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Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation

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Abstract

This paper explores whether socio-demographics still have a role to play in profiling green consumers. Following an interdisciplinary review of the literature, the second part of the paper attempts to address shortcomings identified in previous research. Specifically, hypotheses are developed concerning the relationship between six key socio-demographic variables and five valid and reliable measures of environmental consciousness. These hypotheses are subsequently tested on a large nationwide sample of British consumers and conclusions drawn on the utility of socio-demographic variables for profiling green consumers.

Keywords: Consumer behaviour; Green consumers; Ecological consumer behaviour

1. Introduction and objectives

There is ample empirical evidence that environmental concern is a major factor in consumer decision making (Hackett, 1992, 1993; Zimmer et al., 1994; Meffert and Bruhn, 1996; Grunert-Beckmann et al., 1997; Kilbourne and Beckmann, 1998). With green product markets expanding at a remarkable rate on both sides of the Atlantic (Charter and Polonsky, 1999; Prakash, 2000), companies pursue market opportunities in the production and promotion of environmentally sensitive goods and services (Schlossberg, 1992; Menon and Menon, 1997; Polonsky and Ottman, 1998; Roozen and De Pelsmacker, 1998). In this context, segmentation analysis can enable companies to effectively target environmentally conscious consumers (Meffert and Bruhn, 1996; Prendergast and Thompson, 1997).

The literature on green marketing has attempted to profile green consumer segments using a variety of variables (Kilbourne and Beckmann, 1998). These include *geographic* measures (e.g., Tremblay and Dunlap, 1978; Samdahl and Robertson, 1989; Pickett et al., 1993; Gooch, 1995), *cultural* measures (e.g., Anderson et al., 1974; Webster, 1975; Murphy et al., 1978), *personality* measures (e.g., Kinnear et al., 1974; Crosby et al., 1981), and, last but not least, *socio-demographic* characteristics. However, most studies appear to indicate a limited or ambiguous value of socio-demographic characteristics for segmenting and targeting environmentally conscious consumers (see Samdahl and Robertson, 1989; Scott and Willits, 1994; Stern et al., 1995). At the same time, "many consumer products and services companies focus primarily or even completely on demographics" (McDonald and Dunbar, 1998, p.22) because socio-demographic variables, compared to other segmentation measures, are more readily available and can be applied to segmentation problems with relative ease (Myers, 1996). Therefore, the apparent weakness of socio-demographics for profiling green consumers is of great managerial concern: if such characteristics really have no role to play, marketers are forced to turn to alternative and, invariably, more complex segmentation and targeting approaches (Wedel and Kamakura, 2000).

Against this background, the present paper aims to take a closer look at the role of socio-demographics for profiling

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green consumers. There are a number of reasons calling for fresh analysis of their role. First, with few exceptions (Balderjahn, 1988; Schahn and Holzer, 1990; Grunert and Kristensen, 1994), many earlier studies failed to investigate the impact of socio-demographic variables on *all* components of environmental consciousness; namely, *knowledge* about green issues, *attitudes* towards environmental quality, and levels of environmentally sensitive *behavior*. Second, many measures of environmental consciousness used in past research have not been subjected to sufficient dimensionality, reliability, and validity tests (see Literature and Hypotheses section for details). Third, many previous studies have been based upon data collected in the 1970s and 1980s. This is a potentially serious problem, as environmental knowledge, attitudes, and behavior have undergone substantial changes during the last three decades (Roberts, 1996; Kilbourne and Beckmann, 1998). Finally, the large majority of environmental studies focusing on socio-demographic characteristics are US-based. Although in the 1990s, European academic research has grown substantially (e.g., Beckmann, 1998; Kilbourne and Beckmann, 1998), research conducted in non-English-speaking countries does not always get published in English. This is of particular concern, given that country-specific factors have been found to influence the socio-demographic make-up of green consumers (Arbuthnot and Lingg, 1975) and, therefore, the US results may not hold in other settings.

Taken collectively, the above observations provide a strong argument for a fresh look at the role of socio-demographics in profiling green consumers. The present study aims to redress some of the identified shortcomings by investigating the relationships between socio-demographic characteristics and environmental measures, capturing *all aspects* of the environmental consciousness domain. Specifically, following a review of the pertinent literature, hypotheses are developed concerning the links between five measures of environmental consciousness and gender, marital status, age, education, number of children, and social class. These socio-demographic variables have been addressed most often in earlier research and despite early reports that they might not be totally satisfactory for segmentation and profiling (Frank et al., 1972; McCann, 1974), they continue to play an important role in segmentation research (Wedel and Kamakura, 2000, p.10). (From a practical perspective, socio-demographics is often the best way to start segmentation studies because a lot of published information is available and easily obtainable. Moreover, demographics are often used to enhance the accessibility of segments for subsequent profiling and targeting strategies, since the corresponding media usage profiles are usually available (see Wedel and Kamakura, 2000). The proposed hypotheses are subsequently tested on a large national sample of UK consumers, and the predictive power of the socio-demographic characteristics for profiling purposes is assessed through multiple regression analysis. Overall, the paper aims to provide a more comprehensive understanding of the utility of socio-demographics for profiling green consumers.

2. Literature and hypotheses

2.1. Measuring environmental consciousness

Over the last 25 years, there have been numerous attempts to conceptualize and operationalize the "environmental consciousness" construct. Studies have been conducted in a wide range of social science disciplines, such as psychology (e.g., Maloney et al., 1975; Grunert and Juhl, 1995; Mobley et al., 1995; Stone et al., 1995; Manrai et al., 1997; Sonnenmoser, 1997; Steurer, 1998), sociology (e.g., Buttel and Flinn, 1978; Macnaghten and Urry, 1995), political science (e.g., Jackson, 1983; McIntosh, 1991; Hildebrand, 1992; Chan and Wong, 1994; McCormick, 1995), environmental studies (e.g., Dunlap and Van Liere, 1978; Krause, 1993; Stern et al., 1993, 1995; Thøgersen, 1996; Berger, 1997; Fineman, 1997; Widegren, 1998), business research (e.g., Fuller, 1978; Balderjahn, 1988; Synodinos, 1990; Poduska et al., 1992; McCarty and Shrum, 1994; Shrivastava, 1994; Zimmer et al., 1994; Berger and Kanetkar, 1995; Roberts, 1995b, 1996; Roberts and Bacon, 1997; Minton and Rose, 1997), and marketing (e.g., Garrett, 1987; Corrado and Ross, 1990; Wiener and Doescher, 1991; Prothero and McDonagh, 1992; Iyer and Banerjee, 1993; McDonagh and Prothero, 1993; Drumwright, 1994; Peattie and Charter, 1994; Kilbourne et al., 1997; Ling-yee, 1997). The vast majority of relevant literature are American (80% of the studies that were uncovered was conducted in the US), while only a limited amount of research was conducted in Germany (e.g., Balderjahn, 1988; Schahn and Holzer, 1990; Grunert and Kristensen, 1994; Grunert et al., 1995), Australia (e.g., Ray, 1975; Polonsky and Ottman, 1998), France (e.g., Arbuthnot and Lingg, 1975), Denmark (e.g., Grunert, 1991; Grunert and Kristensen, 1992), Israel (e.g., Zeidner and Shechter, 1988), and the UK (e.g., Lyons and Breakwell, 1994; Peattie and Ringler, 1994; Grunert-Beckmann et al., 1997).

A number of different instruments have been used in the various efforts to measure environmental consciousness. These differ in terms of their implicit or explicit assumptions regarding the *components* or *dimensions* of the environmental consciousness construct. For example, some have solely addressed environmental *attitudes*, capturing individuals' levels of concern/interest about aspects of environmental, ecological, or energy-saving phenomena (e.g., Buttel, 1979; Synodinos, 1990; Benton and Funkhouser, 1994; Shrum et al., 1995; Wall, 1995). Other studies have focused on environmentally sensitive *behavior*, capturing individuals' past, current, and/or intended commitment to activities that aim to ameliorate society's negative impact on the natural environment (e.g., Brooker, 1976;

Stisser, 1994; Roozen and De Pelsmacker, 1998; Widegren, 1998). However, given the controversy of the *attitude–behavior* link (e.g., Foxall, 1984a,b; Tarrant and Cordell, 1997; Antonides and van Raaij, 1998), an analysis of attitudinal components *alone* may not accurately predict *actual* behavior. Indeed, weak linkages between attitudes and behavior have often been noted in the environmental and social marketing literature (e.g., Rothschild, 1979; Gill et al., 1986; Lee and Green, 1991); moreover, "in order to be 'green', it may be argued that individuals require an understanding of the consequences of their behaviors" (Bohlen et al., 1993, p. 417). In this context, positive attitudes towards the environment are *not* necessarily indicative of high levels of environmental *knowledge* (e.g., Ramsey and Rickson, 1976; Bagozzi et al., 1992). Thus, along with attitudinal and behavioral components, knowledge items that capture individuals' level of factual information about specific or general aspects of environmental, ecological, or energy-saving phenomena should be contained within any operationalization of environmental consciousness. Unfortunately, to date, measures of environmentalism "have included relatively few components of the entire 'green' semantic domain" (Hackett, 1992, p.3).

Measurement instruments also differ in terms of the *substantive issues* used in their development, i.e., they vary in the extent to which they incorporate different green issues. For example, some studies have focused on concern about acid rain (e.g., Arcury et al., 1987), recycling issues (e.g., Vining and Ebreo, 1990; Schwepker and Cornwell, 1991; Guagnano et al., 1995; Mobley et al., 1995), or pollution (e.g., Ramsey and Rickson, 1976; Gallarotti, 1995; Manrai et al., 1997). A more common practice has been to either aggregate items into single (composite) environmental measures (e.g., Maloney et al., 1975; Jackson, 1985; Hackett, 1993), or develop a number of measures, each covering a specific set of issues (e.g., Tognacci et al., 1972; Witherspoon and Martin, 1992). At first glance, the latter two approaches would seem to provide a more comprehensive profile of green consumers; however, such approaches have the drawback that "it is unclear whether... these various substantive issues reflect equally the broader concept of concern with environmental quality" (Van Liere and Dunlap, 1981, p. 653).

In spite of the above limitations, several researchers have adopted some of the more acclaimed measurement instruments. For example, the scales proposed by Maloney et al. (1975) have been directly utilized in US studies by Borden and Francis (1978) and Wysor (1983), and have been modified for use in Germany (Schahn and Holzer, 1990) and Denmark (Grunert, 1991; Grunert et al., 1995). On balance, however, most of the instruments aimed at capturing the construct of environmental consciousness have been used in single studies with very little independent replication with different samples. In addition, many of the instruments on offer have not been subjected to rigorous psychometric assessments of dimensionality, reliability, and validity. For example, several studies (particularly earlier ones) have merely relied on internal consistency measures to assess both the reliability *and* dimensionality of their employed items (e.g., Tognacci et al., 1972; Buttel, 1979; Jackson, 1985). However, if items are combined that in reality measure two correlated yet distinct constructs, "a combination of all their items might well yield internal consistency, even though they reflect two different constructs" (Spector, 1992, p.54). Worse still, some studies have aggregated items into composite measures without *any* stated reliability or validity checks (e.g., Ramsey and Rickson, 1976; Murphy et al., 1979; Corrado and Ross, 1990).

Taken collectively, with the exception of a few recent publications (Balderjahn, 1988; Schahn and Holzer, 1990; Bohlen et al., 1993; Scherhorn, 1993; Grunert and Kristensen, 1994; Roberts, 1995a, 1996), the literature on the measurement of environmental consciousness has often offered inadequate theoretical specification of the domain of environmental consciousness as well as inadequate psychometric assessments of the employed measures.

2.2. Socio-demographics and environmental consciousness

Table 1 summarizes the associations (positive, not significant, negative) reported in the empirical literature between six socio-demographic variables (gender, marital status, age, number of children, education, and social class) and the three theoretical dimensions of the environmental consciousness domain, namely, (i) *knowledge* about green issues, (ii) *attitudes* towards environmental quality, and (iii) environmentally sensitive *behavior*. Note that the large majority of studies have failed to review all aspects of environmental consciousness (A blank in the columns corresponding to the three components of the environmental domain indicates that either the study failed to include a measure of the component in the research design or failed to test/report the relationship with the particular socio-demographic characteristic involved.). In many instances, the existence/direction of the relationships varies according to the component of the environmental domain at issue. Such inconsistencies are a clear illustration of the need to investigate the linkages between the socio-demographic characteristics and *all* aspects of the environmental consciousness construct.

The literature summary in Table 1 revealed a number of problems with sample selection procedures. Firstly, in several instances, very narrow samples have been used to investigate the linkages between socio-demographic characteristics and environmental consciousness. These include green organizations and recreation organizations (e.g., Harry et al., 1969; McStay and Dunlap, 1983; Schahn and Holzer, 1990), key decision makers (Costantini and Hanf, 1972), farmers (Vogel, 1996), community "elites" (Buttel and Johnson, 1977), participants in recycling programs and church goers (e.g., Arbuthnot, 1977; Guagnano et al., 1995), and students (Maloney and Ward, 1973; Maloney et al., 1975; Stern et al., 1993). The aforementioned samples are confined to

Table 1
Literature summary of relationships between socio-demographics and environmental consciousness

Authors	Year	Location	Sample		Environmental measures		
			Size	Type	Knowledge	Attitudes	Behavior
Gender							
Chandler (1972)	N/A	US (nationwide)	900	Public	− ve	ns	
Tognacci et al. (1972)	N/A	Boulder, CO, USA	141	Public		+ ve	
Ray (1975)	1974	Sydney, Australia	100	Public		+ ve	
Webster (1975)	N/A	Town in MA, USA	231	Public		ns	+ ve (SR)
Brooker (1976)	N/A	Chicago, IL, USA	102	Public			ns
Arbuthnot (1977)	1974	Town in Ohio, USA	145	R&CM			ns
Lowe et al. (1980)	1973 – 1978	US (nationwide)	1500	Public		+ ve	
Honnold (1981)	1973 – 1978	US (nationwide)	N/A	Public		+ ve	
Van Liere and Dunlap (1981)	1976	Washington State, USA	806	Public		+ ve	+ ve (SR)
McStay and Dunlap (1983)	1976	Washington State, USA	806	Public		+ ve	ns (SR)
McStay and Dunlap (1983)	1976	Washington State, USA	407	Gn Org		+ ve	+ ve (SR)
Neuman (1986)	1981	Three cities in California, USA	376	Public			ns
Arcury et al. (1987)	1984	Kentucky, USA	516	Public	− ve	ns	ns
Sturges (1988)	1988	UK (nationwide)	N/A	Public	+ ve	+ ve	
Zeidner and Shechter (1998)	1986	Haifa, Israel	923	Public		ns	ns
Schahn and Holzer (1990)	1987	Heidelberg, Germany	105	Gn Org	− ve	+ ve	+ ve (SR)
Schahn and Holzer (1990)	1987	Heidelberg, Germany	167	Public	− ve	+ ve	+ ve (SR)
Vining and Ebreo (1990)	1986	Two towns in Illinois, USA	197	Public			ns
Young (1991)	1990	UK (nationwide)	1345	Public		+ ve	+ ve (SR)
Baldassare and Katz (1992)	1990	Orange County, CA, USA	641	Public			+ ve (SR)
Stern et al. (1993)	1990	New York State, USA	349	Students		+ ve	+ ve(IC)
Scott and Willits (1994)	1990	Pennsylvania, USA	3632	Public		ns	** (SR)
Grunert and Kristensen (1992)	1991	Denmark (nationwide)	1476	Public	− ve	ns	+ ve (SR)
Witherspoon and Martin (1992)	1991	UK (nationwide)	1422	Public		+ ve	+ ve (SR)
Pickett et al. (1993)	1992	University town, USA	460	Students			ns
Lyons and Breakwell (1994)	1993	Six regions in UK	1089	Children	− ve	ns	
Shrum et al. (1995)	1993	US (nationwide)	3690	Public		+ ve	
Meffert and Bruhn (1996)	1994	Germany (nationwide)	1544	Public	− ve	− ve	− ve (SR)
Altenburg et al. (1996)	1994	Amsterdam (Netherlands)	400	Public			ns
Altenburg et al. (1996)	1994	Leipzig (Germany)	400	Public			+ ve (SR)
Widegren (1998)	1994	Sweden (nationwide)	1018	Public			ns
Marital status							
Brooker (1976)	N/A	Chicago, IL, USA	102	Public			ns
Honnold (1981)	1973 – 1978	US (nationwide)	N/A	Public		ns	
Neuman (1986)	1981	Three cities in California, USA	376	Public		ns	+ ve (SR)
Research 2000 (1990)	1990	UK (nationwide)	950	Public		+ ve	+ ve (SR)
Age							
Harry et al. (1969)	1966	Oregon/Washington, USA	1074	Rec Org			+ ve (A)
Tognacci et al. (1972)	N/A	Boulder, CO, USA	141	Public		− ve	
Ray (1975)	1974	Sydney, Australia	100	Public		ns	
Webster (1975)	N/A	Town in Massachusetts, USA	231	Public		ns	ns
Brooker (1976)	N/A	Chicago, IL, USA	102	Public			ns
Arbuthnot (1977)	1974	Town in Ohio, USA	145	R&CM			− ve (A)
Weigel (1977)	N/A	Town in Massachusetts, USA	44	Public			ns
Buttel (1979), Buttel and Flinn (1978)	1974	Wisconsin, USA	548	Public		− ve	
Dunlap and Van Liere (1978)	1976	Washington State, USA	806	Public		− ve	
Lowe et al. (1980)	1973 – 1978	US (nationwide)	1500	Public		− ve	
Van Liere and Dunlap (1980)	1976	Washington State, USA	806	Public		− ve	+ ve (SR)
Honnold (1981)	1973 – 1978	US (nationwide)	N/A	Public		− ve	
Jackson (1983)	1969	US (nationwide)	1248	Public			− ve (IC)
Mohai (1985)	1979	US (nationwide)	7010	Public			ns
Neuman (1986)	1981	Three cities in California	376	Public			ns
Arcury et al. (1987)	1984	Kentucky, USA	516	Public	− ve	ns	ns
Mohai and Twight (1987)	1979	US (nationwide)	7000	Public		− ve	ns
Ostman and Parker (1987)	1984	Town in New York, USA	336	Public	ns	ns	ns
Zeidner and Shechter (1988)	1986	Haifa, Israel	923	Public		− ve	− ve (IC)
Samdahl and Robertson (1989)	1978	Illinois, USA	2131	Public		+ ve	+ ve (SR)
Corrado and Ross (1990)	1990	UK (nationwide)	N/A	Public			− ve (SR)
Schahn and Holzer (1990)	1987	Heidelberg, Germany	105	Gn Org			+ ve (SR)

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Table 1 (*continued*)

Authors	Year	Location	Sample		Environmental measures		
			Size	Type	Knowledge	Attitudes	Behavior
Age							
Schahn and Holzer (1990)	1987	Heidelberg, Germany	167	Public			+ve (SR)
Vining and Ebreo (1990)	1986	Two towns in Illinois, USA	197	Public			+ve (A)
Roper Organization (1992)	1992	US (nationwide)	N/A	Public			ns (SR)
Baldassare and Katz (1992)	1990	Orange County, CA, USA	641	Public			+ve (SR)
Grunert and Kristensen (1992)	1991	Denmark (nationwide)	1476	Public	−ve	−ve	−ve (SR)
Pickett et al. (1993)	1992	University town, USA	460	Students			ns
Lyons and Breakwell (1994)	1993	Six regions in UK	1089	Children	ns	+ve	
Scott and Willits (1994)	1990	Pennsylvania, USA	3632	Public		−ve	+ve (SR)
Shrum et al. (1995)	1993	US (nationwide)	3690	Public		ns	
Altenburg et al. (1996)	1994	Amsterdam (Netherlands)	400	Public			ns
Altenburg et al. (1996)	1994	Leipzig (Germany)	400	Public			ns
Meffert and Bruhn (1996)	1994	Germany (nationwide)	1544	Public	ns	ns	ns (SR)
Widegren (1998)	1994	Sweden (nationwide)	1018	Public			ns
Number of children							
Brooker (1976)	N/A	Chicago, IL, USA	102	Public			+ve (SR)
Jackson (1983)	1969	US (nationwide)	1248	Public			+ve (IC)
Grunert (1991)	1991	Denmark (nationwide)	1476	Public	+ve	+ve	+ve (SR)
Education							
Harry et al. (1969)	1966	Oregon/Washington, USA	1074	Rec Org			+ve (A)
Devall (1970)	1969	US (nationwide)	907	Gn Org			+ve (A)
Chandler (1972)	N/A	US (nationwide)	900	Public	+ve		
Costantini and Hanf (1972)	1970	California and Nevada, USA	303	Dec M		+ve	
Tognacci et al. (1972)	N/A	Boulder, CO, USA	141	Public		+ve	
Maloney and Ward (1973), Maloney et al. (1975)	1971	Los Angeles, CA, USA	106	Pu&St	+ve	+ve	+ve (SR)
Buttel and Flinn (1974)	1968–1970	Wisconsin, USA	600	Public		+ve	
Arbuthnot and Lingg (1975)	1972–1973	Two towns in Ohio, USA	112	Public	+ve	+ve	−ve (SR)
Arbuthnot and Lingg (1975)	1973	Tours, France	56	Public	+ve	+ve	ns
Ray (1975)	1974	Sydney, Australia	100	Public		ns	
Webster (1975)	N/A	Town in Massachusetts, USA	231	Public		+ve	+ve (A)
Arbuthnot (1977)	1974	Town in Ohio, USA	145	R&CM			+ve (SR)
Buttel and Johnson (1977)	1973–1974	Wisconsin, USA	231	Elites		+ve	
Weigel (1977)	N/A	Town in Massachusetts, USA	44	Public			+ve (A)
Buttel (1979), Buttel and Flinn (1978)	1974	Wisconsin, USA	548	Public		+ve	
Dunlap and Van Liere (1978)	1976	Washington State, USA	806	Public		+ve	
Lowe et al. (1980)	1973–1978	US (nationwide)	1500	Public		ns	
Van Liere and Dunlap (1980)	1976	Washington State, USA	806	Public		+ve	
Honnold (1981)	1973–1978	US (nationwide)	N/A	Public		ns	
Moore (1981)	N/A	Virginia, USA	219	Students	+ve		
Neuman (1986)	1981	Three cities in California, USA	376	Public			ns
Arcury et al. (1987)	1984	Kentucky, USA	516	Public	+ve	+ve	ns
Mohai and Twight (1987)	1979	US (nationwide)	7000	Public		+ve	
Ostman and Parker (1987)	1984	Town in New York, USA	336	Public	+ve		+ve (SR)
Samdahl and Robertson (1989)	1978	Illinois, USA	2131	Public		−ve	−ve (SR)
Young (1991)	1990	UK (nationwide)	1345	Public			+ve (SR)
Schahn and Holzer (1990)	1987	Heidelberg, Germany	167	Public			ns
Schahn and Holzer (1990)	1987	Heidelberg, Germany	105	Gn Org			+ve (SR)
Grunert (1991)	1991	Denmark (nationwide)	1476	Public	+ve	+ve	+ve (SR)
Baldassare and Katz (1992)	1990	Orange County, CA, USA	641	Public		ns	
Berger (1997)	1990	Canada (nationwide)	43,000	Public			+ve (SR)
Witherspoon and Martin (1992)	1991	UK (nationwide)	1422	Public			+ve (SR)
Roper Organization (1992)	1992	US (nationwide)	N/A	Public			+ve (SR)
Pickett et al. (1993)	1992	University town, USA	460	Students			ns
Scott and Willits (1994)	1990	Pennsylvania, USA	3632	Public			+ve (SR)
Shrum et al. (1995)	1993	US (nationwide)	3690	Public		ns	
Meffert and Bruhn (1996)	1994	Germany (nationwide)	1544	Public	ns	ns	ns (SR)
Widegren (1998)	1994	Sweden (nationwide)	1018	Public			+ve (SR)
Wall (1995)	1995	Edmonton, Canada	448	Public		+ve	
Social class							
Harry et al. (1969)	1966	Oregon/Washington, USA	1074	Rec Org			+ve (A)
Devall (1970)	1969	US (nationwide)	907	Gn Org			+ve (A)

(continued on next page)

Table 1 (*continued*)

Authors	Year	Location	Sample		Environmental measures		
			Size	Type	Knowledge	Attitudes	Behavior
Social class							
Tognacci et al. (1972)	N/A	Boulder, CO, USA	141	Public		+ve	
Arbuthnot and Lingg (1975)	1972–1973	Two towns in Ohio, USA	112	Public	+ve		
Arbuthnot and Lingg (1975)	1973	Tours, France	56	Public	+ve	+ve	−ve (SR)
Brooker (1976)	N/A	Chicago, IL, USA	102	Public			ns
Arbuthnot (1977)	1974	Town in Ohio, USA	145	R&CM			+ve (A)
Weigel (1977)	N/A	Town in Massachusetts, USA	44	Public			+ve (A)
Buttel and Flinn (1978)	1974	Wisconsin, USA	548	Public		ns	
Tucker (1978)	N/A	Town in Pennsylvania, USA	166	Females			+ve (A)
Mohai (1985)	1979	US (nationwide)	7010	Public			+ve (SR)
Ostman and Parker (1987)	1984	Town in New York, USA	336	Public	ns	ns	ns
Zeidner and Shechter (1988)	1986	Haifa, Israel	923	Public		ns	ns
Corrado and Ross (1990)	1990	UK (nationwide)	N/A	Public			+ve (SR)
Research 2000 (1990)	1990	UK (nationwide)	950	Public		+ve	+ve (SR)
Young (1991)	1990	UK (nationwide)	1345	Public			+ve (SR)
Berger (1997)	1990	Canada (nationwide)	43,000	Public			+ve (SR)
Roper Organization (1992)	1992	US (nationwide)	N/A	Public			+ve (SR)
Lyons and Breakwell (1994)	1993	Six regions in UK	1089	Children	+ve	+ve	
Meffert and Bruhn (1996)	1994	Germany (nationwide)	1544	Public	ns	ns	ns (SR)
Widegren (1998)	1994	Sweden (nationwide)	1018	Public			+ve (SR)

Key: N/A — not available; Gn Org — green organization; Rec Org — outdoor recreation society; R & CM — recyclers and church members; Dec M — decision makers; Pu & St — public and students; ns — not significant; *+ve — "personal" behavior; −ve — "public" behavior; **+ve — purchasing behavior, −ve — political behavior; (SR) — self-reported; (A) — actual; (IC) — intentional commitment.

particular population elements which, *by their very nature*, include overrepresentations of certain socio-demographic variables. For example, Costantini and Hanf's (1972) sample of "key decision makers" is more than likely to comprise individuals who are predominantly better-educated members of the higher social classes. Such specific samples may, therefore, not provide the best settings in which to investigate the characteristics of the environmentally concerned members of the "general" population (not least because of obvious "restriction of range" problems).

Secondly, although the predominant sample type has been members of the public as a whole (e.g., Chandler, 1972; Neuman, 1986; Vining and Ebreo, 1990), the majority of US findings have come from geographically restricted samples, such as single states (e.g., Buttel and Flinn, 1978; Van Liere and Dunlap, 1981; Samdahl and Robertson, 1989; Scott and Willits, 1994; Guagnano et al., 1995), or even specific towns and cities within states (e.g., Webster, 1975; Arbuthnot, 1977; Ostman and Parker, 1987; Hallin, 1995; Wall, 1995). If the area from which the sampling frame is taken is not broadly representative of the rest of the country (i.e., location-specific differences exist), the resulting profiles of green consumers may not be transferable to the corresponding nationwide population (Kalton, 1983).

Thirdly, in certain cases, there is a large discrepancy between the year of study and the publication date. For example, McStay and Dunlap's (1983) work was based on data obtained seven years previously (1976). Similarly, Jackson's (1983) article used a 1969 database for analysis purposes. It is possible, therefore, that the associations found between the socio-demographic variables and measures of environmental consciousness no longer applied at the time such articles were finally published. The well-documented increased awareness and concern with environmental issues in recent years add weight to this argument (see Meffert and Bruhn, 1996; Roberts, 1996; Prendergast and Thompson, 1997; Roozen and De Pelsmacker, 1998).

Finally, most of the studies listed in Table 1 have been conducted in the US. Indeed, out of 51 studies analyzed, only 10 are based on European data. However, it has been illustrated that "not all cultures, nor segments within them, face the same problems (or face them in the same manner when the problems are similar)" (Arbuthnot and Lingg, 1975, pp. 275–276). Country-specific factors, such as levels and types of pollution, the availability of green products, environmental legislation, or cultural influences, may (at least partly) explain differences in the socio-demographic characteristics of a particular nation's green consumers.

With the above caveats in mind, the following relationships between socio-demographic characteristics and environmental consciousness have been empirically uncovered in past research.

2.3. Gender

All studies investigating the linkage between gender and environmental knowledge have found a significant relationship, with the large majority of authors concluding that males tend to have higher and better knowledge about green issues than females (indicated by a negative sign in Table 1). However, a different picture emerges for environmentally conscious attitudes and behavior, where, on the whole, females have been found to exhibit both higher concern (Davidson and Freudenburg, 1996) and participate more

frequently in various types of green behavior (e.g., energy conservation, recycling, or political action). Schahn and Holzer (1990, p. 777) indicate that different socialisation patterns of boys and girls lead to the observed variations between the variables at issue, but note that "clear statements, as to which aspects of socialization are responsible, are lacking". While there is a lack of convincing theory with regards to the impact of gender, based on the available empirical evidence, the following hypotheses can be posited:

Hypothesis 1.1: Males are more knowledgeable about environmental issues.

Hypothesis 1.2: Females are more concerned about environmental quality.

Hypothesis 1.3: Females are more likely to participate in green activities.

2.4. Marital status

Only four studies in Table 1 have investigated the impact of marital status, and no study has explored the relationship between marital status and environmental knowledge. In this context, it has been argued that there has been a "general lack of attention given to such variables in the literature" (Neuman, 1986, p. 68). Therefore, an exploratory hypothesis is postulated for this component of the environmental domain:

Hypothesis 2.1: Marital status is related to knowledge about environmental issues.

While two out of the three studies investigating this issue failed to uncover a significant relationship between marital status and environmental attitudes (Honnold, 1981; Neuman, 1986), a UK study by Research (2000) (1990) did find a significant positive relationship between martial status and environmental attitudes, showing that married people are more concerned about the environment. With regards to behavior, two out of the three studies analyzing this relationship reported that married people undertake higher levels of green behavior than those who are single. In explaining the observed relationships, Macey and Brown (1983) suggest that spouses may be an important social referent in influencing environmental consciousness. Moreover, the cultural or lifestyle influences of marriage may affect an individual's greenness; thus, "factors such as home ownership and social support by other family members are likely to play an important role" (Neuman, 1986, p. 68). In light of these arguments, the following hypotheses are postulated:

Hypothesis 2.2: Married people are more concerned about environmental quality.

Hypothesis 2.3: Married people are more likely to participate in green activities.

2.5. Age

Among the 33 studies that have investigated the linkages between age and environmental consciousness, only two reported significant relationships (Arcury et al., 1987; Grunert and Kristensen, 1992), indicating that younger members of the population exhibit higher levels of knowledge. However, since the majority of studies do not support this view, a (null) hypothesis of no difference is postulated:

Hypothesis 3.1: Age is not related to environmental knowledge.

A reasonably consistent finding from Table 1 is the negative association between age and attitudes. The most common explanation of this finding is that "since solutions to environmental problems often are viewed as threatening the existing social order, possibly requiring substantial changes in traditional values, habitual behaviors, and existing institutions... it is logical to expect youth to support environmental reform and accept pro-environmental ideologies more readily than their elders" (Van Liere and Dunlap, 1980, p. 183). Therefore, a negative relationship is anticipated between age and the attitudinal component of the environmental domain:

Hypothesis 3.2: Younger people are more concerned about environmental quality.

Discrepancies have been found regarding the relationship between age and environmentally sensitive behavior. In this context, studies using *intentional commitment* measures of the behavioral domain (e.g., Jackson, 1983; Zeidner and Shechter, 1988) have often found that age is negatively related to (intended) behavior, while those employing indicators of *current* behavior have found that older people display higher levels of green behavior (e.g., Van Liere and Dunlap, 1980; Schahn and Holzer, 1990; Vining and Ebreo, 1990; Scott and Willits, 1994). It is possible that such inconsistencies are due to a lack of resources among younger members of the population. Although younger people are likely to state that they will commit more resources to protecting the environment in the future (Jackson, 1983; Zeidner and Shechter, 1988), many do not *currently* have the financial security necessary to support environmental causes. Given the contradictory results of past studies, an exploratory hypothesis seems warranted:

Hypothesis 3.3: The young and old differ in terms of their participation in green activities.

2.6. Number of children

Three studies in Table 1 have investigated the relationship between number of children and environmental consciousness and consistently found a positive relationship for the behavioral component of the latter. However, only Grunert (1991) investigated the impact of this variable on the remaining two areas of the environmental

domain, concluding that larger families have more environmental knowledge and more positive attitudes towards environmental quality. Grunert's (1991) findings are intuitively appealing, given that: "individuals with larger families are likely to have children in school where problems of ecology are discussed. If these discussions are brought back into the home, the parent might feel some pressure to meet the expectations of his children regarding socially conscious behavior" (Brooker, 1976, p. 111). One would therefore anticipate that consistent positive associations would exist for all three components of the environmental domain:

Hypothesis 4.1: The more children, the greater the environmental knowledge.

Hypothesis 4.2: The more children, the stronger the concern about environmental quality.

Hypothesis 4.3: The more children, the higher the level of participation in green activities.

2.7. Education

A large number of studies have investigated the impact of education on environmental consciousness. With the exceptions of Samdahl and Robertson (1989) (negative results for both attitudes and self-reported behavior) and Arbuthnot and Lingg (1975) (negative result for self-reported behavior), studies reporting a significant relationship have been relatively homogeneous in their findings: the better-educated tend to score higher on all components of the environmental domain, probably reflecting the fact that "the very nature of ecology with its complex interactions between organisms and environment serves to make its subject matter difficult to understand and assimilate" (Maloney et al., 1975, p. 585). It is therefore suggested that the higher-educated understand the issues involved more fully and, hence, are more concerned about environmental quality and more motivated to participate in environmentally responsible behaviors:

Hypothesis 5.1: The better-educated are more knowledgeable about environmental issues.

Hypothesis 5.2: The better-educated are more concerned about environmental quality.

Hypothesis 5.3: The better-educated are more likely to participate in green activities.

2.8. Social class

Only five studies in Table 1 have investigated the impact of social class on environmental knowledge. While Ostman and Parker (1987) and Meffert and Bruhn (1996) found no significant association, Arbuthnot and Lingg (1975) (both in the US and in France) and Lyons and Breakwell (1994) reported positive relationships. Therefore, following the balance of the evidence, a positive relationship is hypothesized in this study:

Hypothesis 6.1: The higher the social class, the greater the environmental knowledge.

Half the studies that have explored the association between social class and environmental attitudes found significant positive relationships. Moreover, the majority of observed patterns for studies failing to establish significant linkages have been in the positive direction (despite being non-significant). To explain the associations between social class and attitudes, it has been agreed that "(t)hose persons most concerned about environmental issues appear to reflect the same configuration of social and psychological attributes which have traditionally characterized individuals active in civic, service, and political organisations" (Tognacci et al., 1972, p. 85). It has also been proposed that concerns about environmental quality "may primarily embody 'status group' concerns" (Buttel and Flinn, 1978, p. 436), which are likely drawn from leisure interests associated with the environment. The assumption of the latter argument appears to be that the higher social classes are more likely to witness the affects of degradation of the natural environment through their outdoor leisure pursuits. Given these arguments, the following hypothesis is proposed:

Hypothesis 6.2: The higher the social class, the stronger the concern about environmental quality.

Most studies reported a positive association between social class and green behavior. A proposed explanation is that the higher social classes undertake higher levels of green behavior due to the very nature of the involvement required. Specifically, the higher social classes are "responsible vis-a-vis political participation, internalisation of democratic norms, and conservation of the society's resource base" (Buttel and Flinn, 1978, p. 434), while members of the working class tend not to undertake the same level of such "political" activities. The following hypothesis is therefore put forward:

Hypothesis 6.3: The higher the social class, the greater the participation in green activities.

3. Methodology

3.1. Data collection

In planning and conducting the fieldwork for the present study, extensive developmental research was undertaken. Firstly, the authors undertook a number of in-depth interviews with acknowledged experts in the environmental arena (e.g., chief executives of major green pressure groups, representatives from the Department of the Environment,

Table 2
Socio-demographic characteristics of respondents

Social class*	Frequency	%	Educational level	Frequency	%	Respective age	Frequency	%	Number of children	Frequency	%	Marital status	Frequency	%	Gender	Frequency	%
												Married	1134	65	Female	591	35
A	40	2	No exams	105	6	00–20	10	0	0	251	15	Single	273	16	Male	1071	63
B	294	17	GCE 'O'	453	27	21–30	188	11	1	277	16	Separated	37	2	Missing	35	2
C1	621	37	GCE 'A'	142	8	31–40	341	20	2	483	29	Divorced	118	7			
C2	312	18	Professional/ HNC	134	8	41–50	408	24	3	204	12	Widowed	112	7			
D	110	7	First degree	257	15	51–60	255	15	4	62	4	Missing	23	1			
E	93	6	Higher degree	67	4	61–70	250	15	5 or more	28	2						
Missing	227	13	Other	89	5	71+	183	11	Missing	391	23						
			Missing	450	27	Missing	62	4									

Key: A — higher managerial, administrative, or professional; B — intermediate managerial, administrative, or professional; C1 — supervisory, clerical, junior administrative, or professional; C2 — skilled manual workers; D — semi-skilled and unskilled manual workers; E — state pensioners, widows, casual, and lowest grade workers.

and environment correspondents from the news media). Secondly, a total of 34 semi-structured interviews with members of the general public were conducted. This was followed by three focus group discussions (one with experts, academics, and postgraduates working on green issues, and two with business undergraduates). Subsequently, a questionnaire was designed and two pilot studies with 220 students were undertaken. Following the necessary modifications, the survey instrument, containing questions pertaining to environmental consciousness and a number of socio-demographic characteristics, was further pretested on a sample of 600 UK consumers. At this stage, only very minor adjustments in the questionnaire (e.g., altering the typesetting and line spacing) were found to be necessary prior to full-scale administration.

For the purposes of the main survey, a sampling frame, consisting of 9700 addresses of members of the general public throughout the UK, was obtained from a professional sampling agency and a structured mail questionnaire was sent to each address. Two weeks after the questionnaires were mailed, 1000 addresses were randomly selected from the sampling database and a research agency was assigned to locate telephone numbers for each address. Only 488 valid numbers were obtained, suggesting an outdated address listing. The 488 subjects were subsequently telephoned in order to *directly* investigate reasons for non-response (Leslie, 1972); the vast majority of reasons given for non-completion of the survey instrument did not pertain to weaknesses in the design of the questionnaire but reflected a general unwillingness to participate in *any* study, lack of time, or special circumstances (e.g., respondent was ill or too old). A total of 1710 questionnaires were finally received, of which 1697 were usable, representing an effective rate of response of 18% (Wiseman and Billington, 1984). To further investigate non-response bias, as recommended by Armstrong and Overton (1977), early and late respondents were compared in terms of their responses to the issues investigated in the analysis; no significant differences were found between the two groups, providing no evidence indicating the presence of non-response bias.

The socio-demographic characteristics of the respondents that are addressed in the study are outlined in Table 2. The data indicate a slight overrepresentation of the higher social classes and the better-educated than the UK population as a whole, when compared to the 1991 Household Survey (Bridgwood et al., 1993). The sample also contains a much higher proportion of male respondents (possibly because males are more likely to see themselves as head of household and, hence, responsible for the provision of the required information).

3.2. Variables

To test the postulated hypotheses, five previously developed measures of environmental consciousness, capturing the entire environmental domain (i.e., knowledge, attitudes, and behavior) were taken from Bohlen et al. (1993). Summary statistics (Table 3) illustrate high internal consistency (Cronbach's $\alpha > .80$) and suggest that the measures are sufficiently sensitive to be able to capture both high and low levels of environmental consciousness (see relevant means and standard deviations). Within- and between-measure correlations also reveal that the adopted measures yield a high degree of construct validity. With regards to the latter, while as expected, all five scales are positively correlated with each other (convergent validity), the observed coefficients are only moderate in magnitude (the highest comes to .595); thus, the measures also display sufficient discriminant validity (which confirms the importance of distinguishing between the different components of the environmental domain).

The adopted measures are briefly described below (full details can be found in Bohlen et al., 1993).

(i) An *Environmental Knowledge Scale* measuring self-perception of knowledge on a total of 11 key environmental

Table 3
Statistics for environmental consciousness measures

	Summary statistics				
Environmental measures	Number of items	Mean	S.D.	Possible range	α
Environmental knowledge scale	11	34.69	7.64	11–55	.935
Environmental attitudes scale	18	72.57	9.80	30–90	.912
Recycling behavior scale	4	14.30	3.40	4–20	.810
Political action scale	4	9.26	3.25	4–20	.818
Purchasing behavior scale	7	23.14	4.82	7–35	.814

	Within-measure correlations					
	Inter-item correlations				Item–total range	
Environmental measures	Minimum	Maximum	Mean	S.D.	Minimum	Maximum
Environmental knowledge scale	.428	.810	.595	0.073	.632	.764
Environmental attitudes scale	.192	.645	.383	0.095	.460	.699
Recycling behavior scale	.437	.671	.552	0.079	.582	.700
Political action scale	.460	.688	.544	0.086	.558	.735
Purchasing behavior scale	.201	.549	.383	0.105	.407	.683

	Between-measure correlations				
Environmental measures	Knowledge	Attitudes	Recycling	Politics	Purchasing
Environmental knowledge scale	1.000				
Environmental attitudes scale	.392	1.000			
Recycling behavior scale	.302	.352	1.000		
Political action scale	.430	.595	.387	1.000	
Purchasing behavior scale	.359	.538	.456	.573	1.000

problems, such as acid rain, ozone layer depletion, and destruction of the rain forests (scored on five-point itemized category scales, anchored at 1 = "Know nothing about" and 5 = "Know a great deal about").

(ii) An *Environmental Attitudes Scale* consisting of 18 five-point Likert statements aimed at capturing concern about environmental quality (the attitudinal measure of Bohlenet et al., 1993 originally contained 19 items. However, following scale purification and validation procedures, one of the Likert statements was removed due to poor inter-item and item–total correlations, resulting in an 18-item summated scale. Note that prior to testing the hypotheses, all scales were subjected to psychometric assessments of reliability and validity) (e.g., "Everyone is personally responsible for protecting the environment in their everyday life").

(iii) A *Recycling Behavior Scale* comprising four items regarding levels of recycling glass, metals, plastic, and paper (scored on five-point itemized category scales, anchored at 1 = "Would never do" and 5 = "Do often").

(iv) A *Political Action Scale* comprising four politically motivated activities, such as writing to newspapers or supporting pressure groups, in order to combat environmental degradation (scored on five-point itemized category scales, anchored at 1 = "Would never do" and 5 = "Do often").

(v) A *Purchasing Behavior Scale* comprising three statements regarding general green shopping habits, as well as the incidence of purchase of four green product categories, such as recycled paper products and green detergents (scored on five-point itemized category scales, anchored at 1 = "Never" and 5 = "Always").

Taken together, the broad nature of the study's sample, the large sample size, and the psychometric soundness of the environmental consciousness measures utilized provide a solid empirical setting for testing the utility of socio-demographics for profiling green consumers.

4. Findings

In their review of the literature pertaining to socio-demographics and environmental consciousness, Van Liere and Dunlap (1980) indicated that the majority of studies had used bivariate associations to gauge the relationships involved. Therefore, simply by way of replicating previous research, attention is initially focused on bivariate relationships for hypothesis testing purposes; the results of a multivariate analysis capturing the joint effects of the socio-demographic variables considered are reported in a later section.

4.1. Bivariate results

4.1.1. Gender and marital status (Hypotheses 1.1–2.3)

While the differences between male and female scores are in the hypothesized direction for the *Environmental Knowledge Scale* (Table 4), the *t* test results are non-significant. Thus, there is insufficient evidence indicating that males are more knowledgeable about environmental issues than their female counterparts (Hypothesis 1.1).

Table 4
Impact of gender and marital status on environmental consciousness measures

	Gender			Marital status		
	Female	Male		Married	Single	
Environmental measures	Mean (S.D.)	Mean (S.D.)	*t* value (one-tailed significance)	Mean (S.D.)	Mean (S.D.)	*t* value (one-tailed significance)
Environmental knowledge scale	34.30 (7.57)	34.94 (7.65)	−1.63[a] (0.052)	34.52 (7.45)	35.08 (7.94)	−1.39[a] (.166[b])
Environmental attitudes scale	74.06 (9.58)	71.76 (9.76)	4.42[a] (0.000)	72.44 (9.60)	73.17 (9.88)	−1.37[a] (0.085)
Recycling behavior scale	14.58 (3.40)	14.16 (3.34)	2.35[a] (0.010)	14.34 (3.38)	14.24 (3.38)	0.51[a] (.304)
Political action scale	9.30 (3.50)	9.24 (3.12)	0.37[c] (0.357)	9.14 (3.16)	9.53 (3.40)	−2.28[a] (0.012)
Purchasing behavior scale	23.92 (4.69)	22.64 (4.85)	4.75[a] (0.000)	22.97 (4.82)	23.59 (4.73)	−2.18[a] (0.015)

[a] Equal variance estimate.
[b] Two-tailed test.
[c] Unequal variance estimate.

Regarding the *Environmental Attitudes Scale*, consistent with Hypothesis 1.2, females are found to hold stronger attitudes towards environmental quality than males. In terms of behavior (Hypothesis 1.3), females are also likely to undertake recycling activities more often and display "greener shopping habits" than their male counterparts (see higher mean scores on the *Recycling Behavior* and *Purchasing Behavior Scales*); however, given that there are no gender differences on the *Political Action Scale*, Hypothesis 1.3 is only partly supported.

With respect to marital status, Neuman (1986) contests that the social influences of the spouse play a major role in shaping an individual's environmental concern. Therefore, this characteristic was recoded into a dichotomous variable, (1 = "married" and 0 = "single/separated/divorced/widowed"), with an exploratory hypothesis (see Hypothesis 2.1 in Section 2.2) adopted to test for differences between the two groups on the *Environmental Knowledge Scale* and directional hypotheses used for the remaining components of the environmental domain (see Hypotheses 2.2 and 2.3). No differences are found between married people and single individuals on the *Environmental Knowledge Scale* (Table 4). Regarding the remaining components of the environmental domain, no significant differences are found for the *Environmental Attitudes Scale* and, although statistically significant results are found for the *Political Action Scale* and the *Purchasing Behavior Scale*, the differences are not in the hypothesized direction; only the differences pertaining to the *Recycling Behavior Scale* are consistent with expectations. Thus, no clear evidence emerges, suggesting that married people are any more environmentally conscious than single individuals in terms of their knowledge, attitudes, or behaviors.

4.1.2. Age and number of children (Hypotheses 3.1–4.3)

Table 5 indicates that there is a negative significant correlation between age and scores on the *Environmental Knowledge Scale*, which contradicts the (null) hypothesis that knowledge about green issues is unrelated to age (Hypothesis 3.1); however, the relationship is not particularly strong, as a coefficient of only −.068 is obtained. On the other hand, the correlation between age and the *Environmental Attitudes Scale* is both significant and in the hypothesized, thus providing support for Hypothesis 3.2. With respect to the behavioral domain, only one of the measures yields a statistically significant result at even the 5% level; specifically, older people tend to undertake higher levels of recycling activities. Thus, there is only partial evidence to support the view that the young and old partake in different levels of environmentally responsible behavior (Hypothesis 3.3).

Regarding the number of children, no statistically significant associations are found for any of the measures of environmental consciousness; moreover, the direction of the correlation coefficients is contrary to expectations (i.e., they are all negative). Thus, 4.1 Hypotheses 4.2 Hypotheses 4.3 are not supported by the data. (It could be contested that, rather than the *number* of children impacting upon environmental consciousness, a more relevant variable is the *existence* of children in the household (regardless of number). Although this hypothesis has not been previously tested in the literature, it was explored using independent sample *t* tests. No significant differences were found between individuals with children and those without on the environmental consciousness measures, thus painting a similar picture as Table 5.)

Table 5
Impact of age and number of children on environmental measures

Environmental measures	Age		Number of children	
	Correlation	Significance	Correlation	Significance
Environmental knowledge scale	−.0680	.009[a]	−.0228	.208[b]
Environmental attitudes scale	−.1403	.000[b]	−.0176	.270[b]
Recycling behavior scale	.0596	.018[a]	−.0236	.202[b]
Political action scale	−.0468	.062[a]	−.0149	.298[b]
Purchasing behavior scale	−.0275	.326[a]	−.0412	.092[b]

[a] Two-tailed test.
[b] One-tailed test.

Table 6
Impact of educational level and social class on environmental measures

	Educational level		Social class	
Environmental measures	*F* ratio	*F* probability	*F* ratio	*F* probability
Environmental knowledge scale	8.311	.000	5.849	.000
Environmental attitudes scale	1.942	.085	1.947	.084
Recycling behavior scale	5.185	.000	5.154	.000
Political action scale	4.958	.000	1.915	.089
Purchasing behavior scale	1.708	.130	2.633	.022

4.1.3. Educational level and social class (Hypotheses 5.1–6.3)

To test the hypotheses pertaining to education and social class, one-way analysis of variance (ANOVA) tests were performed, treating each educational and social class category as an independent sample (Table 6). Regarding educational level, the *F* ratio for the knowledge component of the environmental domain is significant at $P < .001$, indicating that the variation between educational levels is significantly higher than the within-group variation. However, post-hoc Duncan's multiple range (DMR) tests revealed that, instead of the hypothesized monotonic relationship, responses to the *Environmental Knowledge Scale* were dichotomized according to whether the individual had attained degree-level education or not. The ANOVA performed on the attitudinal component is non-significant, thus suggesting the rejection of Hypothesis 5.2. With respect to the three behavioral measures, only the *Recycling Behavior Scale* and the *Political Action Scale* yield significant *F* ratio probabilities. Regarding the former, the results of DMR tests suggest that responses are dichotomized: people who have achieved "O" level education or above undertake more recycling activities. Regarding the latter, it appears that political action is more prevalent among respondents who have completed university education. Thus, on balance, only partial support is achieved for the behavioral hypothesis (Hypothesis 5.3).

Turning attention to social class, in terms of the knowledge component of the environmental domain, a significant *F* ratio was noted, indicating significant variation between social class categories. Specifically, from the results of DMR tests, it was discovered that respondents' scores on the *Environmental Knowledge Scale* were dichotomized according to whether they are white- or blue-collar workers (with the former perceiving themselves to be better-informed about green issues). Thus, the results provide only partial support for Hypothesis 6.1. Regarding the attitudinal component, the ANOVA did not generate a significant *F* ratio and, consequently, Hypothesis 6.2 is not supported. Finally, little support was provided for Hypothesis 6.3. The *Political Action Scale* did not yield a significant *F* ratio and, following post-hoc DMR tests, the only significant differences found for the *Recycling Behavior Scale* and *Purchasing Behavior Scale* were against the C2 social class grouping (who participated in notably fewer green activities than the remaining groupings).

4.2. Multivariate results

To ascertain the joint explanatory value of socio-demographic characteristics for profiling consumers according to their environmental consciousness, five multiple regression analyses were performed. The environmental consciousness measures were used as the dependent variables and the six socio-demographic characteristics previously discussed as the predictor variables. (The equation for the *Environmental Knowledge Scale* violated the assumption of normality in the residual distribution; the scale was subsequently replaced by its natural logarithm, which resolved the non-normality problem.).

Each analysis was run using only those cases which included responses to all the variables at issue. Given that "*regression analysis encourages the use of variables whose amounts can be measured with numeric precision, that is,* ***interval variables***" (Lewis-Beck, 1980, p. 67, emphasis in the original), several socio-demographic characteristics had to be converted to dummy (dichotomous) variables. To this end, the characteristics of gender and marital status were each represented with a single dummy variable. Social class and education were originally multichotomous variables, each classified with six categories (see Table 2); each was replaced with five dichotomous variables (Table 7).

All regressions are significant, indicating that environmental consciousness is related to individuals' socio-demographic characteristics; the signs of the large majority of beta coefficients are consistent with expectations and largely reflect the bivariate results. (Due to space limitations, the individual regression runs are not shown; full details are available from the authors upon request.) However, for all five environmental consciousness measures, socio-demographic characteristics only explain a very small proportion of the variance; in every case, less than 6% of the variance in the environmental measures could be explained. Indeed, and despite the large sample size, the beta coefficients for the large majority of the independent variables in each equation did not yield significant *t* values, providing insufficient evidence that the coefficients are non-zero in the population.

Table 7
Regression results

	Summary statistics			
Environmental measures	Multiple *R*	R^2	*F* value	Significance
Environmental knowledge scale	.198	.039	2.520	.002
Environmental attitudes scale	.240	.057	3.594	.000
Recycling behavior scale	.239	.057	3.664	.000
Political action scale	.211	.044	2.844	.000
Purchasing behavior scale	.198	.039	2.061	.000

5. Discussion and conclusion

According to the study's findings, associations between socio-demographic characteristics and environmental consciousness measures are relatively complex. While, on the face of it, one might anticipate that the relationships hold regardless of the component of the environmental domain at issue, this is by no means the case. For example, although the hypotheses on environmental attitudes for gender, number of children, education, and social class are all supported, none of these variables impacts on environmental knowledge. Furthermore, with regards to the behavioral domain, none of the socio-demographic characteristics behaves exactly as hypothesized. Thus, an accurate profile of the green consumer cannot be constructed without attention to *all* aspects of the environmental consciousness construct.

Socio-demographic variables can, to some degree, be used to profile UK consumers in terms of environmental knowledge and attitudes; however, they are of limited use where behavioral aspects of the environmental consciousness components are concerned. Given that previous research has been predominantly conducted in the US, the current findings may be partly accounted for by country-specific factors. For example, the speed and types of legislative change in the environmental area are very different between the US and the UK. While the US has much more stringent regulations to curb environmental degradation arising from transportation (see Woodruff, 1991), Carson and Moulden (1991) note that environmental requirements are generally much stricter in the EU than in North America. In addition, the structure of environmental activist movements in the US is more localized in their focus; indeed, it has been argued that the UK "has so far seen relatively few US-style locally based environmental movements which demand facilities such as door-step recycling from local authorities" (Witherspoon and Martin, 1992, p. 3). Hence, the different legislatory emphasis and contrasting structure of the environmental movements between the US and UK may affect the socio-demographic make-up of each nation's green consumers.

A second possible explanation as to why several of the hypotheses were not supported in this study relates to the quality of the measures of environmental consciousness that have been employed in previous research. As outlined in Section 2.1, many of the previous measurement instruments were operationalized through issues that fail to capture the entire domain of environmental consciousness; in addition, most measures had not been subjected to rigorous psychometric assessments. Therefore, several of the associations observed in previous studies may not reflect "true" relationships but "noise" associated with the measurement process.

A further plausible explanation of the lack of explanatory power of the profiling variables analyzed in this study is that environmental consciousness is perhaps more a function of *situational* characteristics rather than socio-demographic idiosyncrasies. In this context, it has been argued that "Community activism... arises from a natural human impulse for self-preservation. This impulse has been nicknamed NIMBY, an acronym for 'not in my backyard'" (Carson and Moulden, 1991, p. 7). Thus, those who are at risk from environmental nuisances, such as air pollution, contamination of water supplies, or the detrimental impacts of new road developments, are more likely to be knowledgeable and feel strongly about such issues, and, consequently, more likely to campaign against their effects.

Although the multivariate results indicate that socio-demographics are associated with environmental consciousness, their explanatory power is weak. Thus, from a *managerial* perspective, there is limited utility in the use of socio-demographic characteristics for profiling environmentally conscious consumers in the UK. Throughout the 1970s, there existed a substantial segment of consumers who exhibited "little or no concern about the pollution aspects of products" (Kinnear et al., 1974, p. 23). However, the mindset of consumers both in North America and Europe has changed considerably since the early period of the environmental movement.

Given the increasing media coverage and political attention to green issues, "it appears environmental concern is becoming the socially accepted norm" (Schwepker and Cornwell, 1991, p. 85). Therefore, the weak explanatory power of socio-demographic characteristics may be attributed to the widespread acceptance of environmental responsibility within Western culture. The environment is no longer a marginal issue and hence, high levels of environmental consciousness are not only reflected in certain sectors of the consumer base. Indeed, in the present study, the relatively high mean values for all measures (except the *Political Action Scale*) may indicate strong commitment to environmental responsibility *throughout* the UK population (see Table 3 earlier). Given the ease with which socio-demographics can be applied for consumer segmentation and profiling (Myers, 1996; Wedel and Kamakura, 2000), the results obtained are disappointing for both UK organizations and public policy officials looking for "easy options" in profiling and targeting the green consumer. At the same time, the widespread consumer concern about green issues has to be encouraging for companies that have adopted a commitment to environmental preservation in both their products and day-to-day operations (Coddington, 1993; Barrett, 1998). Indeed, green credentials are becoming a prerequisite for the development and maintenance of a sound customer base for many goods and services (e.g., see Howard et al., 1988; Vandermerwe and Oliff, 1990). However, environmentally friendly products must also perform competitively in other dimensions, since many consumers are unwilling to forgo key product benefits,

such as convenience or durability, in their purchase criteria (Peattie and Ratnayaka, 1992). It seems prudent, therefore, for companies to position their products not only according to environmental aspects, but also on the basis of other important product characteristics, where a combination of psychographic and socio-demographic variables can be applied more readily (Grunert et al., 1995; Roberts and Bacon, 1997).

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