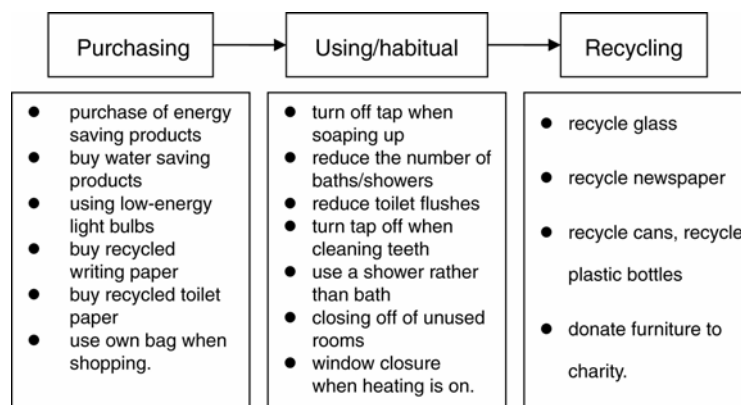
consumption behaviours. We use individual survey data from Nanjing metropolitan area, which permits us to consider differences in individual characteristics in our analysis. Our argument begins with a review of the major factors shaping sustainable consumption behaviours that have been uncovered in the literature. We then describe the measurements we employed before we turn to our data and examine our case city. We conclude with observations on the implications of our findings for policy development.

2 Sustainable consumption behaviours

2.1 Defining the sustainable consumption behaviours

Consumer behaviour is the key to the impact that society has on the environment. The actions that people take and the choices they make – to consume certain products and services rather than others or to live in certain ways – all have direct and indirect impacts on the environment, as well as on personal (and collective) well-being. This is why the topic of ‘sustainable consumption’ has become a central focus for national and international policy. According to the definition, sustainable consumption behaviours can be classified in three categories: purchasing, using or habitual behaviours and recycling (Figure 1) in household level.

Figure 1 Sustainable consumption behaviours categories



The first type of household sustainable consumption behaviours focuses on ‘purchasing’ activities, namely what Stern (1992) has termed ‘technology choices’, also referred to as ‘conserving actions’, ‘purchase-related behaviour’ and ‘energy efficiency choices’ (Barr et al., 2003). Typically, behaviours measured in previous work have included: purchase of energy saving products (appliances which are purchased with saving energy as a priority, such as washing machines, cookers, fires, dishwashers, etc.), water saving products, low-energy light bulbs, recycled writing paper or recycled toilet paper, and using one’s own bag when shopping.

Second, ‘using’ or ‘habitual’ behaviours, for example direct energy saving choices, ‘adjustments’, ‘usage-related’ or ‘curtailment’ (Barr et al., 2003) are all focused around everyday reductions in energy use that require either no or minimal structural adjustment. Such behaviours include: turning the tap off when washing dishes, turning off the tap

when soaping up or cleaning teeth, reducing the number of baths/showers, reducing toilet flushes, using a shower rather than bath, closing off unused rooms, altering room use, closing windows when heating is on, using a clothes line rather than a tumble drier, not filling the kettle full before boiling and washing a full load rather than a half load. These behaviours are evidently related to the everyday habitual element of an individual's lifestyle as they undertake daily activities.

The third type of sustainable consumption behaviours is 'recycling', as the process through which materials previously used are collected, processed, remanufactured and reused (Ruiz, 1993). This paper focuses exclusively on the collection process. Such behaviours include: recycle glass, recycle newspaper, recycle cans, recycle plastic bottles and donate furniture to charity.

2.2 Factors influence sustainable consumption behaviours

Household sustainable consumption behaviours can be traced to a series of different factors, and we will discuss them briefly in this section. The research was situated within the wider context of social-psychological, sociological and geographical work into sustainable consumption behaviours over the past 30 years (Gilg, 2004). Previous work has provided evidence that a wide range of factors influence positive sustainable consumption behaviours, notably in terms of recycling, energy saving, water conservation and green consumption. The factors include the contributions and links between environmental knowledge, environmental values, attitudes, personal characteristics and behaviours (McMakin et al., 2002).

Environmental values: it is often suggested that environmental attitudes and environmental behaviour are related to people's values (Poortinga, 2004). Stern et al. (1995) have argued that social values are significant in distinguishing between different levels of environmental behaviour, including sustainable consumption (Gilg, 2001). The value scales of Rokeach (1973) and Schwartz (1994) have been successfully used for explaining general environmental concern as well as more specific environmental attitudes and beliefs (Poortinga, 2004). Karp (1996) demonstrated that Schwarz's values were significantly correlated to various self-reported behaviours, such as recycling behaviour, consumer behaviour and political behaviours to protect the environment (Poortinga, 2004). Other studies showed that values are related to recycling behaviour (Dunlap et al., 1983) and to people's willingness to take action to protect the environment (Stern and Dietz, 1994). In a recent study, Stern et al. (1999) demonstrated that values significantly contributed to the explanation of activist as well as various non-activist environmental behaviours, such as consumer behaviour, policy acceptance and environmental citizenship (Poortinga, 2004).

Individual characteristics: there are also a variety of individual characteristics related to people's sustainable consumption behaviours. Research into sustainable consumption behaviours has consistently demonstrated the role of individual characteristics factors in differentiating between alternative levels of consumption behaviour (Gilg, 2001). In studies on recycling behaviour, the four most often reported demographic variables are age, gender, income and education (Schultz et al., 1995). Hines et al. (1987), Schultz et al. (1995) and De Oliver (2001) have provided evidence for the role of gender, age, income, education, political affiliation and other variables in determining action. However, these results have been equivocal (Gilg, 2001). In general, the environmentalist has been showed as female, young, wealthy, well-educated and

ideologically liberal urban dwellers. These variables frequently have been correlated with environmental concern, but their relationship to recycling behaviour has been less consistent (Schultz et al., 1995).

Social-psychological factors: it is also suggested that some social-psychological factors have a significant influence on sustainable consumption. Chan (1998) and Lam (1999) have argued social influence and subjective norms is particularly significant with respect to visible behaviours such as recycling; Authors such as Kantola et al. (1982), Baldassare and Katz (1992) and Segun et al. (1998) have found that perceptions of threat increase levels of environmental behaviour significantly. Considerable research has indicated that feeling personally able to effect tangible change to the environment will have significant impacts on behaviour (Roberts, 1996; Samuelson and Biek, 1991); trust and responsibility have both been found as key factors in effecting change, since mistrust of environmental knowledge and a lack of personal responsibility are unlikely to motivate sustainable consumption (Mainieri et al., 1997; Nancarrow et al., 1996–1997); consumption attitudes relate to the influence of consumption-specific influences in determining purchase choices (Mackenzie, 1990; Roberts, 1996).

Given the wide range of factors that influence sustainable consumption behaviours, this paper examines the environmental behaviours of residents in Nanjing, capital of Jiangsu Province, China and understand the influence of individual characteristics factors on people's behaviour, as well as policy implications.

3 Data and analytical approach

The research used both quantitative and qualitative methods. The major element was a questionnaire that sought to measure all of the sustainable consumption behaviours discussed above.

3.1 Questionnaire

In order to provide a holistic framework of sustainable consumption behaviours, individual face-to-face interviews/surveys were conducted in the spring of 2005. We used clustered random sampling of the general population in Nanjing.

The questionnaire was two pages in length and had three parts. The first part is about the respondents' characteristics, including age, gender, education and income (both individual and household). The respondents' characteristics were measured using frequency scales, or multiple-choice items. The second part investigated residents' sustainable consumption behaviours, including a group of 18 consumption behaviours according to the conceptual framework in Figure 1. Their behaviours were measured using two-point scale (yes/no). The last part includes questions about people's response to Time-Of-Use (TOU) pricing. Multiple-choice questions were asked about decision making.

3.2 Measurement

According to the three objects set out above. The first step was to overview the sustainable consumption behaviours participation by using frequency and agreement scales.

The next stage was to explain the variation in these behaviours. Given the policy implications for the research and the relationship between these behaviours, the most effective way of analysing the variation in behaviour was cluster analysis. Cluster analysis is a technique that permits the researcher to identify individuals in a questionnaire as being similar to each other (Gilg, 2001). Through a process of pairing, each individual is paired with another until all similar cases are in one ‘cluster’. Through studying the pairing process, the researcher is able to identify significant clusters. In this research, four clusters were identified with distinctive behavioural characteristics. These were used as the basis for examining the influence of individual factors on sustainable consumption behaviours.

The third stage was to define the role that individual variables played in differentiating between the behavioural clusters. Those significant variables will provide implications for policy-making.

Finally, we examine the response of different behavioural clusters to TOU policy and evaluate the efficiency of such a policy. We also explore whether the effectiveness of such a policy decreases after a certain period of time.

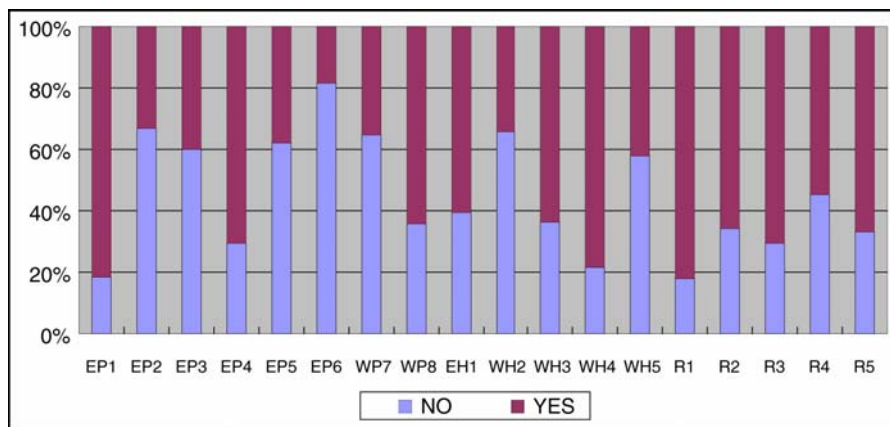
4 Results

The results will be described with reference to the four steps described above. We collected 270 questionnaires – a response rate of 83%. Most of the respondents were 20–59 years old with the education level of undergraduate and senior high school. The individual income and household income of most respondents were under 3000 and within the range of 1000–7999, respectively. Such results are inconsistent with the population and income structure of Nanjing city.

4.1 Overall sustainable consumption attitudes and behaviours

Surveyed behaviours comprised eighteen measurements on frequency or dichotomous scale, Figure 2 provides data on the frequency of the sustainable consumption behaviours. The frequencies clearly demonstrate that the three categories and 18 sustainable consumption behaviours represent alternative levels of commitment.

Figure 2 Frequency of sustainable consumption behaviours



These data provide an ideal summary of the structure and level of sustainable consumption behaviours in the samples. We can see that most of respondents engage in sustainable consumption; participation in 11 of 18 sustainable consumption behaviours' exceeds 50%. Recycling behaviours are the most popular, with the majority of the samples participating in such activities as rubbish classification, cans and plastic bottles recycling and charity giving. Very few families bought high efficiency appliances, high efficiency air conditioning (33%), solar heating systems (39%), energy efficient iceboxes (38%) or energy efficient hearths (19%). The habitual category provides some mixed information, with a majority switching off lights and taps, while very few making more conscious changes, such as taking fewer showers and reusing water.

4.2 Cluster analysis

In our cluster analysis, respondents were sorted into four clusters: full participators, active participators, moderate participators and occasional participators. Most of the respondents (34%) are moderate participators (Figure 3). The behaviour pattern of each cluster can be seen in Figures 4–7. These are shown with reference to the items identified in Table 1. Briefly, the behavioural dimensions of each cluster can be characterised in the following ways:

Cluster 1: full participators (Figure 4) regularly engaged with almost all of the behaviours in all of the three categories (purchase, habitual and recycling). All of the variables have 'yes' values higher than 50%. Many residents in this cluster claimed that they always or usually undertook almost all of these behaviours. Of particular significance in this cluster was the vast majority who stated that they always or usually bought energy and water efficient appliances, in sharp contrast to the general picture given in Figure 3.

Cluster 2: active participators (Figure 5) showed little variation in behavioural commitment to fully participators. There are 12 items that have 'yes' answer over 50%. Many in this cluster stated that they always or usually undertook most of these behaviours. Compared to cluster 1, more individuals never or rarely undertook a range of activities, particularly using energy efficient appliances and saving water.

Cluster 3: moderate participators (Figure 6) were significantly less likely to engage in half of the behaviours. Only 8 of 18 variables have 'yes' values higher than 50%. There were larger proportions of residents that either never or rarely reused water or recycled wastes.

Cluster 4: occasional participators (Figure 7) stand apart in a number of ways from the previous three clusters. In all but three cases, far fewer than 50% of individuals usually or always undertook each behaviour, with most being under 30%. Those activities where there was more behavioural commitment were related mostly to 'common sense' behaviours, with overtly pro-environmental behaviours being undertaken infrequently. This group is significant because it is distinctly inactive group that rarely engage with sustainable consumption.

Figure 3 The proportion of four clusters (for colours see online version)

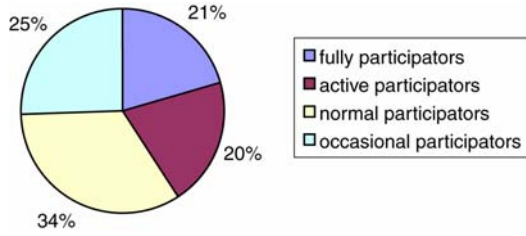


Figure 4 Cluster 1 ‘full participants’

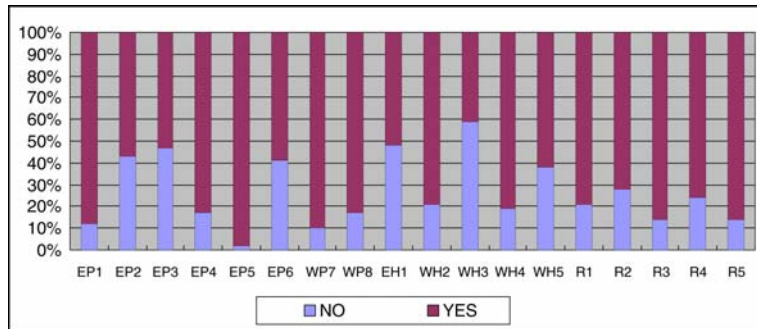


Figure 5 Cluster 2 ‘active participants’

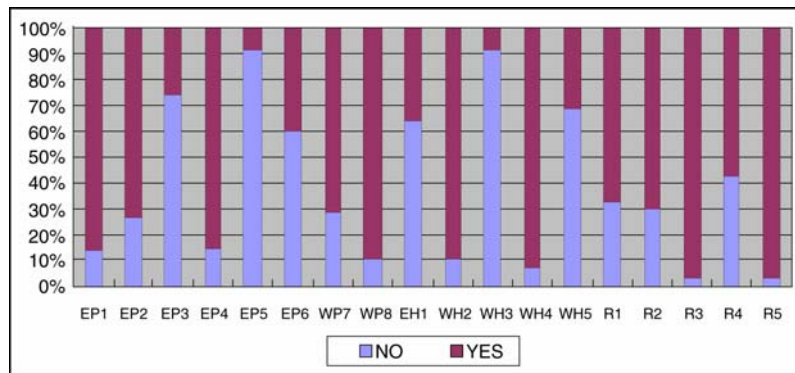


Figure 6 Cluster 3 ‘moderate participants’

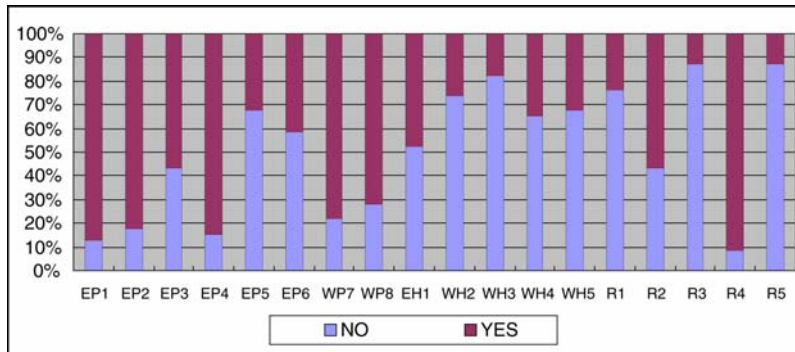


Figure 7 Cluster 4 ‘occasional participants’

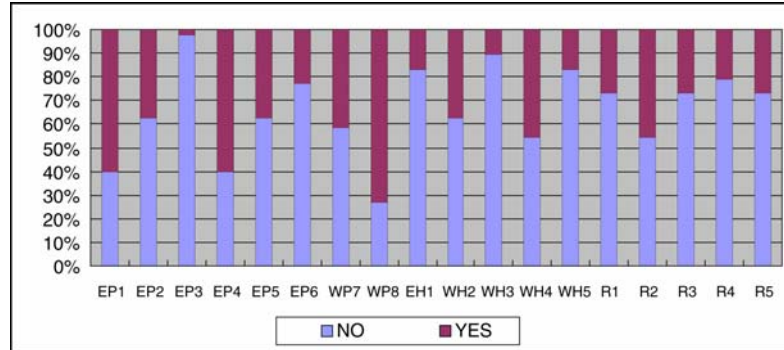


Table 1 Household sustainable consumption behaviours

<i>Factor</i>	<i>Variables included</i>	<i>Label</i>
Purchase behaviours	Buy environmental products	EP1
	High efficiency air conditioning	EP2
	Solar heating system	EP3
	High efficiency bulbs	EP4
	Energy efficient icebox	EP5
	Energy efficient hearth	EP6
	Water efficient appliance	WP7
	Use tertiary treated wastewater	WP8
Habitual behaviours	Close the windows when heating	EH1
	Water reuse	WH2
	Turn off tap when soaping up	WH3
	Turn tap off when cleaning teeth	WH4
	Use a shower rather than bath	WH5
Recycling behaviours	Rubbish classification	R1
	Recycle paper	R2
	Recycle cans and plastic bottles	R3
	Recycle battery	R4
	Donate clothes to charity	R5

4.3 Correlations

Tables 2 and 3 provides data relating to the demographic composition of the clusters. The following points are important to note.

People with the *age* between 20 and 29 or 40 and 59 will be more active in environmental behaviour, while people with the age older than 60 do not like to engage in sustainable consumption behaviours.

Table 2 Demographic characteristics of the respondents

<i>Variable</i>	<i>Options</i>	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
Age	<20	17	6.3	6.3
	20–29	75	27.8	34.1
	30–39	62	23.0	57.0
	40–59	88	32.6	89.6
	≥60	28	10.4	100.0
	Total		270	100.0
Gender	Male	139	52.5	52.5
	Female	126	47.5	100.0
	Total	265	100.0	–
Education	Under junior high school	11	4.1	4.1
	Junior high school	43	15.9	20.0
	Senior high school	68	25.2	45.2
	Undergraduate degree	114	42.2	87.4
	Graduate degree	34	12.6	100.0
	Total		270	100.0
Individual income	<1000	84	31.8	31.8
	1000–1999	98	37.1	68.9
	2000–2999	50	18.9	87.9
	3000–3999	20	7.6	95.5
	4000–4999	6	2.3	97.7
	≥5000	6	2.3	100.0
	Total		264	100.0
Household income	<1000	18	6.9	6.9
	1000–2999	78	29.8	36.6
	3000–4999	78	29.8	66.4
	5000–7999	59	22.5	88.9
	8000–9999	17	6.5	95.4
	≥10,000	12	4.6	100.0
	Total		262	100.0

Table 3 Individual factors on sustainable consumption behaviours

Variables	Options		Cluster				Total	F value
			1	2	3	4		
Age	<20	Count	3	6	3	3	15	15.709 (0.205)
		% within age	20.0	40.0	20.0	20.0	100.0	
	20–29	Count	19	19	19	15	72	
		% within age	26.4	26.4	26.4	20.8	100.0	
	30–39	Count	11	24	13	9	57	
		% within age	19.3	42.1	22.8	15.8	100.0	
	40–59	Count	22	36	8	18	84	
		% within age	26.2	42.9	9.5	21.4	100.0	
	≥60	Count	3	12	2	3	20	
		% within age	15.0	60.0	10.0	15.0	100.0	
Gender	Male	Count	32	40	26	30	128	7.3172 (0.062*)
		% within gender	25.0	31.3	20.3	23.4	100.0	
	Female	Count	24	55	20	17	116	
		% within gender	20.7	47.4	17.2	14.7	100.0	
Education	Under junior high school	Count	2	6	1	2	11	14.658 (0.261)
		% within education	18.2	54.5	9.1	18.2	100.0	
	Junior high school	Count	6	21	2	7	36	
		% within education	16.7	58.3	5.6	19.4	100.0	
	Senior high school	Count	18	19	10	15	62	
		% within education	29.0	30.6	16.1	24.2	100.0	
	Undergraduate degree	Count	25	40	26	17	108	
		% within education	23.1	37.0	24.1	15.7	100.0	
	Graduate degree	Count	7	11	7	6	31	
		% within education	22.6	35.5	22.6	19.4	100.0	
Individual income (Σ)	<1000	Count	13	43	6	14	76	31.887 (0.007***)
		% within i-income	17.1	56.6	7.9	18.4	100.0	
	1000–1999	Count	25	27	21	18	91	
		% within i-income	27.5	29.7	23.1	19.8	100.0	

Table 3 Individual factors on sustainable consumption behaviours (continued)

Variables	Options	Cluster				Total	F value	
		1	2	3	4			
2000–2999	Count	15	15	11	7	48		
	% within i-income	31.3	31.3	22.9	14.6	100.0		
3000–3999	Count	3	8	2	5	18		
	% within i-income	16.7	44.4	11.1	27.8	100.0		
4000–4999	Count	2	1	1	2	6		
	% within i-income	33.3	16.7	16.7	33.3	100.0		
≥5000	Count	0	1	4	1	6		
	% within i-income	0.0	16.7	66.7	16.7	100.0		
Household income (Σ)	<1000	Count	1	12	1	3	17	22.844 (0.088*)
		% within h-income	5.9	70.6	5.9	17.6	100.0	
1000–2999	Count	16	28	8	18	70		
	% within h-income	22.9	40.0	11.4	25.7	100.0		
3000–4999	Count	19	24	17	13	73		
	% within h-income	26.0	32.9	23.3	17.8	100.0		
5000–7999	Count	18	19	10	9	56		
	% within h-income	32.1	33.9	17.9	16.1	100.0		
8000–9999	Count	2	8	4	3	17		
	% within h-income	11.8	47.1	23.5	17.6	100.0		
≥10,000	Count	2	3	5	1	11		
	% within h-income	18.2	27.3	45.5	9.1	100.0		

*Significant at 10%

**Significant at 5%

***Significant at 1%

There was significant difference between male and female (chi-square $Pr < 0.1$). More *males* were in the fully participator cluster, moderate participator or occasional participator cluster, while more *females* in the active participator cluster. This may imply that males are more like to take relatively extreme actions. *Education* does not have a significant effect on behaviours according to the cluster analysis. Higher education does not necessarily produce environmentally friendly people.

Individual income is significantly related to the behaviours. Low-income group is more likely to be active participator cluster. With the increase of the income (group with income between 1000 and 5000 RMB per month), people are more likely to be active in environmental behaviour. But the rich people (group with income more than 5000 RMB) are not active in sustainable consumption behaviours. Most of them are moderate participator cluster.

Household income showed the same pattern as individual income. Low-household income (<1000 RMB) group is more likely to be active participator cluster. With the increase of the income (group with income between 1000 and 7999 RMB per month), people are more likely to be active in environmental behaviour. But the rich family (group with household income more than 8000 RMB) will not be active in environmental behaviour. Most of them belong to moderate participator cluster.

The data provide a clear demographic setting for the different sustainable consumption behaviours. Individual and household incomes play a critical role in environmental behaviours. Low-income group are either very active because of the intention to save money, or very occasional participators because of the lack of knowledge.

4.4 Policy evaluation

One of the objectives of the study was to evaluate the effectiveness of TOU. TOU policy has been recently adopted in many cities in China because of the shortage of electricity.

The policy aimed at encouraging household sustainable consumption on energy using (e.g. the time of washing clothes and taking shower). In Nanjing, the peak time period (8:00–21:00) is 0.55 RMB per kW when that of other period (21:00–8:00) is 0.33 RMB. Though there is no statistical significance for any variable, we can still get several conclusions (Table 4):

- Except for the youngest group (age less than 20), more people would like to change behaviours because of the TOU policy. The groups of 30–39 and 40–59 are more positive. Maybe it is because those people are usually the major income earners so they care more about money than other groups.
- Both males and females prefer to adopt the policy and there is no obvious difference between their behaviours.
- Low-income group are more likely to adopt the policy (more than 60% for people with income less than 2000 per month). Since, income is usually associated with the education level, low education group (lower than senior high school) is also more likely to take advantage of the TOU policy (more than 60%). This is also the same pattern for household variable.
- It is interesting that four clusters do not show significant differences in terms of the TOU policy. That means TOU policy is not very closely associated with the three types of behaviour we described above.
- From Table 5, we can see the effectiveness decay for cluster 4 (occasional participator group). There are significant differences between four clusters.

Table 4 Factors on the TOU policy

<i>Variables</i>	<i>Options</i>	<i>Change energy using</i>		<i>F value</i>
		<i>Yes</i>	<i>No</i>	
Age	<20	40.0	60.0	0.168
	20–29	53.8	46.2	
	30–39	73.9	26.1	
	40–59	59.1	40.9	
	≥60	52.6	47.4	
Gender	Male	64.0	36.0	0.283
	Female	56.0	44.0	
Education	Under junior high school	77.8	22.2	0.684
	Junior high school	56.0	44.0	
	Senior high school	63.6	36.4	
	Undergraduate degree	59.0	41.0	
	Graduate degree	52.0	48.0	
Individual income	<1000	59.6	40.4	0.443
	1000–1999	64.6	35.4	
	2000–2999	56.7	43.3	
	3000–3999	53.3	46.7	
	4000–4999	100.0	0.0	
	≥5000	33.3	66.7	
Household income	<1000	66.7	33.3	0.328
	1000–2999	66.7	33.3	
	3000–4999	60.0	40.0	
	5000–7999	55.3	44.7	
	8000–9999	63.6	36.4	
	≥10,000	25.0	75.0	
Cluster	Full participators	65.0	35.0	0.901
	Active participators	57.7	42.3	
	Moderate participators	61.3	38.7	
	Occasional participators	61.5	38.5	

Table 5 Time-based decay of effectiveness of TOU policy

	<i>Clusters</i>	<i>Effectiveness decay</i>		<i>Total</i>	<i>F value</i>
		<i>No (%)</i>	<i>Yes (%)</i>		
Clusters	Full participators	90.5	9.5	100.0%	7.199 (0.066*)
	Active participators	100.0	0.0	100.0%	
	Moderate participators	93.8	6.3	100.0%	
	Occasional participators	78.6	21.4	100.0%	

5 Conclusion

This paper examined the sustainable consumption behaviours of residents of Nanjing, Jiangsu Province. The result provided valuable new evidence on the state of sustainable consumption behaviours in this specific city. This exploratory research not only provides descriptive information, but also suggests questions for further study in the future. These conclusions could assist policy makers at both the national and local level in formulating policies. The most obvious conclusions are.

Income level is a very significant variable for various sustainable consumption behaviours. Low-income people are more likely to adopt cost-related policies such as TOU. They may not necessarily be full participators if sustainable consumption behaviours cannot obviously bring them economic benefits or they cannot pay the piper of sustainable consumption behaviours. Sometimes, they are lack of knowledge of sustainable consumption behaviours. On the other hand, high-income people may have higher environmental awareness, but are less activated by environmental policy. So most of them will also be not full participators. It appears that there is an inverse U of participation in sustainable consumption by income, with people of medium income participating most actively. Therefore, policies encouraging sustainable consumption should pay special attention to high- and low-income groups.

Unfortunately, people who are well-educated and with high income are surprisingly unwilling to take part in sustainable consumption. This means that special educational efforts about sustainable consumption are necessary to improve their awareness and change their behaviours. Policy makers should also provide more incentives to encourage high-income people to participate in sustainable consumption behaviours.

The effectiveness of environmental policy (TOU) will decrease along with the time, especially for occasional participators of sustainable consumption. Policy makers must be very careful to make sure that incentives for a specific policy last for as much long as possible to avoid policy effect decreases.

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