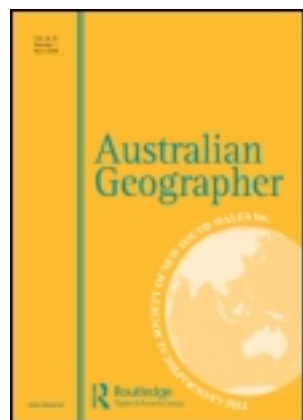


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Gordon Waitt^{a b}, Peter Caputi^{a b}, Chris Gibson^{a b}, Carol Farbotko^{a b}, Lesley Head^{a b}, Nick Gill^{a b} & Elyse Stanes^{a b}

^a Australian Centre for Cultural Environmental Research, School of Earth and Environmental Sciences, University of Wollongong, Australia

^b School of Psychology, University of Wollongong, Australia, *(All at ACCER except for PC)

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Sustainable Household Capability: which households are doing the work of environmental sustainability?

GORDON WAITT, PETER CAPUTI, CHRIS GIBSON, CAROL FARBOTKO, LESLEY HEAD, NICK GILL & ELYSE STANES, *Australian Centre for Cultural Environmental Research, School of Earth and Environmental Sciences, University of Wollongong, Australia; School of Psychology, University of Wollongong, Australia*
*(All at ACCER except for PC)

ABSTRACT *This paper presents a framework for analysing which households are doing 'their bit' for sustainability in an era of climate change, using a two-stage cluster analysis of sustainable household capabilities. The framework segments households by their reported level of commitment to 'pro-sustainability' practices common to conventional government policies. Results are presented from a large-scale survey of Wollongong households, New South Wales, Australia. Results illustrate the importance of approaching household sustainability through everyday practices. Attention is drawn to the wide variation in participation in specific household sustainability practices. Investigation into sustainable household capability by household segments shows the limits of even the most committed households. Results show the importance of socio-cultural contexts in differentiating sustainable household capabilities—with women, suburban-detached households and lower income segments of the population ultimately doing most of the work of being sustainable.*

KEY WORDS *Household sustainability; capabilities; climate change; pro-sustainability behaviour; Wollongong.*

Introduction

The trigger for this study is that the responsibility for sustainability in government policy increasingly appears to lie with households. Announcement of the Commonwealth of Australia's Green Loans Program in 2010 is just one example of the emphasis placed in Australian politics on the self-regulating household to ameliorate sustainability problems, including those posed by climate change, caused by over-consumption—through incentive schemes and education programs to reduce household consumption of energy, water and other resources. Conventional policies in these sectors, like that of Australia's Green Loans Program, have focused on influencing consumer choice with regards to energy and water efficiency

rating systems and government-sanctioned 'green' technologies, such as insulation, rainwater tanks and solar power. Overlooked in the incentive and education programs are how household energy, water and other resource consumption practices are part of rituals, rhythms, habits and routines of everyday life. As we have argued elsewhere (Gibson *et al.* 2011) conventional household sustainability policies take little account of the ways in which different households utilise this information through everyday practices. For example, people do not generally think of consuming energy, but about driving to work, picking up the kids, and warming or cooling their house. As argued by Reid *et al.* (2010) and Lane and Gorman-Murray (2011) there is a need to focus on the household as an organisational unit in debates about sustainability—their compositions, socio-economic attributes and as sites where situated meanings of consumptions practices are made salient. These consumption practices may be made more salient if constituted in the activities of being a parent, of being frugal, of living in a share household, and so on rather than having anything to do with 'the environment'. In this paper we do this through one particular conception of the nexus between society and 'environment', that of sustainability and what constitutes behaviours in the household that are promoted in government policies as, or have come to be understood by the public as, 'pro-environmental' or 'pro-sustainability'. Further, while sustainability itself has a complex history and range of uses, our work is framed around discourses of climate change. This is both a response, in the larger research project of which this paper is part, to concerns about the impact of climate policy on employment in heavy industry, and to the fact that climate change has come to be a key medium through which sustainability discourses have been mobilised since it became a key aspect of Australian political life and government from about 2007.

Our aim is to direct attention to the broader social issues around household sustainability and everyday practices. We realise this aim by a focus on what we term 'sustainable household capability'. We understand sustainable household capability as the ability of households to implement the conventional sustainability actions found in governmental policies, such as recycling, saving energy or conserving water. To meet our aim we explore which households have the greatest capability to incorporate sustainability, as defined in wider political discourses, into their daily household routines. First, we measure levels of household engagement with conventional pro-sustainability practices. Second, we statistically describe which segments of society claim to have a higher engagement than others in sustainability practices and what household characteristics account for any observed disparity between segments. Finally, we investigate how sustainability judgements may restrict sustainable household capability—specifically awareness, concern or knowledge about climate change.

In order to address our aim this paper presents a framework that investigates sustainable household capability from a large household survey conducted in Wollongong, Australia in July 2009. The survey was part of a larger project drawing on mixed methods to explore the ways in which climate change action is constructed in everyday life. In accounting for sustainable household capability we aim to capture the forces at play in household responsibility for environmental sustainability as constituted in wider political discourses.

This paper is organised as follows. It begins with review of the literature on sustainable consumption and a discussion of our sustainable household capability framework. The second section outlines our methodologies. An overview is given of

the way in which two-stage cluster analysis was applied to identify segments in the sample by 'normal' pro-environment household practices found in government policy. A rationale for the case study selection is provided by giving an overview of relevant conditions specific to Wollongong, Australia. In the results section, attention first turns to the reported level of household engagement with different types of pro-sustainability household practices. Households are then categorised by their level of engagement within each pro-environment sustainable household practice. Statistical relationships are reported between household segments and household structure. The final results section explores the situated meanings of a particular sustainability issue—that of climate change. Statistical relationships are reported between household segments and household judgements of climate change.

Household sustainability and consumption

Fundamental to the task of household sustainability is a better understanding of what drives current consumption (Gibson *et al.* 2011). Four, sometimes overlapping, strands of approach and decision making can be identified in this highly diverse field. The first is mainstream government programs that deploy a utilitarian logic to consumption and sustainability, drawing on neo-liberal assumptions about economic behaviour on the basis of rational utility-maximisation (Lipsey & Harbury 1992). This approach concentrates on policies to correct market failures, and to ensure that individuals have greater information to practise more sustainable consumption. The underlying assumption is that when consumers are equipped with the facts and figures of the impact of their consumption practices, particularly when there are clear cost savings, this will lead to 'rational' changes in behaviour. For example, in Australia, 'Climate Clever' and its successor 'Think Climate, Think Change' were federally funded greenhouse gas emissions education campaigns that provided information to consumers on greenhouse gas emissions and climate change, along with advice on what action individuals could take to reduce their emissions. In the late 2000s the federal government funded a home insulation scheme, solar hot water rebates and green loans; while local, state and federal governments have legislated for energy rating schemes for household appliances, cars and houses (Robinson & Edwards 2009; DCCEE 2010). These initiatives took a utilitarian approach, assuming that given clear financial incentives individuals would behave following the prescribed course of pro-sustainability action.

A second emerging strand is research that highlights the shortcomings of policy moves informed by a utilitarian approach: first, the utilitarian approach wrongly implies that people are passive consumers rather than citizens or active subjects (Burgess *et al.* 2003; Malpass *et al.* 2007); second, information campaigns are frequently met with scepticism because of cynicism towards government and clashes of ideology (Eden *et al.* 2008; Hinchliffe 1996); third, promoting public awareness of climate change is inadequate to change behaviour, because cultural norms shape household consumption in complex and uneven ways (Lorenzoni *et al.* 2007); and fourth, sustainability campaigns normally fail to appeal to or appreciate the emotional meanings to material possessions (Allon & Sofoulis 2006; Hobson 2008) or home spaces (Blunt & Dowling 2006). Together, these critiques suggest that consumption practices will not change simply through the provision of

better quality information and financial incentives. Furthermore, Gregson *et al.* (2007) troubled many assumptions of what constitutes ‘normal’ pro-sustainability behaviours, including recycling and reducing electricity or fossil fuel consumption, by recognising these practices may not necessarily be motivated by individual environmental concerns. So too, austerity, hoarding, sharing and charity donations—all cultural practices with implications for reducing consumption—require analysis in specific social settings to ascertain motivations and meanings (Gregson *et al.* 2007).

A third strand is concerned with the establishment and maintenance of the wider social institutions, socio-technological regimes and cultural context within which individual consumption decision making is made. Lawrence and McManus (2008) illustrate the importance of socio-technological regimes of water that mediated between patterns of production and consumption. Water utilities are just one example of institutional, technological and resource assemblages which constrain consumer options. Giddens’ (1984) conception of structuration suggests that household patterns of consumption are both created and constrained through systems of provision of transport, waste management, recycling, water and energy. Overcoming limitations involves challenging existing social institutions and socio-technological regimes. Emphasis is given to collective citizen action, rather than consumer behaviour. Focusing on socio-technical regimes, rather than individual decision making, questions are asked about continued economic growth and the capitalistic logic of expansion (Jackson 2009). For example, the ‘transition towns’ movement is underpinned by an economy of ‘sufficiency’ and mutual aid, as opposed to continued growth and market competition (Hopkins 2008).

Extending this line of enquiry is the work of Shove (2003) on the role of tools and technologies in the making and remaking of everyday household practices. She illustrates how changing social norms, say in terms of cleanliness and washing clothes, may counteract efficiency improvements within systems of provision. Another line of enquiry with a focus on socio-technological regimes of household consumption has drawn together Bruno Latour’s ideas of actors and networks (see, for instance, Hobson’s work on the ‘techno-ethics of sustainable living’ (Hobson 2003, 2006a, b) and Michel Foucault’s concept of ‘governmentality’ (see Hobson 2011; Bulkeley 2005; Bulkeley *et al.* 2007). This line of enquiry illustrates the importance of strategies of government, including the institutional structures, procedures and norms in analysing any ‘responsibility’ of the individual.

A fourth strand has adopted a social approach to consumption research. From its beginnings this approach has emphasised the social contexts within which consumption occurs because it is here that peer pressures and supportive contexts can be found (see Jackson 2005). This diverse body of work is important for the emphasis that it gives to highlighting the importance of situated meanings, social networks, peers and institutions in shaping consumption decisions (see Burgess *et al.* 2003). Drawing on Bourdieu’s (1984) theories of social distinction, Jackson (2007) shows the significance of acts of purchase in terms of the symbolic value of objects and how these give insights into the self and wider social relations.

Social approaches have currency in sustainability research by examining the social contexts that mediate an individual’s ability and motivations to engage with pro-sustainability consumption practices (see Barr *et al.* 2001, 2005; Barr & Gilg 2006; Barr 2007; Gilg *et al.* 2005; Lorenzoni *et al.* 2007; Whitmarsh *et al.* 2011). Particular attention is given to explain the lack of public engagement with

sustainability measures and the so-called ‘environmental value action gap’ (Blake 1999); that is the discontinuity between an expressed concern for ‘the environment’ and individual sustainability behaviours. This research points towards the importance of social marketing targeted at tightly focused segments of the population to shift social norms, the importance of structural measures as strategies to change consumption behaviour and a better understanding of the environmental knowledge of so-called ‘ordinary’ people—including those surrounding climate change.

Sustainable household capability

We draw on the social approach to propose the concept of sustainable household capability to characterise households by their reported level of adoption of ‘normal’ pro-sustainability behaviours. Our way of thinking requires sustainable household capability to be viewed as an achievement rather than analysed as a material attribute for comparing the sustainability of resource use among populations, as with ‘ecological footprint’ (Lenzen & Murray 2001). The key point is that sustainable household capability is an achievement, the outcome of a specific social and cultural context that offers sufficient possibilities to reduce emissions. Accordingly, some households may accept the environmental science that frames sustainability issues, including climate change, but their everyday social contexts, habits and routines may render pro-sustainability actions as unthinkable, or ‘the environment’ is just one of the lines of responsibility being juggled, say along with being a mother (Burgess *et al.* 2003). How households act is a different matter from what they know about environmental sustainability, and willingness to act may be constrained not only by cultural and conventional limits as to what counts as acceptable consumption practice but also specific material, technological and economic restrictions and possibilities. In this regard, sustainable household capability is understood as a resourceful process of juggling, trade-off and manipulation of daily routines, purchasing practices, and use of building, garden and domestic technologies. We identify three core dimensions of sustainable household capability:

- (1) household practices (e.g. recycling and water conservation);
- (2) household structure (e.g. income, employment, dwelling type and composition);
- (3) household sustainability judgements (e.g. knowledge, awareness, concern towards climate change).

The concept of sustainable household capability enables analysis of the relationships between household practices, structures and judgements. Adopting this approach, the household is not conceptualised as a group of individuals with their own psychological responses to environmental sustainability but as a social and cultural milieu within which consumption practices take place (Reid *et al.* 2009; Gibson *et al.* 2011). Our approach most closely resembles Whitmarsh *et al.*’s (2011) deployment of the concept of ‘carbon capability’ for individuals. Rather than focus on individual decision making, however, we consider it important to understand how the work of urban environmental sustainability is spread across households. Our approach enables a consideration of which households demonstrated the capability to

adopt pro-sustainability behaviours across two dimensions—household structures and household sustainability judgements, specifically those surrounding climate change.

Method

A postal survey entitled ‘Tough Times? Green Times? A survey of the issues important to households in the Illawarra’ was conducted to investigate which households demonstrated the capability to adopt ‘normal’ pro-sustainability practices. The survey and cover letter was posted in July 2009 in Wollongong, Australia, and invited an adult familiar with the running of the household to participate. The timing of survey distribution is worth acknowledging: July 2009 was not long after the shock of the global financial crisis, and during heated public debate over the federal Labor government’s proposed carbon emissions trading scheme. Debates surrounding climate change economics fuelled a leadership spill in the Coalition Party in 2009, and increased concerns about rising consumer costs and the security of jobs of Australian workers. Only 18 months earlier there had been widespread public praise of the Rudd Labor government signing the Kyoto Protocol, in the shadow of Al Gore’s *Inconvenient Truth* and widespread drought. According to a Lowy Institute poll at the time, Australians feared climate change more than international terrorism (Gynell 2007). The context, then, for this survey, was one where climate change was potentially an issue of significant concern among households.

Wollongong is an important setting to undertake research about household consumption and responses to sustainability and climate change. Wollongong is a coastal regional city with a population of about 270 000, located 80 km south of Sydney on Australia’s urbanising southeast coastal crescent. Wollongong is a city adapting to fundamental economic changes as education, health and tourism come to challenge traditional coal, steel and transportation industries in employment, landscape, and a regional sense of identity. The city is marked by scientific taxonomies of the Intergovernmental Panel on Climate Change (IPCC 2007) as a ‘hotspot’, where predicted global climate change will be felt in sea-level rise and increased flooding and bush-fires. While in the more diversified contemporary economy of Wollongong coal and steel are no longer the only key sectors of employment, national debates about climate change and policy responses such as pricing carbon in some way have consistently aroused deep-seated concern about the demise of collieries and the steelworks.

A report by the Australian Conservation Foundation (2010) on sustainable cities rated Wollongong as number 16 out of 20. The city performed worst on indicators such as air quality, human health, education and mortgage stress, and relatively well on water usage, biodiversity, transport and climate change. Reflecting the high proportion of households on lower incomes, it is no surprise that the report identified that Wollongong households have limitations on ‘social resilience’ in comparison to more affluent communities. Yet the Australian Conservation Foundation (2010) report also identified a high awareness of climate change relative to other Australian cities. This is a complex picture of a city characterised by a heightened collective sense of vulnerability, and an increased awareness of the critical role of the city in the global smokestack economy, supplying the global

carbon economy with cheap coal. This is, in other words, an exemplar city in which to measure the capability of households to respond to a changing climate.

Survey design

The survey comprised both open and closed questions, and addressed socio-economic characteristics, pro-environmental household consumption practices, judgements of climate change and place-based attachments. In framing the survey questions we were mindful of Liverman's critique that too many case studies of climate change adaptation and vulnerability have been 'undertaken outside frameworks that permit aggregation, comparison or general insights' (2008, p. 5). She identified the urgent research need for rigorous comparative frameworks 'including some common metrics and questions that will facilitate aggregation, meta-analysis and generalisation' (2008, p. 6). We were at pains to facilitate international comparison. Several of the questions used were therefore adapted from previous studies so that results could be compared. What are constituted as 'normal' pro-sustainability household consumption practices were measured on a 32-item scale, adapted from Barr (2008), including energy consumption, water consumption, recycling practices and shopping practices. This measure explored the frequency of reported pro-sustainability household practices in the past year (1 = always done that to 5 = never done that). There were another four items with yes/no responses.

Data on household judgements of climate change were collected in three ways. First, to gather data on household awareness of the predicted regional vulnerability to climate change, respondents were asked to rank their opinions on nine future scenarios for the region in 2030. Respondents responded on 5-point Likert attitude scales (1 = very likely to 5 = very unlikely). Second, respondents were requested to respond to seven questions adapted from two CSIRO studies (2005a, b) on a 5-point Likert attitude scale (1 = strongly agree to 5 = strongly disagree) about the household's evaluation of climate change, addressing importance, interest, information, arguments and willingness to change practices. Finally, in the 'your words' section respondents were asked to provide their understanding of 'climate change'.

A pilot survey was conducted in May 2009 with 32 adults familiar with the daily running of their households. Successive revisions of the survey addressed apprehensions about the length and wording of some questions. Senior project staff appeared in regional television, radio and print media leading up to the distribution of the final survey in order to improve public knowledge of the impending exercise. The survey was posted to a random sample of 11 555 households drawn from eight suburbs in metropolitan Wollongong. These suburbs represented five points on a low-high continuum of income quintile ranges: the lowest (Bellambi ($n = 1609$) and Port Kembla ($n = 2083$)), second lowest (North Wollongong ($n = 553$) and Oak Flats ($n = 2339$)), the middle (Mangerton ($n = 1028$) and Shellharbour ($n = 1274$)), second highest (Balgownie ($n = 1855$)) and highest (Austinmer ($n = 815$)). The urban form of these suburbs included the higher density inner-city apartments of North Wollongong; medium-density 1960s state housing in Bellambi; and the low-density detached suburban housing in Shellharbour, Austinmer, Mangerton and Balgownie.

The number of surveys posted to each suburb was first shaped by their proportional contribution to the total population of metropolitan Wollongong, and second, by anticipation of lower response rates in less affluent suburbs. Twice as many surveys were posted to the lower income quintiles to account for expected lower response rate. This targeted random sampling framework was employed to improve sample representativeness. The sample size reflected the need to generate approximately 200 useable survey returns from each quintile range to permit statistical testing, based on an expected overall return rate of 10 per cent. The actual return rate was 12.67 per cent ($n = 1465$). Respondents in the postal survey were statistically representative of the total population sampled; and returns were therefore not weighted (see Table 1). Quantitative analysis was conducted using the Statistical Software Package for Social Sciences (SPSS).

A two-stage cluster analysis was used to explore the question: which households are doing the work of environmental sustainability? In other words, which are the most sustainable households as per conventional understandings of pro-sustainability behaviour? A two-stage cluster analysis first categorised responses from 878 surveys (due to incomplete answers) by 'normal' pro-sustainability household consumption practices, and then designated households by the similarity between their levels of engagement with these practices. In the first step, Ward's (1963) hierarchical cluster analysis was employed as a classification tool in order to identify groups within the list of 36 household sustainability practices. Ward's minimum variance method is designed to generate categories in such a way as to minimise within-cluster variance. The dendrogram, or tree-like structure, is a representation of how Ward's hierarchical algorithm creates clusters by either adding or deleting individual items from clusters. Working from lower to higher levels of agglomeration within the hierarchy, the responses in each category become more dissimilar. In this project, clustering practices were therefore a helpful starting point to segment Wollongong households by their level of engagement in particular sets of pro-sustainability household consumption practices.

The second stage involved K-means, a non-hierarchical clustering technique that reassigned each household to a pre-specified number of three clusters whose centroid was closest to that household consumption practice. The number of clusters was suggested by the segment profiles identified by the DECC (2006): 'strong', 'modest' and 'limited'. This strategy fostered possibilities for detailed quantitative description of the socio-demographic characteristics of each household cluster. Reassignment continued until every household was assigned to a cluster with the nearest centroid. Such a procedure minimised the variance within each cluster. Thirty-two sustainability practices were employed to cluster households. Following the advice of Ketchen and Shook (1996), four yes/no response questions were dropped for this particular analysis because centroid methods can only be used with interval and ratio data. The three household clusters were labelled to reflect the frequency and diversity of taken-for-granted 'pro'-sustainability consumption practices: 'strong', 'modest' and 'limited'.

Results and discussion

Our results are presented in three sections to meet our overall aim of directing attention to the broader social issues around household sustainability and everyday practices, investigating: engagement levels with conventional pro-sustainability

TABLE 1. Socio-demographic characteristics of the sample and metropolitan Wollongong

Variable	Survey sample	Wollongong Urban Centre Locality (UCL)
Household composition (number of people)		
1	(<i>n</i> = 297) 20.7%	(<i>n</i> = 21 012) 24.4%
2	(<i>n</i> = 545) 38.1%	(<i>n</i> = 28 741) 33.4%
3	(<i>n</i> = 200) 14%	(<i>n</i> = 13 796) 16%
4	(<i>n</i> = 257) 17.9%	(<i>n</i> = 14 064) 16.4%
5	(<i>n</i> = 99) 6.9%	(<i>n</i> = 5999) 7%
6	(<i>n</i> = 34) 2.4%	(<i>n</i> = 2388) 2.8%
Total	(<i>n</i> = 1432) 100%	(<i>n</i> = 86 000) 100%
Total weekly household income (after tax)		
\$1–249	(<i>n</i> = 119) 8.9%	(<i>n</i> = 7224) 9.5%
\$250–499	(<i>n</i> = 241) 17.9%	(<i>n</i> = 12 917) 17.0%
\$500–799	(<i>n</i> = 209) 15.6%	(<i>n</i> = 1400) 18.4%
\$800–1199	(<i>n</i> = 243) 18.1%	(<i>n</i> = 13 553) 17.8%
\$1200–1699	(<i>n</i> = 236) 17.6%	(<i>n</i> = 10 706) 14.1%
\$1700–2499	(<i>n</i> = 178) 13.3%	(<i>n</i> = 10 400) 13.7%
\$2500 +	(<i>n</i> = 118) 8.8%	(<i>n</i> = 7186) 9.5%
Total	(<i>n</i> = 1344) 100%	(<i>n</i> = 75 986) 100%
Dwelling type		
Detached house	(<i>n</i> = 1093) 76.1%	(<i>n</i> = 63 498) 73.2%
Semi-detached house	(<i>n</i> = 77) 5.4%	(<i>n</i> = 8919) 10.3%
Unit/apartment	(<i>n</i> = 240) 16.7%	(<i>n</i> = 12 353) 14.2%
Caravan, cabin or cottage	(<i>n</i> = 27) 1.9%	(<i>n</i> = 1954) 2.3%
Total	(<i>n</i> = 1437) 100%	(<i>n</i> = 86 724) 100%
Age		
18–24	(<i>n</i> = 40) 2.8%	(<i>n</i> = 22 999) 13.5%
25–34	(<i>n</i> = 162) 11.2%	(<i>n</i> = 29 892) 17.5%
35–44	(<i>n</i> = 243) 16.9%	(<i>n</i> = 32 999) 19.4%
45–54	(<i>n</i> = 336) 23.3%	(<i>n</i> = 31 673) 18.6%
55–64	(<i>n</i> = 300) 20.8%	(<i>n</i> = 25 170) 14.8%
65 +	(<i>n</i> = 360) 25%	(<i>n</i> = 27 760) 16.3%
Total	(<i>n</i> = 1441) 100%	(<i>n</i> = 170 493) 100%
Education		
Year 9 or below	(<i>n</i> = 149) 11.2%	(<i>n</i> = 33 866) 14.2%
Year 10	(<i>n</i> = 208) 15.7%	(<i>n</i> = 58 987) 24.8%
Year 11	(<i>n</i> = 40) 3%	(<i>n</i> = 11 442) 4.8%
Year 12	(<i>n</i> = 143) 10.8%	(<i>n</i> = 63 969) 26.9%
Diploma or trade/ apprenticeship	(<i>n</i> = 328) 24.7%	(<i>n</i> = 48 973) 20.6%
Bachelor's/honour's degree	(<i>n</i> = 282) 21.2%	(<i>n</i> = 16 051) 6.8%
Postgraduate	(<i>n</i> = 178) 13.4%	(<i>n</i> = 4477) 1.9%
Total	(<i>n</i> = 1328) 100%	(<i>n</i> = 237 765) 100%
Employment		
Employed full time	(<i>n</i> = 429) 31.3%	(<i>n</i> = 59 911) 35.2%
Employed part time	(<i>n</i> = 208) 15.2%	(<i>n</i> = 30 669) 18%
Self-employed	(<i>n</i> = 82) 6%	(<i>n</i> = 0) 0%
Unemployed	(<i>n</i> = 47) 3.4%	(<i>n</i> = 8059) 4.7%
Not in labour force	(<i>n</i> = 604) 44.1%	(<i>n</i> = 71 636) 42.1%
Total	(<i>n</i> = 1370) 100%	(<i>n</i> = 170 025) 100%

practices; which household segments claim to have a higher engagement than others in pro-sustainability practices; and the statistical relationships between pro-sustainability practices and sustainability judgements—specifically awareness, concern or knowledge about climate change.

Household engagement levels with conventional pro-sustainability practices

Households were asked about levels of engagement with ‘recommended’ pro-sustainability consumption practices that inform policy frameworks advocating for household sustainability. Table 2 shows the proportion of households allocated by their level of engagement. The majority of households claimed to undertake some form of pro-sustainability consumer action. Table 2 shows that recycling (78 per cent claim ‘always’ to recycle newspaper, glass, plastics and cans) was the most widespread reported pro-sustainability practice. This result is in general agreement with other studies (see Barr *et al.* 2005; Barr & Gilg 2006; Barr 2007; Lorenzoni *et al.* 2007; Whitmarsh *et al.* 2011). As elsewhere, in Wollongong this is a highly structured and regulated behaviour that does not rely upon purchase decisions. Waste management is operationalised by Wollongong City Council through the provision and use of wheeled bins collected at the kerbside each fortnight.

Consistent with previous research, environmental household action is based around daily household practices rather than particular sectors—such as transport, water or energy (see Barr & Gilg 2006). For example, certain water conservation measures were extensive amongst households, specifically those practices associated with washing dishes (64 per cent), cleaning teeth (63 per cent) and washing clothes (56 per cent). However, the adoption of other water conservation practices was less widespread, such as ‘always’ reducing the number of toilet flushes (29 per cent) and ‘always’ taking shorter showers (28 per cent). Social norms surrounding the use of water in the habitual practices of showering and toilet flushing are perhaps harder to shift than those informing the everyday household routines of cleaning teeth and washing clothes and dishes. Similarly, the practice of ‘always’ switching off lights in unoccupied rooms was prevalent (68 per cent), whereas respondents were less likely to ‘always’ buy energy-efficient household appliances.

Table 2 shows that the lowest levels of reported engagement with pro-sustainability household practices were those related to purchase decisions. Only 6 per cent claimed ‘always’ to walk to the shops. Not walking to the shops is related to having purchased a car. In Wollongong, given available transport and shopping infrastructure, the car is the normal means of transport for shopping (over 80 per cent of respondents used their car to travel to the grocery shop). Like many other cities, Wollongong’s suburban growth was built on the assumption of car mobility, replete with the ubiquitous shopping mall and car park. Only since the completion of the survey, in 2009, has the state government encouraged alternative modes of transport through the provision of a free bus service around the inner city. Similarly, only 34 per cent claim to ‘always’ compost their kitchen and garden waste. Whereas systems of governance have helped embed recycling as a common practice through street-side recycling, composting is constrained by the decision to purchase a wormery or composter. There are no community composting schemes in Wollongong.

TABLE 2. Frequency distribution of household practices

Please indicate how often	Always (%)	Usually (%)	Sometimes (%)	Rarely (%)	Never (%)
Water consumption					
I avoid keeping the tap running when washing dishes	64	22	8	3	3
I turn off the tap whilst cleaning my teeth	63	21	8	4	4
I wait until I have a full load of laundry before washing	56	34	8	1	1
I try and reduce the number of times I take showers in a day	43	26	11	8	12
I try and reduce the number of times I flush the toilet	29	32	19	9	11
I try to save water in the bathroom by taking short showers	28	34	26	8	4
Household purchases					
I try to buy energy-efficient household appliances	34	46	14	4	2
I use environmentally friendly detergents whenever possible	32	33	19	9	7
I use my own bag when I go shopping	28	34	21	9	8
I buy products with as little packaging as possible	19	36	30	10	5
I buy plants that require less water	18	39	28	7	8
I avoid products in aerosol containers	17	31	28	13	11
I buy toilet paper made from recycled paper	17	17	25	17	24
I buy local produce wherever possible	14	29	36	17	4
I buy fair-trade wherever possible	12	19	34	17	18
I grow my own fruit and vegetables	9	14	28	11	38
I buy organic produce whenever possible	9	13	38	22	18
I buy food from a store that I walk to	6	8	36	26	24
I buy pesticides	2	4	24	34	36
Recycling and reusing					
I recycle glass, plastics bottles and cans	78	15	6	1	1
I recycle newspaper	78	19	1	1	1
I take old clothes to the charity shops	62	21	11	3	3
I repair clothing	55	28	12	3	2
I donate old household items to charity	55	22	17	4	2
I compost my garden waste	34	16	13	9	28
I compost kitchen waste	34	9	10	11	36
I reuse scrap paper	31	28	24	9	8
I reuse glass bottles and jars	27	28	29	9	7
Energy consumption					
I switch off lights in unoccupied rooms	68	25	5	1	1
I put on an extra layer of clothing before turning up the heating	44	39	13	2	2

Statistically, Wollongong households were least engaged with pro-sustainability behaviours associated with everyday shopping practices. For example, few households' sustainability actions are centred on the purchase of organic products

(9 per cent), fair trade products (12 per cent), 'local' produce (14 per cent) and toilet paper made from recycled paper (17 per cent). In recent years the two major supermarkets in Australia have increased the visibility of both 'local' (Australian) and 'organic' produce within their stores. However, our results suggest that households regard these as niche groceries. The responses perhaps also reflect that most respondents were constrained by current socio-technological regimes of groceries provision. Small-scale grassroots innovations are present in Wollongong. Our results suggest that only small transformations in the production-consumption system were being generated by community gardens, organic food co-operatives, veggie-box subscription schemes and farmers' markets. Having established the level of engagement with different pro-sustainability behaviours, the next section reports the results from segmenting the households by their reported sustainable household capability.

A segmentation analysis of sustainable household capability

A two-stage cluster analysis was conducted to investigate whether some households that claimed to have a higher level of engagement with sustainability practices shared similar socio-economic attributes. The first step of the cluster analysis categorised the 36 included sustainability practices. Results from the first stage of the cluster analysis revealed four clusters of sustainability-related household practices. These were labelled according to their generic characteristics. First, there were 'mainstream practices' of recycling, reusing and reductions of water and energy consumption within everyday lives. The frequency of reporting across all households suggests that collective norms govern the consumption of water and energy consumption by having a stabilising effect on some household routines, turning off lights in unoccupied rooms and turning off taps while cleaning teeth. Others have become habituated through the provision of recycling bins and the widespread distribution of charity bins for donating unwanted clothes. Second were reported household practices involving 'big ticket purchase decisions', understood as sustainably 'good' or 'bad', including installing solar panels and water tanks, or alternatively choosing not to purchase air-conditioners. Solar panels and water tanks are increasingly taken for granted and promoted by national policy as sustainably-responsible behaviours, while air-conditioners are often positioned as sustainably-irresponsible technology. Third, there was an empirical cluster of reported sustainable household practices that involved 'everyday purchase decisions'. This set of practices was centred on a move in households towards more 'sustainable consumption' patterns including: avoiding use of plastic bags, reusing items and purchasing decisions that avoid packaging, aerosols, imported products and water-intensive plants. Finally, there appeared a group of 'labour intensive or "green branded" practices' that include a conscious effort to compost, growing fruit and vegetables, walking to the shops, or buying fair-trade products and toilet paper made from recycled paper. Overall, Ward's cluster analysis identified these four relatively homogeneous categories into which household practices could be categorised. The results from the first step of the cluster analysis provided further evidence for the argument that sustainable household action is based around everyday practices.

The second step of the two-stage cluster analysis then classified each household by the reported level of engagement with pro-sustainability household practices.

Figures 1, 2 and 3 show results from the second stage of the cluster analysis. Figure 1 shows that households segmented as demonstrating 'strong' sustainable household capability (34 per cent) reported the highest frequency of *always* engaging in all four major clusters of sustainable household practices. These households reduced direct household water and energy consumption as a matter of concern, priority and everyday practice, complemented by a strong sustainable action through the purchasing decisions of many household items. Yet there were limits beyond which even 'strong' households were unable, or unprepared to act. Even the majority of 'strong' households did not report 'always' purchasing food

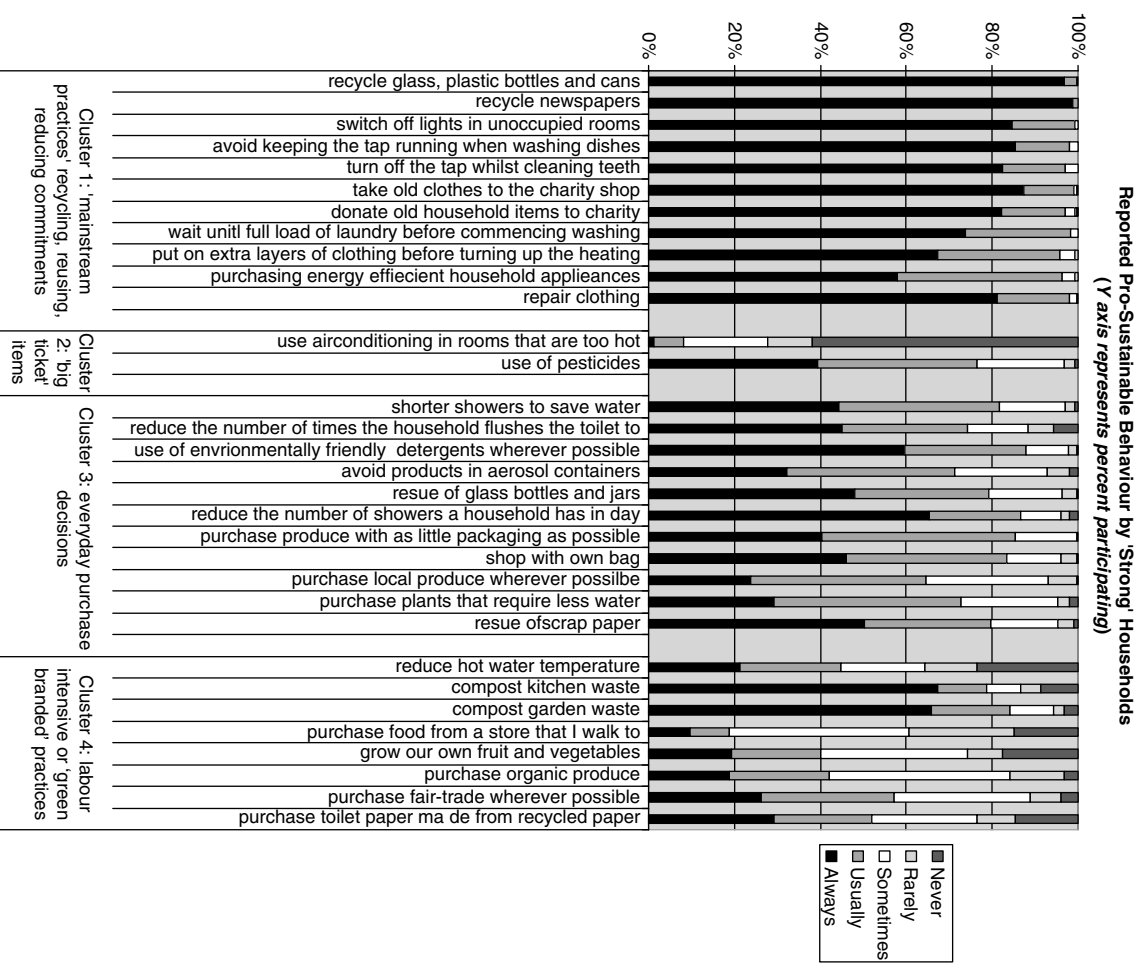


FIGURE 1. Frequency distribution of sustainability practices undertaken by a 'strongly' committed household segment.

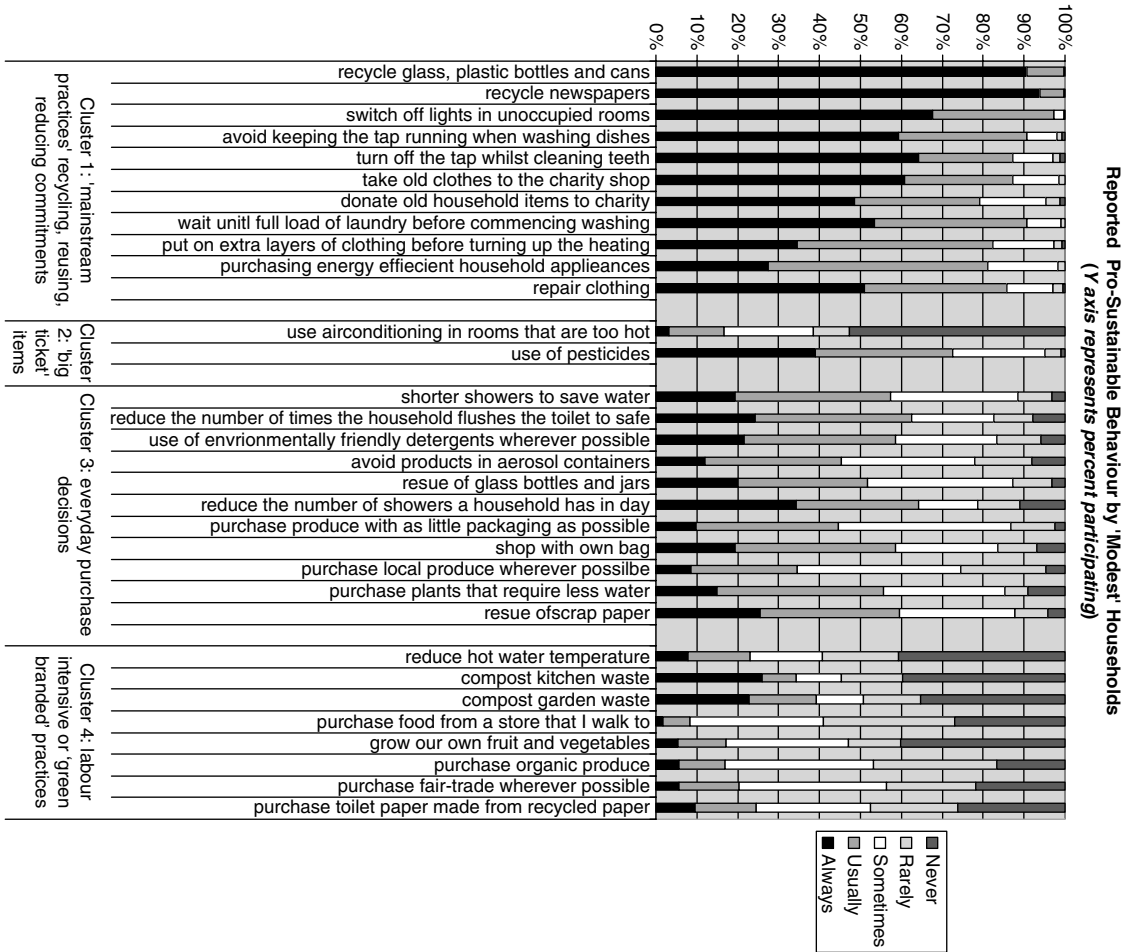


FIGURE 2. Frequency distribution of sustainability practices undertaken by a 'modesty' committed household segment.

from a store they had walked to, purchasing organic produce or growing their own fruit and vegetables.

Figure 2 shows households categorised as having 'modest' sustainable household capability (48 per cent). These households usually reported a commitment to 'mainstream practices' of recycling, reusing and some reductions of water and energy consumption in household routines of laundry, dishwashing and purchasing energy-efficient appliances. This group was less committed through 'everyday purchase decisions' and showed little to no involvement in those activities categorised as labour intensive or 'green branded' consumption practices.

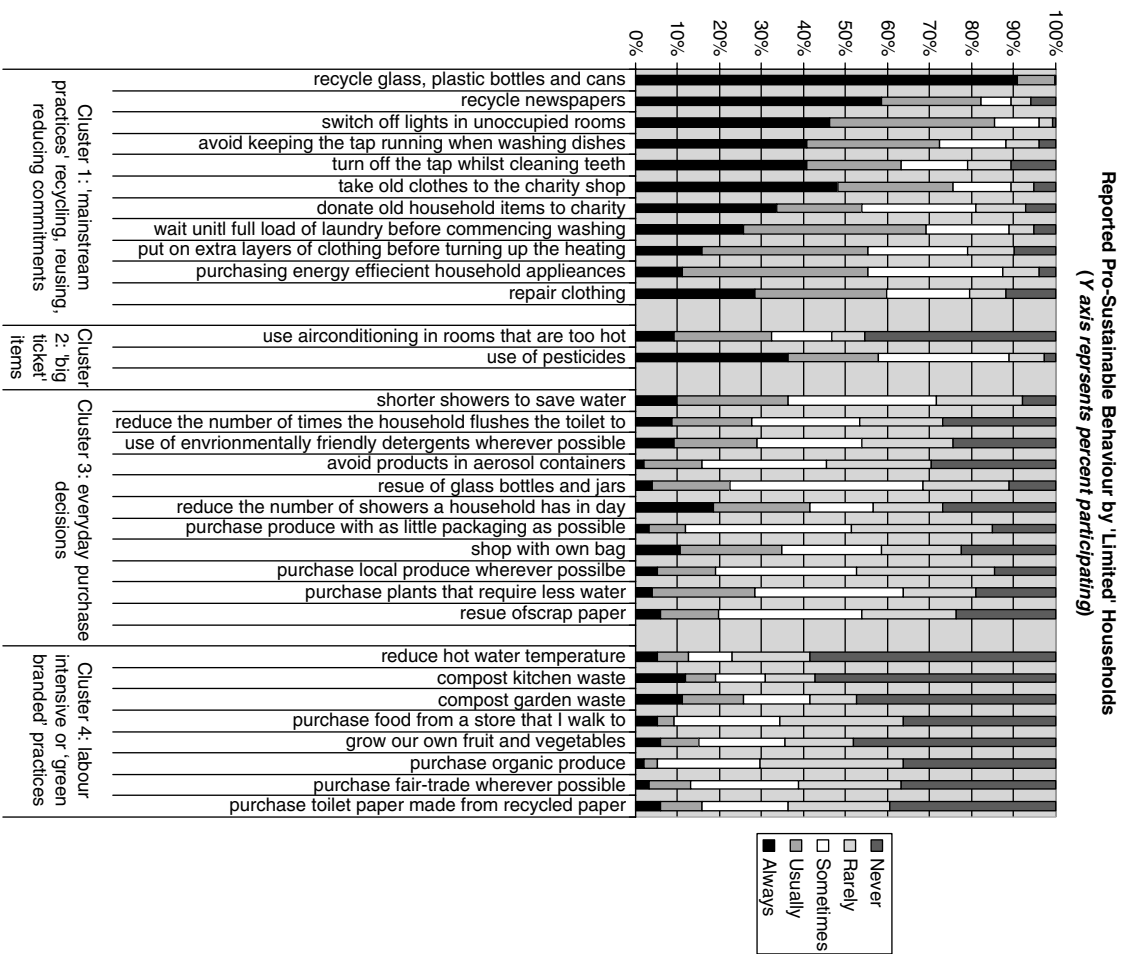


FIGURE 3. Frequency distribution of sustainability practices undertaken by a household segment with 'limited' commitment.

Figure 3 shows that households with 'limited' sustainable household capability (17 per cent) reported the lowest frequency of engaging with conventional pro-sustainability practices. With the exception of recycling, donation and a couple of water- and energy-saving practices, these households had little demonstrable commitment to curtailing consumption. That recycling, donation, and turning off taps and lights did occur may have been because, as highlighted by Barr *et al.* (2001), unlike many 'green' pitched products or sustainability campaigns to save water or energy, these behaviours have become common sense, as economic frugality measures, without necessarily having any 'green' associations.

These three statistically distinct Wollongong household segments provided a basis from which to investigate the structural attributes of households—the characteristics of those households doing the work of sustainability. Table 3 shows the statistical relationship between sustainable household capability and six dimensions of household structure. Chi-square tests were used to ascertain whether there were statistical differences between the three household segments across housing type (three categories), household structure (eight categories), gender, income (seven categories), employment status (seven categories), and education (five categories). Statistically significant results are reported for gender, household type and income.

For gender, these results are difficult to interpret with certainty because individuals completed the survey *on behalf of* whole households. Strictly speaking, more women who completed the survey were in households categorised as ‘strongly committed’; while men statistically outnumbered women in completing the survey in households categorised as ‘limited’. This disparity suggests that gender is a key element of household sustainability. The statistical difference suggests that women shoulder higher expectations of household sustainability. At a time when the house remains a primary site of women’s labour, further work requires exploring how gender is negotiated through the domestic politics of homemaking practices, including construction and maintenance, food shopping and preparation, waste management and clothes making.

For household type, pro-sustainability household practices are statistically higher for households living in detached houses than those living in units. Our results counter arguments routinely found in some environmentalist and New Urbanist planning discourses, an intellectual movement of architects that positions the detached houses of suburbia as an ‘evil’ urban form because of thermal inefficiency and commuting (see Frumkin *et al.* 2004). Instead, our results confirm Davison’s (2011) and Gleeson’s (2008) argument that points towards the socio-cultural context of the suburban urban form as offering creative possibilities to engage in urban environmental sustainable living. As noted by Gleeson (2008), higher density unit dwelling often entails higher expenditure on goods and services (e.g. swimming pools, lifts and common property lighting) while strata laws and the need for consensus among a large number of co-habiting households limit autonomy to reshape the systems, practices and habits surrounding waste management and utility use in apartment blocks.

For income, households in the lowest income bracket, earning \$1–249 per week, were statistically over-represented in households categorised as having a ‘strong’ sustainable household capability. In contrast, households in the highest incomes bracket, earning \$1700 to more than \$3500 per week were over-represented in the segment denoting ‘limited’ sustainable household capability. Sustainable household capability was uneven across Wollongong by income. The lowest income households reported they were doing more work in terms of environmental sustainability than the highest income households. Whether this is solely by necessity or arising from some combination of lifestyle and career choices relating to environmental, self-sufficiency or other values cannot be answered from our survey data, but is a suitable topic for future qualitative research.

The least affluent households demonstrated the greatest creative willingness to change certain everyday household practices that improve dimensions of energy, transport, water, and food efficiency. In contrast, fewer households in the highest

TABLE 3. Household carbon-reduction willingness by household structure, gender, income, employment and education

Variable	Strong	Modest	Limited
Housing type (% within two step cluster number) Pearson chi-square 9.1, df 4 $P=0.04$ (<0.05)	($n=290$)	($n=412$)	($n=149$)
Detached house	($n=254$) 87.6%	($n=335$) 81.3%	($n=120$) 80.5%
Semi-detached house	($n=17$) 5.9%	($n=22$) 5.3%	($n=9$) 6.0%
Uni/apartment	($n=19$) 6.6%	($n=55$) 13.3%	($n=20$) 13.4%
Household structure	($n=297$)	($n=422$)	($n=150$)
Couple family with children (percentage within two step cluster number)	($n=86$) 29%	($n=154$) 36.5%	($n=54$) 36%
Couple family without children	($n=61$) 21.1%	($n=89$) 20.5%	($n=33$) 18%
One-parent family	($n=17$) 5.7%	($n=17$) 4.0%	($n=6$) 4%
Couple with non-dependent children	($n=52$) 17.5%	($n=67$) 15.9%	($n=27$) 18.5%
One-parent family with non-dependent children	($n=12$) 4%	($n=12$) 2.8%	($n=0$) 0%
Single-person household	($n=51$) 17.2%	($n=69$) 16.4%	($n=21$) 14%
Extended family	($n=10$) 3.4%	($n=6$) 1.4%	($n=5$) 3.3%
Sharehouse	($n=8$) 2.7%	($n=8$) 1.9%	($n=4$) 2.7%
Gender of respondent completing survey: Pearson chi-square 31.9, df 2, $P=0.001$ (<0.05)	($n=273$)	($n=383$)	($n=136$)
Male	($n=67$) 23.1%	($n=153$) 52.8%	($n=70$) 24.1%
Female	($n=206$) 41%	($n=230$) 45.8%	($n=66$) 13.1%
Totally weekly household income (percentage within two step cluster number) Pearson chi-square 20.9, df 12, $P=0.051$ (<0.05)	($n=277$)	($n=402$)	($n=139$)
\$1–249	($n=28$) 10.1%	($n=24$) 6.0%	($n=8$) 5.8%
\$250–499	($n=42$) 15.2%	($n=67$) 16.7%	($n=14$) 10.1%
\$500–799	($n=44$) 15.9%	($n=51$) 12.7%	($n=18$) 12.9%
\$800–1199	($n=53$) 19.1%	($n=69$) 17.2%	($n=23$) 16.5%
\$1200–1699	($n=42$) 15.2%	($n=75$) 18.7%	($n=31$) 22.3%
\$1700–2499	($n=31$) 11.2%	($n=71$) 17.7%	($n=31$) 22.3%
\$2500–> 3999	($n=37$) 13.4%	($n=45$) 11.2%	($n=14$) 10.1%
Employment status Pearson chi-square 8.92, df 12, $P=0.71$ (>0.05)	($n=281$)	($n=399$)	($n=146$)
Employed full time	($n=89$) 31.7%	($n=146$) 37.3%	($n=56$) 38.4%
Employed part time	($n=54$) 19.2%	($n=67$) 16.8%	($n=23$) 15.8%
Self-employed	($n=14$) 5.0%	($n=20$) 5.0%	($n=11$) 7.5%
Unemployed	($n=11$) 3.9%	($n=16$) 4.0%	($n=5$) 3.4%
Home duties	($n=19$) 6.8%	($n=33$) 8.3%	($n=12$) 8.2%
Retired/pensioner	($n=90$) 32%	($n=104$) 26.1%	($n=35$) 24.0%
Full-time student	($n=4$) 2.2%	($n=10$) 2.5%	($n=4$) 2.7%
Education level (percentage within two step cluster number)	($n=283$)	($n=389$)	($n=137$)

TABLE 3 (Continued)

Variable	Strong	Modest	Limited
Pearson chi-square 11.9, df 8, $P=0.151$ (>0.05)			
High school	($n=99$) 33.3%	($n=133$) 44.8%	($n=65$) 21.9%
Certificate/diploma	($n=55$) 19.4%	($n=62$) 15.9%	($n=18$) 16.1%
Bachelor's/honour's degree	($n=64$) 22.6%	($n=98$) 25.2%	($n=22$) 10.2%
Trade/apprenticeship	($n=26$) 9.2%	($n=36$) 9.3%	($n=14$) 10.2%
Postgraduate degree	($n=39$) 13.8%	($n=60$) 54.4%	($n=18$) 13.1%

income bracket have changed basic household activities to maintain homes and gardens, commute to work, and to meet everyday needs for subsistence. Reported sustainable household capability is generally higher for households with lower disposable income. Constrained by income, the lowest income households reported the most committed involvement in conventional pro-environment household behaviours found in government policies. These findings are consistent with ecological footprint analysis that has found that both globally (Rees 2006) and in Australia (Australian Conservation Foundation 2007) it is relatively affluent populations and households, often with a high interest in, and commitment to, sustainability, who continue to live unsustainably by virtue of their ability to consume. The next section investigates the statistical relationships between climate change judgements and household sustainable capability, having established the statistical significance of gender, household form and income.

Expert knowledge: helping households become sustainable?

A common policy assumption is that households require ever increasing amounts of information from 'experts' to help them become sustainable. Informed by 'expert' knowledge, it is assumed that people will make the 'right' choices. In Australia, this appears to be the driving assumption surrounding public engagement with greenhouse gas emissions and climate change. The final results section explores the relationships between household climate change judgements and sustainable household capability. Awareness of climate change was very high. Over 80 per cent (1250 households) agreed that 'climate change is an important issue for Australia'. Similarly, over 75 per cent (1089 households) agreed with the statement that their 'household was well informed about climate change', with only 10 respondents in strong disagreement. Furthermore, less than 15 per cent (169 households) agreed with the statement that their 'household is uninterested in climate change'. While the survey highlighted diverse situated understandings of what Wollongong respondents understood by the words 'climate change', the most common responses cited accepted science (59 per cent of households). Scientific framings included:

rising sea levels, high temperatures, drought, fall in water supply, coastal damage. (P10253)

sea level rise, increased temperature, drought, storms. (P20006)

warming, drought, sea level rise, extreme events. (P30050)

Furthermore, the majority of households recognised that scientists predict that climate change will impact on Wollongong. Responses to the survey section 'Wollongong Futures' suggest that the majority of households accepted the scientific claim that climate change would modify the coastlines and increase the risks of bushfires. Only 6 per cent thought a changed coastline was 'very unlikely' and only 3 per cent thought increased bush fire threats were 'unlikely'. Consistent with households' knowledge of predicted impacts, the least frequent response to what respondents understood by the words 'climate change' was sceptical framings (9 per cent of respondents). Our survey results also echo findings from the Australian Conservation Foundation (2010) that suggest only a minority continue to be sceptical about the implications of climate change. In short, most households were familiar with the 'expert' knowledge of climate scientists.

Yet our survey results also suggest that households that are ardently concerned about climate change were few in number. When asked to rank the three most important issues facing Wollongong in 2009 from a list of 15, the top two issues were unemployment (35 per cent, $n=482$) and health (15 per cent, $n=213$), followed by an ageing population (12 per cent, $n=1176$), crime (8 per cent, $n=116$) and 'the economy' (8 per cent, $n=115$). Climate change was ranked the seventh most important issue (4 per cent, $n=50$). Respondents were evidently knowledgeable about the predicted scientific implications of climate change but their ranking suggests that respondents did not connect climate change with personal financial or health concerns. Consistent with respondents' rankings is the lack of evidence in their qualitative responses of any connection between climate change and personal choices. Only 1 respondent understood climate change as a financial issue ('increase taxes', P30085), only 2 respondents understood climate change in terms of health, and only 42 respondents highlighted personal choice or action. While households expressed a willingness to change their behaviour because of climate change (75 per cent, $n=1080$), only a handful actually understood climate change as individualised pro-environmental action.

Do households act in accordance with their awareness, interest and concern for climate change? Awareness, interest and concern for climate change were measured as means on the Likert scale of 1 (strongly agree) to 5 (strongly disagree). Consistent with previous surveys (DECC 2007), a new social sensibility regarding climate change is evident: households of varying levels of sustainability commitment are broadly agreed in wanting more information about climate change, in believing that climate change is important, and on articulating a willingness to change behaviours to help limit climate change. Table 4 shows Bonferroni post hoc tests of a multiple analysis of variance. Although support was statistically strongest amongst households already committed to sustainable practices, overall means were only slightly different between Wollongong household segments categorised with 'strong', 'modest' and 'limited' sustainability capability (see Table 4). These results are in general agreement with other studies, such as Blake (1999), Owens (2000) and Whitmarsh *et al.* (2011) that point towards the limitations of policies based on information and awareness. Such policies take little consideration of the ways in which different households utilise this information in changing the socio-cultural contexts of their everyday household practices. Hence, consistent with the 'environmental value-action gap' reported in previous research (Blake 1999) is the divergence between households

TABLE 4. Bonferroni, post hoc tests: climate change knowledge, importance and concern by household carbon-reduction willingness

Variable	Strong (<i>n</i> = 278)	Modest (<i>n</i> = 400)	Limited (<i>n</i> = 142)
My household is informed about climate change***	1.82 (0.691)	2.14 (0.747)	2.37 (0.785)
Strong**	–	–0.32*	–0.54*
Modest	0.32*	–	–0.22*
Limited	0.54*	0.22*	–
My household would like more information about climate change***	2.51 (0.953)	2.78 (0.933)	2.88 (1.055)
Strong**	–	–0.26*	–0.37*
Modest	0.26*	–	–0.10
Limited	0.37*	0.10	–
My household is uninterested about climate change***	4.12 (1.058)	3.92 (0.96)	3.64 (0.977)
Strong**	–	0.20*	0.47*
Modest	–0.20	–	0.28*
Limited	–0.47*	–0.28*	–
Climate change is an important issue for Australia***	1.54 (0.677)	1.80 (0.796)	2.01 (0.960)
Strong**	–	0.25*	–0.47*
Modest	–0.25*	–	–0.22*
Limited	0.47*	0.22*	–
My household would be prepared to change behaviours to help limit climate change***	1.80 (0.666)	2.12 (0.740)	2.3 (0.891)
Strong**	–	–0.32*	–0.50*
Modest	0.32*	–	–0.18*
Limited	0.50*	0.18*	–
There are different opinions of climate change in my household***	3.45 (1.157)	3.20 (1.065)	3.13 (0.921)
Strong**	–	0.25*	0.32*
Modest	–0.25*	–	0.08
Limited	–0.32*	–0.08	–

Notes: *** = mean and standard deviation of a 5-point Likert scale (1 = strongly agree to 5 = strongly disagree); ** = mean difference; * = mean difference is significant at the 0.05 level.

with 'limited' and 'modest' sustainable household capability and an expressed concern, knowledge and willingness to act. Wollongong households with more information, greater concern and willingness to act upon climate change did not become more 'virtuous' through embracing conventional pro-environmental household practices. As Hobson (2002) has argued, information-intensive environmental campaigns are unlikely to encourage households to do more work for climate protection.

Conclusion and implications for policy and future research

In government policies, households are positioned as crucial sites of environmental action. Our results underscore the importance of government action based on daily household practices rather than sectoral behaviour (such as transport, energy or water saving). Second, our results point to a need for government actions alert to the diversity of sustainable household capability. Households are not an undifferentiated mass; they possess different capabilities to alter consumption practices in a consistent fashion to policy moves. In some households there were relatively few adjustments, focused mostly on recycling activities and turning off taps and electricity switches. Even in the most committed sustainable households there are limits in Wollongong to the embracing of less conventional pro-sustainable behaviours, such as walking to the shops to purchase groceries, purchasing organic foods and households growing their own fruit and vegetables.

Our results also suggest that through policy apprehending everyday practices, attention needs to be given to the deeper socio-cultural contexts that drive consumption in households. Socio-demographic contexts matter to contemplating individual action in relation to everyday practices that underpin sustainable household capability. Statistically there is a relationship between sustainable household capability in Wollongong and housing type, gender and income. Statistically, higher levels of reported sustainability action in Wollongong were apparent among less affluent households, households living in detached dwellings and households organised by women. In the light of these understandings about household sustainability, concentrated policy efforts are required to shift the everyday practices of the most affluent Wollongong households. Likewise, policies and programs must acknowledge that the less affluent Wollongong households are already doing the work of sustainability, and have the least capability to further reduce consumption practices.

Furthermore, contrary to conventional arguments of some environmentalists that focus on suburban form as counter to sustainability, when sustainable household capability is conceptualised as a creative human achievement, those households living in detached suburban homes exhibited greater capability to engage with practices to reduce carbon emissions than those living in units. The cultural contexts of households also matter because of the situated meanings that frame environmental issues within the social relationships and everyday household practices. However, as emphasised in previous research, provision of information alone does not change everyday household practices. Wollongong households segmented by level of engagement with pro-sustainability practices shared almost similar levels of concern, awareness and knowledge about climate change. Our results underscore that household decision making is not based on rational decision-making models of utility; rather, household practices must attend to their distinctive spatial context. Understandings of climate are always negotiated in and through the relations that comprise households.

In the context of the challenges of urban environmental sustainability, our study is currently limited by the use of the social survey approach. Large-scale survey work only takes us so far. Future research can go beyond what was possible here in better understanding the everyday socio-cultural contexts within which dynamic household decisions, experiences and practices are embedded. As Gibson *et al.* (2011)

additionally argue, this will require further theoretical and qualitative work to flesh out how the social worlds of ethics and pragmatics come to shape household decisions about resource use, sharing and consumption. Only further qualitative research that adopts a more grounded approach, and is sensitive to how sustainability policy issues such as climate change are made sense of in everyday life, can delve beyond the survey results presented here. Overall, these survey results are a starting point rather than the end point in the investigation of household sustainability.

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Correspondence: Gordon Waitt, Australian Centre for Cultural Environmental Research, School of Earth and Environmental Sciences, University of Wollongong, NSW 2522, Australia. E-mail: gwaitt@uow.edu.au

REFERENCES

- ALLON, F. & SOFOULIS, Z. (2006) 'Everyday water: cultures in transition', *Australian Geographer* 37, pp. 45–55.
- AUSTRALIAN CONSERVATION FOUNDATION (2007) *Consuming Australia: main findings*, ACF, Melbourne.
- AUSTRALIAN CONSERVATION FOUNDATION (2010) *Sustainable cities index: ranking Australia's 20 largest cities in 2010*, ACF, Melbourne.
- BARR, S. (2007) 'Factors influencing environmental attitudes and behaviors: a U.K. case study of household waste management', *Environment and Behaviour* 39, pp. 435–73.
- BARR, S. (2008) *Environment and society: sustainability, policy and the citizen*, Ashgate, Aldershot.
- BARR, S. & GILG, A. (2006) 'Sustainable lifestyles: framing environmental action in and around the home', *Geoforum* 37, pp. 906–20.
- BARR, S., GILG, A.W. & FORD, N. (2001) 'A conceptual framework for understanding and analysing attitudes towards household waste management', *Environment and Planning A* 33, pp. 2025–48.
- BARR, S., GILG, A. & FORD, N. (2005) 'Defining the multi-dimensional aspects of household waste management: a study of reported behaviour in Devon', *Resources, Conservation and Recycling* 45, pp. 172–92.
- BLAKE, J. (1999) 'Overcoming the "value-action gap" in environmental policy: tensions between national policy and local experience', *Local Environment* 4, pp. 257–78.
- BLUNT, A. & DOWLING, R. (2006) *Home*, Routledge, London.
- BOURDIEU, P. (1984) *Distinction: a social critique of the judgement of taste*, Routledge, London.
- BULKELEY, H. (2005) 'Reconfiguring environmental governance: towards a politics of scales and networks', *Political Geography* 24(8), pp. 87–101.
- BULKELEY, H., WHATSON, M. & HUDSON, R. (2007) 'Modes of governing municipal waste', *Environment and Planning A* 39, pp. 2733–53.
- BURGESS, J., BEDFORD, T., HOBSON, K., DAVIES, G. & HARRISON, C. (2003) '(Un)sustainable consumption', in Scoones, I. & Leach, M. (eds) *Negotiating environmental change*, Edward Elgar, Cheltenham, pp. 261–91.
- CSIRO (COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION) (2005a) *Energy consumption and alternative energy report*, CSIRO, Canberra.
- CSIRO (COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION) (2005b) *Turning point or tipping point?*, CSIRO, Canberra.

- DAVISON, A. (2011) 'A domestic twist on the eco-efficiency turn: environmentalism, technology, home', in Lane, R. & Gorman-Murray, A. (eds) *Material geographies of household sustainability*, Ashgate, London, pp. 35–50.
- DCCEE (DEPARTMENT OF CLIMATE CHANGE AND ENERGY EFFICIENCY) (2012) *Energy Rating Website*, available from: <http://www.energyrating.gov.au/> (accessed 16 January 2012).
- DECC (DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE) (2006) *Who cares about the environment in 2006?*, available from: <http://www.environment.nsw.gov.au/community/whocares2006.htm> (accessed 1 March 2009).
- DECC (DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE) (2007) *Who cares about water and climate change in 2007? A survey of NSW people's environmental knowledge, attitudes and behaviours*, available from: <http://www.environment.nsw.gov.au/community/Whocares2007.htm>
- EDEN, S., BEAR, C. & WALKER, G. (2008) 'The sceptical consumer? Exploring views about food assurance', *Food Policy* 33, pp. 624–30.
- FRUMKIN, H., FRANK, L. & JACKSON, R. (2004) *Urban sprawl and public health*, Island Press, Washington, DC.
- GIBSON, C., HEAD, L., GILL, N. & WAITT, G. (2011) 'Climate change and household dynamics: beyond consumption, unbounding sustainability', *Transactions of the Institute of British Geographers* 36, pp. 3–8.
- GIDDENS, A. (1984) *The constitution of society: an outline of the theory of structuration*, Polity Press, Cambridge.
- GILG, A., BARR, S. & FORD, N. (2005) 'Green consumption or sustainable lifestyles? Identifying the sustainable consumer', *Futures* 37, pp. 481–504.
- GLEESON, B. (2008) 'Waking from the dream: an Australian perspective on urban resilience', *Urban Studies* 45, pp. 2653–68.
- GREGSON, N., METCALFE, A. & CREWE, L. (2007) 'Moving things along: the conduits and practices of divestment in consumption', *Transactions of the Institute of British Geographers* 32, pp. 187–200.
- GYNELL, A. (2007) *Australia and the world: public opinion and foreign policy*, Lowy Institute, Sydney.
- HINCHLIFFE, S. (1996) 'Helping the earth begins at home: the social construction of socio-environmental responsibilities', *Global Environmental Change* 6, pp. 53–62.
- HOBSON, K. (2002) 'Competing discourses of sustainable consumption: does the "rationalisation of lifestyles" make sense?', *Environmental Politics* 11(2), pp. 95–120.
- HOBSON, K. (2003) 'Thinking habits into action: the role of knowledge and process in questioning household consumption practices', *Local Environment* 8, pp. 95–112.
- HOBSON, K. (2006a) 'Environmental psychology and the geographies of ethical and sustainable consumption: aligning, triangulating, challenging?', *Area* 38, pp. 292–300.
- HOBSON, K. (2006b) 'Bins, bulbs, and shower timers: on the "techno-ethics" of sustainable living', *Ethics, Place and Environment* 9, pp. 317–36.
- HOBSON, K. (2008) 'Reasons to be cheerful: thinking sustainably in a (climate) changing world', *Geography Compass* 2, pp. 199–214.
- HOBSON, K. (2011) 'Environmental politics, green governmentality and the possibility of a "creative grammar" for domestic sustainable consumption', in Lane, R. & Gorman-Murray, A. (eds) *Material geographies of household sustainability*, Ashgate, London, pp. 193–210.
- HOPKINS, R. (2008) *The transition handbook: creating local sustainable communities beyond oil dependency*, Finch, Sydney.
- INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) (2007) *Climate change 2007: climate change impacts, adaptation and variability. Summary for policymakers*, Working Group II Contribution to the IPCC Fourth Assessment Report, available from: <http://www.ipcc.ch/> (accessed 1 March 2009).
- JACKSON, T. (2005) *Motivating sustainable behaviour: a review of evidence on consumer behaviour and behaviour change*, report to the Sustainable Development Research Network, Policy Studies Institute, London.
- JACKSON, T. (2007) 'Readings in sustainable consumption', in Jackson, T. (ed.) *The Earthscan reader in sustainable consumption*, Earthscan, London, pp. 1–23.

- JACKSON, T. (2009) *Prosperity without growth: economics for a finite planet*, Sustainable Development Commission, London.
- KETCHEN, D.J. & SHOOK, C.L. (1996) 'The application of cluster analysis in strategic management research: an analysis and critique', *Strategic Management Journal* 17, pp. 441–58.
- LANE, R. & GORMAN-MURRAY, A. (2011) 'Introduction', in Lane, R. & Gorman-Murray, A. (eds) *Material geographies of household sustainability*, Ashgate, Aldershot, pp. 1–16.
- LAWRENCE, K. & MCMANUS, P. (2008) 'Towards household sustainability in Sydney? Impacts of two sustainable lifestyle workshop programs on water consumption in existing homes', *Geographical Research* 46, pp. 314–32.
- LENZEN, M. & MURRAY, S.A. (2001) 'A modified ecological footprint method and its application to Australia', *Ecological Economics* 37, pp. 229–55.
- LIPSEY, R. & HARBURY, C. (1992) *First principles of economics* (2nd edition), Oxford University Press, Oxford.
- LIVERMAN, D. (2008) 'Assessing impacts, adaptation and vulnerability: reflections on the Working Group II Report of the Intergovernmental Panel on Climate Change', *Global Environmental Change* 18, pp. 4–7.
- LORENZONI, I., NICHOLSON-COLE, S. & WHITMARSH, L. (2007) 'Barriers perceived to engaging with climate change among the UK public and their policy implications', *Global Environmental Change* 17, pp. 445–59.
- MALPASS, A., BARNETT, C., CLARKE, N. & CLOKE, P. (2007) 'Problematizing choice: responsible consumers and sceptical citizens', in Bevin, M. & Trentmann, F. (eds) *Governance, consumers and citizens: agency and resistance in contemporary politics*, Palgrave Macmillan, Basingstoke, pp. 231–46.
- OWENS, S. (2000) 'Engaging the public: information and deliberation in environmental policy', *Environment and Planning A* 32, pp. 1141–8.
- REES, W.E. (2006) 'Ecological footprints and bio-capacity: essential elements in sustainability assessment', in Dewulf, J. & Van Langenhove, H. (eds) *Renewables-based technology: sustainability assessment*, Wiley, Chichester, pp. 143–58.
- REID, L., SUTTON, P. & HUNTER, C. (2010) 'Theorizing the meso level: the household as a crucible of pro-environmental behaviour', *Progress in Human Geography* 34, pp. 309–27.
- ROBINSON, D. & EDWARDS, D. (2009) 'Sustainable housing design: measurement, motivation, and management in Sutherland Shire, Sydney, Australia', *Environment and Planning B: Planning and Design* 36, pp. 336–54.
- SHOVE, E. (2003) *Comfort, cleanliness and convenience*, Berg, Oxford.
- WARD, J. (1963) 'Hierarchical grouping to optimize an objective function', *Journal of the American Statistical Association* 58, pp. 236–44.
- WHITMARSH, L., SEYFANG, G. & O'NEIL, S. (2011) 'Public engagement with carbon and climate change: to what extent is the public "carbon capable"?', *Global Environmental Change* 21, pp. 56–65.