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SUSTAINABLE PARTNERSHIPS: An empirical study into matched sustainable behaviour within married and cohabiting opposite sex couples living in the UK

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Abstract:

This is an exploratory study into the behaviour of people living in the same household. Through it I have two main aims. The first is to discover the extent to which two people living in the same household follow the same sustainable or non-sustainable household behaviours. The second is to try and explain this behaviour by testing three particular theories for correlated behaviour suggested by Manki (1993). Using Understanding Society, a nationally representative study of households in the UK, I examine the sustainable behaviour of over 7,000 married or cohabiting couples. My findings suggest that couples behave similarly. The first theory for this behaviour is that they face a common set of enablers or constraints to sustainable behaviour and I find this explanation has some value with respect to heating, electricity and water use in the home. The second theory suggests couples support each other's views making them more or less likely to behave similarly. Here I find that individual probability of either behaving more or less sustainably is increased when couples agree on climate change giving some support to this explanation. The third theory suggests that common sustainable practices in the home are the result of within couple influence. Through a mechanism which I refer to as ideological exchange, I find that where couples are ideologically opposed to each other, for certain behaviours, increased social exchange results in a higher probability of matched behaviour. Interestingly, differences in the effects observed, suggests that the outcome of any interaction is also determined by household responsibilities held.

Keywords/tags:

Couples, shared ideology, sustainable behaviour, green household, enablers and constraints

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1 INTRODUCTION

There is now a degree of consensus within climate science in Britain that climate change is occurring and its rate of future change is likely to be moderated by human consumption behaviours (Butler 2010, Lorenzoni & Pidgeon 2006, Liverman 2007). In a report for DEFRA (2008) by the Green Alliance, a number of what are referred to as 'headline behaviours' are suggested through which people in Britain can make a meaningful contribution towards reducing the risks from climate change. These include using low carbon vehicles, seeking alternative transport, avoiding short haul flights, tackling energy efficiency in the home, tackling water efficiency in the home, buying local, relying less on animal protein and wasting less food. Many of these behaviours require some significant changes in household practices, likely to require some degree of collaboration within the family. Through their work, Noorman, Biesiot and Uiterkamp (1998) demonstrate how complex behaviour change is likely to be. Their research into greener households uniquely places centrality upon the home as a physical and social space. Through a mechanism they refer to as 'household metabolism' (Noorman et al 1998:26), the authors' demonstrate how, similar to a biological system, modern homes are hardwired to nature through many technologies that support modern family living. Subsequently non-sustainable patterns of consumption of essential resources such as oil, energy and water are deeply integrated into family life, creating not only a collective sense of wellbeing but also a sense of what is normal and comfortable (Silva 2010, Gatersleben & Vlek 1998). Living in a temperate home, having a family car, daily changes of clean clothes, using tumble dryers, dishwashers and showering daily are likely to be similarly perceived as essential to comfort and quality of life. In support of this argument and building upon Gidden's (1984) notion of practical consciousness, Shove (2003) demonstrates how routines of domestic behaviour such as frequency of bathing and showering are not individually determined but more socially determined. Driven by a growing societal concern for greater public health, cleanliness and personal hygiene, people's desire to conform to norms of behaviour, she argues, better frames our understanding of the rapid increase in household water and energy consumption over the last few decades. Shove suggests that people do not always behave as individual rational actors, conscious or in direct control of environmentally damaging

behaviour. Giddens's (1984:16) notion of 'dialectic of control' provides some further relevant theoretical perspective. He suggests that whilst agents have the power to control structure, structures also have the power to control agents. Whether they exercise this control, according to Giddens, depends upon whether the structures are perceived as "constraints or enablers" (Giddens 1984:25). Although individuals are likely to have the power to behave more frugally by turning down the heating, using less water, generating less waste their lives are often collectively caught up in routine, comfort and convenience.

Although work by Noorman et al (1998) and Shove (2003) suggests that many aspects of household consumption are determined by the existing physical and technical infrastructure of the home, some families or even individuals within families are likely to be willing to overcome some of these barriers to behaviour change and instigate greener practices in the home. From the 2009 Social Attitudes Survey, Randall (2011) reports that more than half of adults over age 16 (56%) do not agree with the statement "I find it hard to change my habits to be environmentally friendly. Historically research into collective behaviour change has concentrated on observing behaviour in more public social institutions such as environmental groups. These groups tend to consist of individuals who are ideologically very similar. A few recent studies, however, have conceptualised the family, as a similarly important social unit. Wells & Lekies (2006) and Kola-Olusanya (2005) conclude the home is an important social environment in which children form their early views on nature by learning from their parents. Other studies have concentrated on particular social ties between family members as potential mechanisms through which greener beliefs and behaviours are exchanged and influenced. Most noticeably these studies have concentrated on the transfer from parents to their children (Ballantyne, Connell & Fien 1998) and from children to their parents (Evans, Gill & Marchant 1996). What is important from these studies is the idea that families are likely to be ideologically similar and where there might be dis-concordance, particular family members who hold stronger green views could act as agents for change within the family.

2.1 THE PRESENT STUDY

My approach in this study is to focus upon the family as a social institution in which individual beliefs and behaviours are shaped. The broad argument I formulate is that people

living together in such a close social grouping develop similar routines of behaviour. These routines are likely to be greener in households where members have a similar ideological outlook with respect to nature. In families where there is inconsistency in this ideology and gaps between individuals in terms of greener behaviour, ideologically stronger members of the household seek some resolution, especially where their role or status in the home gives them agency to do so. However, a fundamental mechanism which supports this is the quality of social interaction in the household. One further important consideration in terms of family behaviour is the ability to act which I argue is similarly constrained or enabled by the physical, technical, economic and social environment which individuals living as a family share. Regardless of beliefs in climate change this is likely to present a significant barrier to behaviour change and there are likely to be many families who prioritise their existing lifestyle above many forms of more sustainable behaviour.

Although Brynin and Ermisch (2009:7) suggest the family itself is a form of loose 'governance structure' under which many collective activities are organised, there is little specific research into patterns of family behaviour, specifically whether people living in the same household follow the same sustainable or non-sustainable practices. One important dyadic relationship in terms of initiating and sustaining any form of greener family governance is likely to be the primary couple in the household. In order to directly compare two individuals living in the same home, I therefore focus on this primary couple. Although there is no research into matched environmental behaviour within such partnerships, many other behavioural studies show that men and women living together have a tendency to behave the same. Farrell & Shields (2002) find couples do similar types of sporting activities, Clarke & Etile (2005) find couples are more likely to be either smokers or non-smokers. Kan & Heath (2003) find a strong correlation between the political attitudes and behaviours of couples whilst Leonard & Mudar (2003) find correlation in alcohol consumption. Concentrating on couples in this manner also enables me to draw directly on the theoretical framing of Manski (1993) who identifies three major underlying mechanisms which explain correlated behaviour between two individuals. The first relates to exogenous or contextual effects, where the propensity of an individual to behave in some manner varies with the exogenous

characteristics of the group being observed. In this study I conceptualise this as the shared physical, technical, economic and social environment of the couple and include structures relating to not only the physical and technical aspects of the home but the family as an economic and social unit. The second relates to what Manski (1993) calls correlated effects, whereby individuals behave similarly because they share similar characteristics and I draw on theories of cultural homogamy to contextualise this theory. The third relates to endogenous effects whereby the propensity of an individual to behave in some way varies with the behaviour of a group and here I draw on relationship theory. This framing forms the basis of the following research questions:

- (1) Do couples behave similarly with regards to routine sustainable behaviour within their home?
- (2) To what extent is this explained by?
 - (a) Constraints or Enablers within their Immediate Environment?
 - (b) Homogamy in their Beliefs in Climate Change?
 - (c) Within Couple Influences?

Using Understanding Society, a nationally representative study of households in the UK, to address these research questions, I examine the behaviours of over 7,000 married or cohabiting couples within three particular domains of sustainable behaviour, referred to by the Department of Food and Rural Affairs (DEFRA 2008) as 'headline behaviours'. These behaviours are seen as important ways in which the public can tackle anthropogenic climate change and include making greener purchases, saving on energy and water and using more sustainable forms of travel.

2.1.1 The Physical, Technical, Economic and Social Environment as a Constraint or Enabler

There are three broad theories which explain correlated behaviour between two individuals who live together. The first relates to their immediate environment and suggests that by sharing a physical and social space, couples are exposed to the same exogenous factors that equally enable or constrain their behaviour (Clarke & Etile, 2005, Manski, 1993). In the broader socio-environmental literature these constraints or external barriers to

environmental action are conceptualised as being either physical or technical, such as a lack of recycling facilities, reliance on non-sustainable technology in the home or access to public transport (Shove 2003, O’Riordan 1981, Guagnano et al 1995). They are also more situational, such as family composition, roles and responsibilities held, established norms of family behaviour such as use of living space, food and cooking rituals or other family customs that are difficult to change (Davidson & Freudenburg 1996, Mohai 1992, Rajecski 1982 cited in Kollmus et al, McStay & Dunlap 1983, Stout Wiegand & Trent 1983, Van Liere & Dunlap 1980, Blocker & Eckberg 1979). In their research Gatersleben and Vlek (1998) show that many common household objects are integral to the comfort and quality of family life making them very hard to replace or give up. The washing machine, cooker and central heating, they suggest, contribute to comfort and health. The family car helps maintain social relations, helps the family experience pleasure, get to school, to work and enables privacy, freedom and control. MacNaghten (2003) appropriately concludes from his research that environmental behaviour is ‘tangled up with social life’ (2003:80).

With respect to the ‘headline behaviours’ (DEFRA 2008) with which policy makers are urging householders to engage, there are likely to be a number of constraints or enablers to compliance depending upon the physical and social features of the household. Household size and composition are likely to direct patterns of consumption not only with respect to food and waste but also energy and water consumption and transportation. As Shove (2003) and Gatersleben and Vlek (1998) demonstrate a great deal of non-sustainable behaviour is the result of hard wiring of objects and technologies that are ‘plumbed’ into homes. Bigger houses have more bathrooms, more showers and more space to keep temperate. Space heating itself is known to account for one half to two thirds of domestic energy use in the UK (Defra, 2006). The physical location of the home determines access to public transport, provision of footpaths and pedestrian routes, distance to local shops and other amenities, schools and distance travelled to place of work. Some physical interventions, intended to control consumption such as water metering, are more likely to be hardwired in certain types of properties. Only 30% of households in England and Wales are connected to a water meter and these are likely to be larger properties situated in a higher council tax band (Ofwat, 2011). With respect to more

socio-structural determinants, income is likely to place a significant constraint on paying more for greener food for households of low income but enable this behaviour in households of high income. Similarly income is likely to moderate energy use differently between higher and lower income households. In the 1970's pro-environmentalism was largely seen as a more middle-class phenomena (Buttel and Flinn 1976, 1974). Morrison, Hornback & Warner (1972:271) specifically refers to what they call a 'participation paradox' whereby people already living in a more superior environment were more likely to be concerned about the environment. Oddly, this paradox could be extended to reflect more modern living whereby people on higher incomes are more likely to be educated and informed about climate change. However, they are also equally more likely to be tied into higher consuming lifestyles by living in a larger home, relying on high performing cars and accustomed to taking holidays abroad. Household size and composition is also likely to place similar constraints on individuals living in the household in terms of living space and how it is utilised as well as moderating patterns of general consumption. In addition to family structures that are likely to similarly moderate behaviour, some could divide behaviour particularly between men and women. The division of responsibilities within the partnership for child care, chores such as shopping could situate the woman in the home more, with greater responsibility and influence for decisions related to greener household practices. In conceptualising all these factors as a single mechanism I examine the extent to which the individual behaviour of partners living together is similarly enabled or constrained by their common environment. I also examine the extent to which this varies across and within different domains of sustainable behaviour in and around the home.

2.1.2 Ideological Homogamy

There is a great deal of research into the individual socio-psychological determinants of environmental behaviour. These more cognitive constructs have been observed in many studies to distinguish pro-environmentalists and include value disposition (Poortinga, Steg & Vlek 2004, Stern & Dietz 1994, Stern, Dietz & Kalof 1993) attitudes and concerns towards the environment (Guagnano et al 1995, Theodori & Luloff 2002) and environmental and scientific knowledge (Borden & Schettino 1979, Lyons & Breakwell 1994). Although studies often find a weak direct association between these constructs and actual behaviour, they do distinguish

individuals with a greater motivation to modify their behaviour and those more willing to overcome some of the barriers to behaviour change (Kollmus & Agyeman, Blake 1999, Guagnano et al 1995). The second main theory for matched behaviour draws upon theories of homogamy which suggest that similar people tend to match (Kalmin 1998, 1994, DiMaggio & Mohr, 1985). According to this theory people of similar age, ethnicity, social class and education are more likely to partner. The theory of cultural homogamy is a development of this theory suggesting that not only do people tend to match in terms of their social characteristics but also with respect to their values, beliefs and of relevance to this study, ideological outlook (Brynin et al 2009, Kalmin 1998, 1994, DiMaggio & Mohr, 1985). Brynin et al (2009:93) further develop this idea by suggesting that concordance intensifies within couples through the process of living together, towards what they term 'homogamy of outlook'.

Although typically cultural homogamy is discussed as a matching in terms of parenting values, political views and attitudes towards culture and the arts, it is also conceivable that people who are ideologically greener in their outlook are also more likely to match. These people are likely to share an interest and concern for the natural environment as well as a concern for the effects of human activity on nature. In their 'New Environmental Paradigm (NEP)' Dunlap & Van Liere (1978), suggest pro-environmentalism represents a new paradigm shift towards a distinctive world view in which people share very specific beliefs and concerns with respect to human behaviour and the delicate balance of nature. Distinguishable from dominant societal values, based upon a belief in economic growth and faith in abundance, Dunlap & Van Liere suggest pro-environmentalists believe more in limits to economic growth and the need for balance between human behaviour and nature (Dunlap & Van Liere 1984, 1978). In Freedman's (1995) conceptualisation of green ideology he takes a more radical approach defining it as one grounded in a vision for a society that identifies nature as equal, resources as finite and quality of all life a priority. As a measurable scale, NEP has been tested in many studies showing that pro-environmentalists have a distinctive set of values and beliefs in common (Dunlap & Van Liere 1984, 1978, Albrecht, Bultena, Hoiberg & Nowak 1982). A further possible mechanism through which couples might be more likely to engage

in sustainable behaviour is therefore their matching in terms of this shared outlook. Couples who have similar dispositions towards nature and the environment are more likely to match and form a greener household. Kalmin (1998) and Schellenberg (1960) suggest homogamy involves not only a matching of two people but leads ultimately to confirmation of each other's behaviours as being more acceptable to each other. The important point here is that even if couples are not as strong as each other in terms of their environmental beliefs, over time they are likely to become similar. Through this mechanism it is possible to test not only the extent to which people living together are ideologically matched and more or less likely to form a greener household, but also to determine the importance of this matching. To what extent do partner's beliefs actually reinforce individual behaviour?

2.1.3 Within-Couple Influence

The third main theory for correlated behaviour draws upon relationship theory, in particular the mechanisms through which couples influence each other's behaviour towards homogamy of outlook described by Brynin et al (2009:93). They also refer to this mechanism quite simply as 'within-couple' influence (Brynin et al 2009:95), a process through which couples moderate each other's behaviour towards some mutually beneficial outcome. Brynin & Ermisch (2009) further suggest that interactions between two individuals form the basis of a relationship and these interactions have what they refer to as a 'degree of mutuality' such that they take the views and behaviour of the other into account. This is important because it suggests that any behaviour modification within the couple is somewhat dependent on the quality of their relationship and the extent to which they interact with each other. In their research into smoking behaviour Clarke & Etile (2005) refer to a similar mechanism which they call behavioural bargaining. Through this interaction they suggest mutually acceptable behaviours are discussed and agreed within the partnership. For couples living together there are a number of interesting questions about behaviour change. If couples are ideologically opposed to each other, the theoretical framing followed in this study suggests their behaviour with respect to more sustainable practices is also more likely to be dis-concordant. The third mechanism I test in this study draws on Brynin et al's (2009) notions of within-couple influence and homogamy of outlook. I conceptualise it as ideological exchange, a mechanism

through which amicable exchange of ideas and beliefs takes place between ideologically opposed couples resulting in their matched behaviour. Through this I am able to test a mechanism through which partners potentially influence each other's behaviour.

2.1.4 Method

The data used comes from Wave 1 Understanding Society which is an up to date and representative survey of 30,169 households within the United Kingdom. Wave 1 data was collected between 2009/2010. Of the 77,309 individuals who live in these households 37,489 are males over the age of 16 of whom 14,713 are married and living with their spouses and 3,292 are cohabiting. There are 39,820 females over 16 of whom 14,733 are married and living with their spouses and 3,276 are cohabiting. Of these, 18,005 females are matched with their male or female partners (they have male or female partners currently living with them). Of these 17,871 are opposite sex partnerships and form the initial sample for this research.

Due to the use of behavioural and attitude variables used within this study there is further reduction in the sample. Of the 17,871 matched couples 15,454 females provided a fully productive interview, 580 a proxy interview and 103 a partially productive interview. For males 13,393 provided full interviews, 1,500 a proxy interview and 71 a partially productive interview. Thus there are 16,137 females and 14,964 males for whom a personal interview of some sort is available. Some of the non-productive interviews are due to a lack of contact, refusal to participate, broken appointment or physical and medical difficulties which prevent interview. Environmental behavioural questions are not asked as part of the proxy interview therefore there is a further reduction in sample size (580 females and 1,500 males) for the behavioural questions used for this research to 15,557 females and 13,464 males. Finally of these a fairly large number failed to answer the adult self-response questionnaire from which the attitude variables used in this study are derived. This results in a final sample of 11,543 females and 10,324 males. Variables are derived from matching couples answers to the attitude questions, therefore differing patterns of missing-ness within couples results in final available sample size for modelling of 7,669 couples in which both partners completed both the interview and the self-completion questionnaire.

To address the hypotheses, 9 different sustainable behavioural outcomes are tested for

couples using ordered bivariate regression modelling. This modelling approach enables the simultaneous modelling of two correlated dependent variables which have common covariates and uses full information maximum likelihood (Sajaia, 2008). In the model used the error terms are assumed to have a bivariate standard normal distribution with correlation ' ρ '.

In order to address the research questions, I test the following hypotheses;

- H₁ The probability of an individual engaging in sustainable behaviour is correlated with that of their cohabiting partner or spouse.
- H₂ Social environmental effects on individual sustainable behaviour are significantly different from zero for each partner and there is no significant difference in the size of these effects between partners.
- H₃
 - H_{3.1} The probability of a woman who is a strong believer in climate change behaving sustainably is increased if her male partner is also a strong believer (compared to if he is a weak believer).
 - H_{3.2} The probability of a man who is a strong believer in climate change behaving sustainably is increased if his female partner is also a strong believer (compared to if she is a weak believer).
 - H_{3.3} The probability of a woman who is a weak believer in climate change behaving sustainably is decreased if her male partner is also a weak believer (compared to if he is a strong believer).
 - H_{3.4} The probability of a man who is a weak believer in climate change behaving sustainably is decreased if his female partner is also a weak believer (compared to if she is a strong believer).
- H₄ Where couples have opposite ideological beliefs their joint probability of behaving sustainably is increased if they exchange their ideas and beliefs more.

With respect to H₄ I test the extent to which an ideologically stronger partner positively influences the behaviour of a weaker partner, although I acknowledge that the finding could be that the weaker partner negatively influences the stronger partner. There are 18 dependent variables in total, consisting of nine sustainable behaviours compared for both partners. These

are derived from the following questions which all measure frequency of sustainable behaviour using a five point likert scale (4=always, 3=very often, 2=quite often, 1=not very often, 0=never). Males and females living together as spouses or cohabiting partners are individually asked "How often do you personally"

- a. Decide not to buy something because you feel it has too much packaging?
- b. Buy recycled paper products such as toilet paper or tissues?
- c. Take your own shopping bag when shopping
- d. Put more clothes on when you feel cold rather than putting the heating on or turning it up?
- e. Leave the tap running when brushing your teeth? (this is reverse coded)
- f. Switch off lights in rooms that are not being used
- g. Use public transport (e.g. bus, train) rather than travel by car?
- h. Car share with others who need to make a similar journey?
- i. Walk or cycle for short journeys less than 2 or 3 miles?

There is a weak correlation between most of the above behaviours (<0.3) suggesting that deriving a single measure from these variables for sustainable behaviour is not reliable. This is confirmed by a fairly low Cronbach's Alpha test on each set of 9 variables (0.51 for male behaviours and 0.49 for female behaviours). In this study I also have an interest in observing any differences within and between the following three main behavioural domains (1) purchase related behaviour (avoiding excess packaging, buying recycled goods and recycling plastic carrier bags) (2) energy and water efficiency (avoiding putting the heating on, saving water and saving electricity) and (3) travel behaviour (using public transport, car sharing and walking or cycling short journeys). However, there is an inherent problem in testing the hypotheses on multiple behavioural outcomes. A Bonferroni test suggests there is a 38% chance of accepting a chance finding across 9 behavioural outcomes at $\alpha = 0.05$. This is reduced to 4.41% for $\alpha = 0.005$, these two levels of significance are indicated within all models.

In further support of the use of these behavioural domains, in their research Barr & Gilg (2006) perform a factor analysis on a number of sustainable behaviours, concluding that there

are some main behavioural domains within which people are likely to act similarly. The first is purchase related behaviours covering a wide variety of actions such as buying energy saving products, buying composting bins, buying recycled goods. The second main domain incorporates more habitual activities involving minor adjustments to current lifestyle including turning off lights and taps (Barr & Gilg, 2006). In this research I use their classification to distinguish between purchase behaviour and energy and water saving behaviours in the home. The third grouping is based upon a classification suggested by DEFRA (2008) into broad travel related behaviour.

A number of independent variables are used to test the three main mechanisms. The first mechanism is tested through the use of 11 different variables representing the shared physical, technical, economic and social environment. The first of these is property size (number of bedrooms in the home, $n=17,843$) used in its continuous form. In the sample nearly 25% of couples live in smaller homes (1 to 2 bedrooms), 73% live in houses with up to 3 bedrooms and 27% of couples live in houses with 4 or more bedrooms. The second variable used is home ownership ($n=17,808$). It is estimated that approximately 9 million households use fuel slot coin metering or credit metering to manage and pay their energy bills and a high percentage of these households are located on local authority housing estates (Hill 1986). A binary variable is used to indicate whether a household owns or rents their property since this might have an effect upon energy management behaviour. In the dataset almost 63% of couples own their homes and 37% live in rented accommodation. Of those who rent nearly 15% rent from private landlords, just over 25% rent from local authority or housing associations and the remaining rent from an employer or other sources. Four discrete binary variables are also used to distinguish between households that face particular enablers or constraints related to patterns of parenting and childcare. The first variable identifies parents who have a young, dependent baby to care for (aged 0-2, $n=17,857$). The second variable distinguishes parents who have to deal with pre-school children in terms of childcare and early years learning (aged 3-4, $n=17,857$). The third variable distinguishes households in which at least one primary school aged child resides (aged 5-11 $n=17,857$). The fourth variable distinguishes between households that have at least one secondary school aged child residing

(aged 12-15 years, n=17,857). This is used to identify households with older teenagers where for example household space might be used quite differently. Nearly 5,000 couples have more than 2 adults living in the household. This would include children over the age of 16 and other extended family members. A binary variable is used to determine whether the presence of older children and other family members has any significant effect upon behaviour (n=17,857). Having other adults present in the household would add to food consumption and energy consumption might be increased, especially if elderly relatives live in the household. A variable is also derived from monthly gross equivalised household income to distinguish between those couples whose income is below 60% of the mean equivalised income for all households (n=17,858). 24% of couples are defined in this sample as on low incomes. These households would be expected to have less disposable income available for food and energy and be less likely to own and run a car. In the United Kingdom nearly 5 million households (21%) are defined as being in fuel poverty, having to spend more than 10% of their income on maintaining an adequate level of warmth in the home (Department Energy and Climate Change, DECC 2011).

Although 99% of domestic energy in the UK is supplied by six energy suppliers (DECC, 2011) there is some variation in energy supply and energy pricing within the UK which might affect energy saving behaviour. In 2010 the average annual domestic gas bill was slightly higher in England and Wales than Scotland (DECC, 2011) and because gas supply is still limited in Northern Ireland, the average household electricity bill was slightly higher in Northern Ireland. Although the main determinants of household energy use relate to income, age of property and size of property, because of local area supply and price differences, country of residence may also distinguish energy saving behaviour. Temperature and climate differences between countries, as well as employment and income variations could also affect behaviour. A dummy variable is therefore used in modelling the social environmental effects such that 1=live in England/Wales, 2=live in Scotland, 3=Northern Ireland (n=17,871). In all models England/Wales is compared to Scotland and Northern Ireland. Couples who live in more urban locations such as towns, cities and larger villages would be expected to have better access to public transport, better pedestrian and cycle access and shorter distances to

travel for local amenities (schools, shops and other public places). A binary variable is used such that 1=urban, 0=rural setting (n=17,871). Finally, a binary variable is used to indicate whether the couple are married as opposed to cohabiting (n=16,136) which studies have shown has a considerable effect upon the distribution of household roles and responsibilities (Bianchi et al 2000, Sullivan 2000).

The second mechanism is tested by constructing a scale to measure ideological homogeneity between couples (n=7,878). Although as an ideological scale NEP was developed many years before science had evidence to support anthropogenic climate change, key to this ideology is a belief that human behaviour presents a threat to the balance of nature. Although new discourses related to 'risk' have emerged to engage the public (Pidgeon & Butler, 2009) ideologically there are likely to be related divisions between those who believe the evidence and are willing to engage and those who remain sceptical. Within Understanding Society all individuals above the age of 16 are asked a series of questions with respect to their climate change beliefs and their willingness to engage in mitigating behaviour. Individuals are asked the extent to which they agree with the following five statements (Yes, No, Don't Know);

- a. If we continue on the current course we will soon experience a major environmental disaster
- b. The environmental crisis facing humanity has been greatly exaggerated (reverse coded)
- c. The effects of climate change are too far in the future (reverse coded)
- d. People in the UK will be affected by climate change within the next 30 years
- e. It is not worth me doing things to help the environment if others don't do the same (reverse coded)

By converting these variables into binary, (1=yes, 0=no/don't know) a scale to represent strength of individual environmental ideological beliefs is formed measuring from 0 to 5, where 5=strong (individual agrees with all five climate change statements). A test for inter-item correlation returns a relatively high Cronbach's alpha score for both scales (female scale=0.6026, male=0.6325). A total of 10,324 males and 11,543 females answered all five questions. For both men and women the scale is a poisson distribution with both more men

(27%) and women (33%) agreeing with all five statements (table 1).

Number statements agreed with	Females (%)	Males (%)
0	2.71	4.85
1	7.53	10.52
2	14.16	16.51
3	19.46	20.10
4	22.52	21.01
5	33.63	27.01
N	11,543	10,324

To operationalize ideological homogamy, four dummy variables are constructed which identify concordant (both strong, both weak) and dis-concordant couples (opposite ideological beliefs) defining strong environmental ideology as agreeing with all five statements. In this manner four couple types are identified for modelling purposes, 1=both partners are ideologically weak, 2=female has strong ideology, male has weak, 3=male has strong ideology, female has weak, 4=both partners ideologically strong. Different patterns of missing-ness between couple’s results in an available sample size for this variable of 7,878 cases. Of these 15% are couples who are both ideologically strong, 20% are couples where the female is strong and male weak, 13% are couples where the male is strong and the female is weak and 52% are couples where both partners are weak. What is observed is that 67% of couples are ideologically homogenous.

The final mechanism is tested using a scale which measures the extent to which couples interact with respect to their ideas and beliefs (n=14,680). This is derived from both partner’s answers to the following three questions. “How often do you and your partner?” (1) Have stimulating exchange of ideas (2) Calmly discuss something (3) Work together on a project. All questions are measured according to a 6 point likert scale where (1=never, 2=less once month, 3=once or twice a month, 4=once or twice week, 5=once day, 6=more often). Initially a separate scale is devised for each person measuring the extent to which they amicably exchange their ideas with their partner towards some mutually beneficial outcome. A test for inter-item correlation returns a relatively high Cronbach’s alpha score for both scales (female scale=0.8347, male=0.8272). Thompson & Walker (1982) suggest when couples are both

individually reporting on relationship properties, couple scores can be averaged or summed if the correlation between the partners is high. In this instance for each of the variables used in the scale over 65% of couples gave concordant responses. The correlation between the two scales is relatively high (0.3736) therefore a single scale is constructed by averaging the summated scale scores to represent the extent of ideological exchange between couples. The final scale measures between 1 and 6 such that couples who score 6 rate very highly in terms of ideological exchange. In order to test the extent to which this scale serves as a mechanism for ideological exchange between partners, interaction terms are created between the scale and shared partner ideology.

Theories of homogamy suggest that couples are also likely to have very similar social characteristics. A test for correlation confirms that for cohabiting or married couples within the sample there is a very strong correlation between their ages (0.94), education (0.46) and being born in the UK (0.78). In all models own and partner’s education, age, nationality as well as an indicator of parent’s social class, (fathers work status when they were 14) are included as controls. Finally sampling probability weights are used in all modelling.

3.1 RESULTS

3.1.1 Do Couples Behave Similarly Sustainably or Non-Sustainably? (Formal Testing of H₁)

To directly test H₁, two ordinal measures for association are used. A gamma test is used to calculate concordance between couples behaviour (Agresti & Finlay, 1997) whilst Spearman’s rho is used as a formal test for independence (table 2).

	Gamma	Spearman’s rho
Take own bags shopping	0.598 ASE = 0.008	0.520 *
Use public transport	0.558 ASE = 0.009	0.490 *
Car share with others	0.510 ASE = 0.010	0.376 *
Buy recycled goods	0.501 ASE = 0.009	0.468*
Avoid excess packaging	0.473 ASE = 0.011	0.348*
Walk or cycle	0.390 ASE = 0.009	0.376 *
Turn the tap off	0.353 ASE = 0.010	0.304 *
Switch off the lights	0.352 ASE = 0.013	0.234 *
Put more clothes on	0.301 ASE = 0.010	0.284 *

*(prob > |t| = 0.0000)

For all behaviours Spearman’s rho is significant (prob>|t|=0.0000) providing evidence

to support H₁. Male and female sustainable behaviours are correlated and not independent of each other. In fact, 80% of couples answer the same when asked about taking their own bags shopping, 78% give the same answer when asked about their use of public transport and 75% when asked about car sharing.

3.1.2 Descriptive Statistics

The main competing theories for the causes of correlation between partners' sustainable behaviours are tested in H₂ to H₄ by means of nine separate ordered bivariate models, reporting probit coefficients and these are presented initially as descriptive statistics (tables 3 to 5). In all models significant effects are determined at 95% level of confidence.

Table 3 reports the main effects of the social environment, individual and shared ideology and ideological exchange on three types of purchase behaviour.

Variable	Model 1 Excess Packaging		Model 2 Buy Recycled		Model 3 Own Bags Shopping	
	Female	Partner	Female	Partner	Female	Partner
Bedrooms	0.036*	-0.016	0.009	-0.054**	0.012	-0.054**
	[0.017]	[0.018]	[0.0166]	[0.016]	[0.0174]	[0.017]
Own home	-0.080*	-0.022	-0.07*	-0.054	-0.090*	-0.021
	[0.039]	[0.042]	[0.037]	[0.037]	[0.039]	[0.038]
Children 0-2	-0.030	0.005	-0.062	0.048	-0.063	-0.084
	[0.043]	[0.045]	[0.042]	[0.041]	[0.042]	[0.040]
Children 3-4	-0.021	-0.025	0.007	0.036	-0.026	-0.054
	[0.047]	[0.051]	[0.047]	[0.048]	[0.048]	[0.046]
Children 5-11	0.072*	-0.017	0.039	0.030	-0.047	-0.139**
	[0.036]	[0.039]	[0.036]	[0.035]	[0.037]	[0.035]
Children 12-15	-0.034	0.067	-0.016	0.047	-0.040	-0.038
	[0.041]	[0.045]	[0.039]	[0.041]	[0.042]	[0.041]
Other adults	0.056	0.075*	-0.003	0.063	-0.096*	-0.107**
	[0.034]	[0.037]	[0.033]	[0.033]	[0.036]	[0.034]
Low income	0.025	0.030	0.023	0.055	-0.038	0.094
	[0.059]	[0.048]	[0.042]	[0.042]	[0.045]	[0.044]
Live England	0.147**	0.105**	0.058	0.031	0.063	0.091*
	[0.038]	[0.040]	[0.034]	[0.036]	[0.037]	[0.037]
Urban Location	-0.090**	-0.058	-0.028	0.004	-0.035	0.009
	[0.031]	[0.033]	[0.030]	[0.030]	[0.033]	[0.032]
Married	-0.018	-0.017	-0.088*	-0.058	0.089	0.097*
	[0.039]	[0.043]	[0.037]	[0.037]	[0.039]	[0.087]
Shared Ideology (ref both partners weak)						
Female	0.317**	-0.077*	0.216**	0.077*	0.098**	-0.035
stronger	[0.035]	[0.0382]	[0.0327]	[0.034]	[0.035]	[0.034]
Male stronger	0.125*	0.292**	0.162**	0.191**	0.068	0.184*
	[0.043]	[0.042]	[0.040]	[0.040]	[0.044]	[0.042]

Both strong	0.409** [0.039]	0.449** [0.041]	0.381** [0.038]	0.321** [0.038]	0.211** [0.042]	0.256** [0.039]
Ideological Exchange	0.021 [0.015]	0.066** [0.016]	0.0159 [0.015]	0.054** [0.015]	0.059** [0.022]	0.108** [0.016]
P (correlation)		0.3718		0.5059		0.5893
Log-likelihood		-14756		-19678		-16959
N		7,643		7,584		7,669

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis, shading denotes effects significant for both partners

What the table shows is that very few of the shared social environmental factors have a statistically significant effect upon individual behaviour. For both partners, living in England or Wales as opposed to Scotland is significant in determining their behaviour with respect to excess packaging and living with other adults in the household has a negative effect upon their behaviour with respect to using recycled carrier bags. Personal and shared ideology (and in some cases partner’s ideology) are significant across all behaviours for both females and partners, suggesting that these more principled acts of greener behaviour are affected more by ideology than immediate social environment. Interestingly there is also evidence to suggest the association between some physical and social factors and purchase behaviour varies. Women are more likely to make greener purchases if they live in bigger properties whereas their partners are less likely. Similarly if the couple have at least one child aged 5-11 the woman is more likely to avoid products with less packaging whilst her partner is more likely.

Table 3a reports the results of the interaction effects between shared ideology and ideological exchange for the three purchase behaviours. It shows is that for two of the behaviours, buying recycling goods and taking own bags shopping the exchange of ideas and beliefs between ideologically opposed couples has a significant effect upon male behaviour only. The interaction term between stronger female (weak male) ideology and ideological exchange is mildly significant at $|p| \leq 0.05$.

Table 3a – Simultaneous regression examining the interaction effects between shared individual ideology and ideological exchange on purchase behaviour

Variable	Model 1a Excess Packaging		Model 2a Buy Recycled		Model 3a Own Bags Shopping	
	Female	Partner	Female	Partner	Female	Partner
Shared Ideology (ref both partners weak)						
Female stronger	0.376 [0.050]	-0.184 [0.200]	0.408 [0.165]	-0.274 [0.177]	-0.119 [0.171]	-0.388 [0.178]
Male stronger	0.278 [0.213]	0.423 [0.215]	0.391 [0.196]	0.313 [0.205]	-0.173 [0.226]	0.380 [0.212]
Both strong	0.341 [0.194]	0.286 [0.210]	0.496 [0.200]	0.120 [0.200]	0.382 [0.219]	0.020 [0.212]
Ideological Exchange	0.026 [0.021]	0.954 [0.022]	0.034 [0.020]	0.037 [0.020]	0.048 [0.022]	0.089** [0.022]
Interaction Terms (strength ideological beliefs x ideological exchange) (ref both partners weak)						
Female Stronger	-0.013 [0.040]	0.058 [0.043]	-0.043 [0.036]	0.079* [0.039]	0.049 [0.038]	0.095* [0.039]
Male Stronger	-0.034 [0.047]	-0.029 [0.047]	-0.052 [0.043]	-0.027 [0.045]	0.054 [0.050]	-0.044 [0.047]
Both Strong	0.015 [0.043]	0.036 [0.045]	-0.026 [0.044]	0.045 [0.043]	-0.037 [0.048]	0.053 [0.046]
P (correlation)		0.391		0.506		0.589
Log-likelihood		-14754		-19672		-16951
N		7,643		7,584		7,669

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

Table 4 – Simultaneous regression comparing the main effects of social environment, individual ideology and ideological exchange on energy and water saving behaviours

Variable	Model 4 Extra Clothing		Model 5 Turning off Taps		Model 6 Switching off Lights	
	Female	Male	Female	Male	Female	Male
Number bedrooms	0.028 [0.014]	0.015 [0.015]	0.015 [0.167]	0.001 [0.016]	0.004 [0.018]	0.013 [0.017]
Own home (1=yes)	-0.058 [0.037]	0.039 [0.037]	0.064 [0.039]	0.003 [0.038]	-0.086* [0.041]	-0.105* [0.043]
Children 0-2	-0.123** [0.039]	-0.151** [0.040]	-0.035 [0.043]	0.048 [0.043]	-0.031 [0.044]	0.006 [0.044]
Children 3-4	0.026 [0.046]	0.053 [0.047]	0.0878 [0.049]	0.007 [0.049]	-0.008 [0.051]	0.028 [0.050]
Children 5-11	-0.034 [0.035]	-0.053 [0.035]	-0.014 [0.038]	0.010 [0.037]	-0.053 [0.038]	-0.048 [0.039]
Children 12-15	-0.049 [0.040]	0.027 [0.040]	0.034 [0.043]	0.011 [0.041]	0.043 [0.043]	0.078 [0.044]
Other adults	0.034 [0.033]	-0.010 [0.033]	-0.105** [0.035]	-0.100** [0.035]	-0.094* [0.036]	-0.078* [0.036]
Low income	0.084* [0.042]	0.181** [0.041]	0.064 [0.043]	0.044 [0.043]	0.128 [0.048]	0.177** [0.049]
Live England	0.145** [0.034]	0.140** [0.035]	0.333** [0.037]	0.333** [0.038]	-0.086* [0.039]	-0.105* [0.039]
Urban Location	-0.095** [0.031]	-0.132** [0.030]	-0.053 [0.032]	0.001 [0.032]	0.060 [0.033]	0.007 [0.033]
Married	-0.075* [0.037]	-0.021 [0.038]	0.155** [0.039]	0.122** [0.039]	-0.038 [0.040]	-0.056 [0.040]
Shared Ideology (ref both partners weak)						
Female stronger	0.053 [0.033]	0.061 [0.033]	0.098** [0.035]	-0.019 [0.035]	-0.018 [0.036]	-0.085* [0.189]
Male stronger f	0.038 [0.039]	0.103** [0.039]	0.049 [0.044]	0.227** [0.042]	-0.034 [0.200]	-0.030 [0.215]
Both strong	0.136** [0.037]	0.182** [0.037]	0.226** [0.041]	0.266** [0.040]	-0.090* [0.041]	-0.017 [0.220]
Ideological Exchange	0.047** [0.014]	0.052** [0.014]	0.025 [0.015]	0.046** [0.020]	0.036* [0.016]	0.068* [0.022]
P (correlation)		0.283		0.3217		0.242
Log-likelihood		-20840		-18703		-14484
N		7,655		7,670		7,671

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis, shading denotes effects significant for both partners

Table 4 reports the results for the three energy and water saving behaviours and shows there is greater consistency in the observed effects of the social environment between females and their male partners. Having very young children in the household has a significant negative effect on both female and partner behaviour with regards to wearing extra clothing rather than putting the heating on and it could be that having babies or toddlers in the household makes keeping the home warm important. Living in rented accommodation also has a significant positive effect on both partners in terms of conserving electricity by switching

off lights. In terms of conserving water and electricity, having other adults in the household has a significant negative effect upon behaviour in both partners. One possible explanation relates to general patterns of occupation. With more people living in the home, rooms may be less likely to be unoccupied, particularly if the household contains older teenage children. Households with more occupants are also less likely to have a water meter voluntarily installed.

Partners who live in low income households are both significantly more likely to wear extra clothing rather than putting the heating on and save electricity by turning off the lights giving some support to the idea that income is a significant constraint on behaviour. Since only 30% of households pay directly for their water consumption by metering this might explain why income is not a significant constraint here. Interestingly couples living in England or Wales as opposed to Scotland or Northern Ireland are significantly more likely to engage in behaviours which save on their heating and water but are significantly less likely to save on their electricity. Differences in pricing and metering policies in these countries may account for these effects. In 2010 the average annual domestic gas bill was slightly higher in England and Wales than Scotland and because gas supply is still limited in Northern Ireland, the average household electricity bill was slightly higher in Northern Ireland (DECC, 2011a). In contrast to purchase behaviours, the main effects of individual ideology are relatively weak compared to the size and significance of the social environment. Although for two of the behaviours (excess clothing and turning off taps) shared ideology does significantly and positively affect individual behaviour.

Table 4a – Simultaneous bioprobit regression examining the interaction effects between shared individual ideology and ideological exchange on energy and water saving behaviours

Variable	Model 4a Extra Clothing		Model 5a Turning off Taps		Model 6a Switching off Lights	
	Female	Male	Female	Male	Female	Male
Shared Ideology (ref both partners weak)						
Female stronger	-0.113 [0.165]	-0.164 [0.172]	0.366* [0.1813]	-0.158 [0.177]	0.025 [0.175]	0.076 [0.189]
Male stronger	-0.123 [0.186]	0.293 [0.192]	0.002 [0.208]	0.285 [0.211]	-0.503* [0.200]	-0.059 [0.215]
Both strong	0.269 [0.194]	0.146 [0.185]	0.352 [0.211]	0.140 [0.208]	-0.137 [0.218]	-0.214 [0.220]
Ideological Exchange	0.039* [0.020]	0.048* [0.020]	0.033 [0.020]	0.040* [0.020]	0.017 [0.022]	0.067** [0.022]

Interaction Terms (strength ideological beliefs x ideological exchange) (ref both partners weak)						
Female Stronger	0.037 [0.037]	0.050 [0.038]	-0.060 [0.040]	0.040 [0.039]	-0.010 [0.039]	-0.036 [0.041]
Male Stronger	0.036 [0.042]	-0.042 [0.043]	0.010 [0.046]	-0.037 [0.047]	0.106* [0.044]	0.020 [0.048]
Both Strong	-0.029 [-0.043]	0.008 [0.041]	-0.028 [0.046]	0.028 [0.045]	0.051 [0.047]	0.044 [0.048]
P (correlation)		0.372		0.322		0.247
Log-likelihood		-14794		-18700		-14480
N		7,643		7,670		7,671

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

Table 4a presents the interaction effects of shared ideology and ideological exchange on the three energy related behaviours. What it shows is that for switching off lights the exchange of ideas and beliefs between ideologically opposed couples has a significant effect upon female behaviour only. The interaction term between stronger male (weak female) and ideological exchange is significant at $|p| \leq 0.05$.

Table 5 reports the effects for travel behaviours and shows that income related factors are also significant in predicting behaviours for both females and males. Living in a larger home results in both females and males being significantly less likely to use public transport. Couples who live in low income households are significantly more likely to use public transport. Couples who live in a more urban environment are significantly more likely to use public transport and walk/cycle short journeys, even when controlling for low income. Couples who live in more urban locations such as towns, cities and larger villages would be expected to have better access to public transport, better pedestrian and cycle access and shorter distances to travel for local amenities such as schools, local shops and other public places. The presence of very young children in the household has a negative and significant effect upon all three transport related behaviours for females only again suggesting that some social structuring affects men and women differently. For women only, having primary school aged children is significant in predicting behaviour with regards to walking/cycling short journeys and this is likely to reflect a division in childcare responsibilities with mothers responsible for the school run. With respect to individual ideology this is significant for both men and women in terms of their likelihood of using public transport and for women only in terms of car sharing and walking/cycling. None of the interaction effects are significant for travel related behaviours hence these are not reported.

Table 5 – Simultaneous bioprobit regression comparing the main effects of social environment, individual ideology and ideological exchange on transport related behaviours

Variable	Model 7 Public Transport		Model 8 Car Sharing		Model 9 Walk/Cycle	
	Female	Male	Female	Male	Female	Male
Bedrooms	-0.097** [0.018]	-0.038* [0.018]	0.035* [0.017]	-0.027 [0.018]	-0.055** [0.015]	-0.047** [0.016]
Own home	-0.295** [0.041]	-0.245** [0.041]	0.057 [0.041]	0.111* [0.041]	-0.158** [0.038]	-0.070 [0.038]
Children 0-2	-0.094* [0.044]	-0.013 [0.043]	-0.133** [0.045]	-0.129** [0.045]	0.114** [0.039]	-0.029 [0.038]
Children 3-4	-0.103* [0.051]	-0.043 [0.052]	-0.102* [0.051]	-0.018 [0.051]	0.041 [0.045]	0.029 [0.046]
Children 5-11	-0.1000* [0.036]	-0.020 [0.039]	0.004 [0.037]	0.015 [0.038]	0.127** [0.034]	-0.025 [0.034]
Children 12-15	-0.123* [0.041]	-0.138** [0.042]	-0.028 [0.043]	-0.070 [0.044]	-0.028 [0.039]	0.024 [0.039]
Other adults	-0.025 [0.034]	-0.076* [0.035]	0.152** [0.037]	0.124** [0.036]	0.002 [0.033]	-0.065* [0.033]
Low income	0.173** [0.046]	0.259** [0.046]	-0.140** [0.049]	-0.069 [0.047]	0.029 [0.042]	0.126** [0.044]
Live	-0.026 [0.037]	0.054 [0.038]	0.080* [0.039]	0.031 [0.039]	0.140** [0.036]	0.072* [0.036]
England	0.409** [0.032]	0.395** [0.032]	-0.009 [0.033]	0.033 [0.034]	0.231** [0.031]	0.159** [0.030]
Urban	-0.138** [0.039]	-0.132** [0.040]	-0.028 [0.040]	-0.055 [0.040]	-0.015 [0.036]	-0.038 [0.037]
Married						
Shared Ideology (ref both partners weak)						
Female stronger	0.067* [0.034]	0.001 [0.035]	0.128** [0.036]	0.001 [0.037]	0.087** [0.032]	0.044 [0.033]
Male stronger	-0.022 [0.041]	0.115** [0.041]	0.037 [0.045]	0.041 [0.045]	0.045 [0.040]	0.136** [0.039]
Both strong	0.082* [0.039]	0.167** [0.206]	0.145** [0.042]	0.126** [0.042]	0.192** [0.038]	0.200** [0.038]
Ideological Exchange	0.002 [0.051]	-0.013 [0.021]	0.046** [0.022]	0.066** [0.016]	0.035** [0.015]	0.025 [0.014]
P		0.548		0.450		0.387
L-likelihood		-17740		-15133		-20960
N		7,669		7,670		7,670

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis, shading denotes effects significant for both partners.

3.1.3 Does the Physical, Technical, Economic and Social Environment Affect Both Partners Equally? (Formal Testing of H₂)

Descriptive results suggest there is some variation in the effects of the environmental variables on females and their partners living together, particularly for the purchase and travel behaviours. However, in order to formally test for H₂ a Wald test is conducted for males and females separately on each behavioural outcome which confirms the accumulated effects of

the social environment from models 1-9 are significantly different from zero. This is followed by a further Wald test for cross equation equality of constraints. The null hypothesis is that the cumulative effects of the environmental variables are significantly different for females and males for all behaviour. H_0 is accepted where the chi2 statistic is large and significant (*prob|chi2>=0.05).

	Model 10	Model 11	Model 12
	Female Chi ² (prob>chi ²)	Partner Chi ² (prob>chi ²)	Cross Equation Chi ² (prob>chi ²)
Taking own bags shopping (model 3, table 3)	30.44 (0.001)*	76.18 (0.000)*	77.58 (0.000)*
Using public transport (model 7, table 5)	440.68 (0.000)*	339.72 (0.000)*	44.10 (0.000)*
Walking/cycling short journeys (model 9, table 5)	146.96 (0.000)*	82.88 (0.000)*	39.10 (0.000)*
Buying recycled goods (model 3, table 3)	18.76 (0.066)	30.14 (0.001)*	26.85 (0.005)*
Car Sharing (model 8, table 5)	72.17 (0.000)*	39.87 (0.000)*	25.15 (0.009)*
Not buying products excess packaging (model 1, table 3)	44.80 (0.000)*	18.96 (0.062)	16.56 (0.122)
Turning tap off when brushing teeth (model 5, table 4)	117.76 (0.000)*	101.89 (0.000)*	11.46 (0.406)
Wearing excess clothing (model 4, table 4)	55.70 (0.000)*	67.84 (0.000)*	14.67 (0.198)
Turning lights off when room not in use (model 6, table 4)	32.94 (0.001)*	42.45 (0.000)*	4.52 (0.952)

*(prob chi2<=0.05)

Table 6 shows for all energy and water saving behaviours the test supports H_2 . The combined effects of income, home ownership, size of property, presence of children, other adults, residency and marital status similarly moderate a couple's behaviour. These findings concur with the work of Shove (2003) and Gaterslaben & Vlek (1998) in that consumption of energy and water for individuals living in the same household is moderated similarly by their shared environment. The effects of the immediate social environment also similarly moderate couple behaviour with regard to avoiding excess packaging and one possible explanation is offered which is consistent with findings by Clarke & Etile (2005). They suggest that the home is also an environment for shared learning. Increasing intervention by local authorities, getting more households to recycle waste, could be affecting the collective awareness of householders with respect to food packaging. In their research Guagnano et al

(1995) find that merely providing recycling bins positively affected knowledge and attitudes towards recycling.

Figure 1 shows the extent to which each factor conceptualised within the physical, technical, economic and social environment moderates the joint probability of couple’s behaving similarly sustainably. One particularly significant effect with respect to energy and water saving behaviour is the significance of income and price (figure 1).

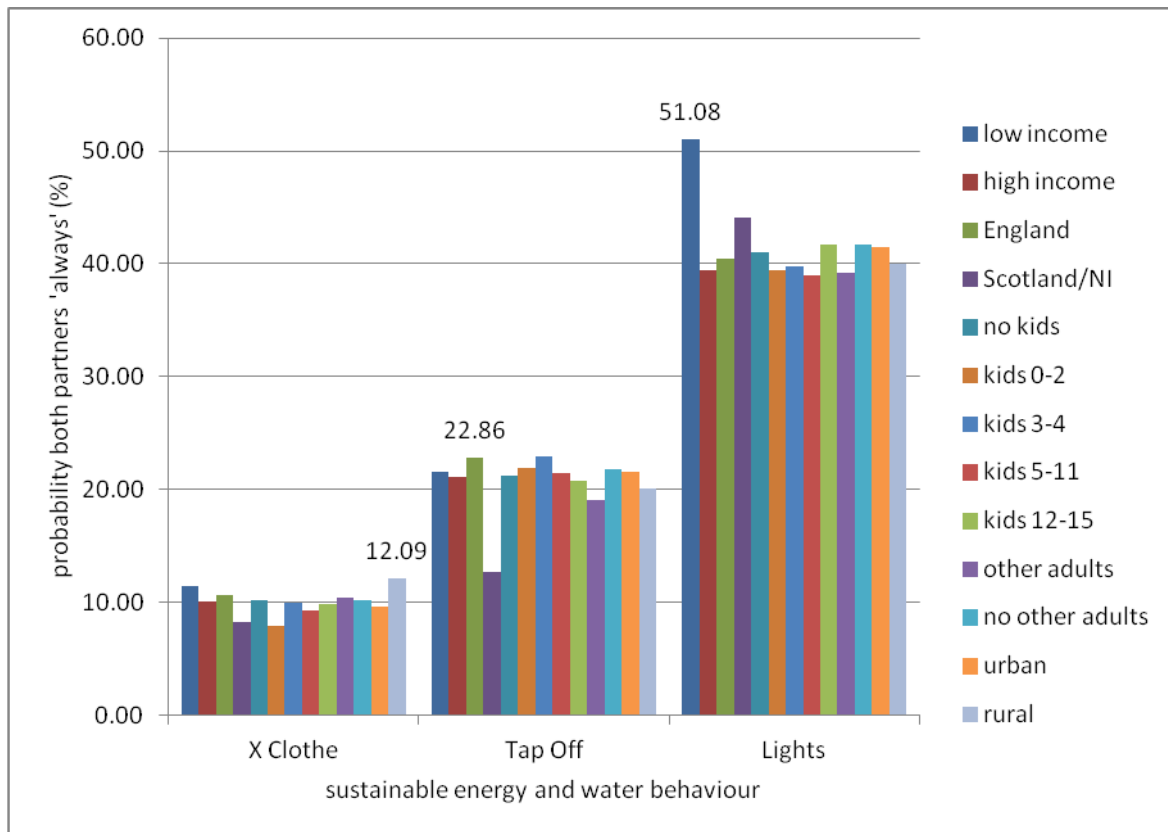


Figure 1 – Average joint predicted probabilities that couples always engage in energy and water saving behaviours, conditional upon their immediate social environment

Couples living on low income (below 60% mean equivalised income) have almost a 12% higher predicted probability of always switching off lights compared to couples on higher incomes. Couples living in Scotland or Northern Ireland, where average electricity charges are higher, are also more likely to be more frugal with electricity use. Couples living in England, where average gas bills are higher, are more likely to wear extra clothing rather than put the heating on. With respect to water use, couples living in England or Wales are more than 10% more likely to engage in water saving behaviour. This might reflect real differences between

these countries in terms of water metering, which since the Walker Report (2009) has enabled water authorities to designate areas as water scarce and implement a policy of compulsory metering. People living in England or Wales, particularly in areas of low rainfall, might also perceive water to be a more threatened resource.

The sharing of similar social environment, however, was not a mechanism through which matched travel behaviour nor two of the purchase related behaviours can be explained.

3.1.4 Do Partners Influence Each Other’s Behaviour? (Formal Testing of H₃)

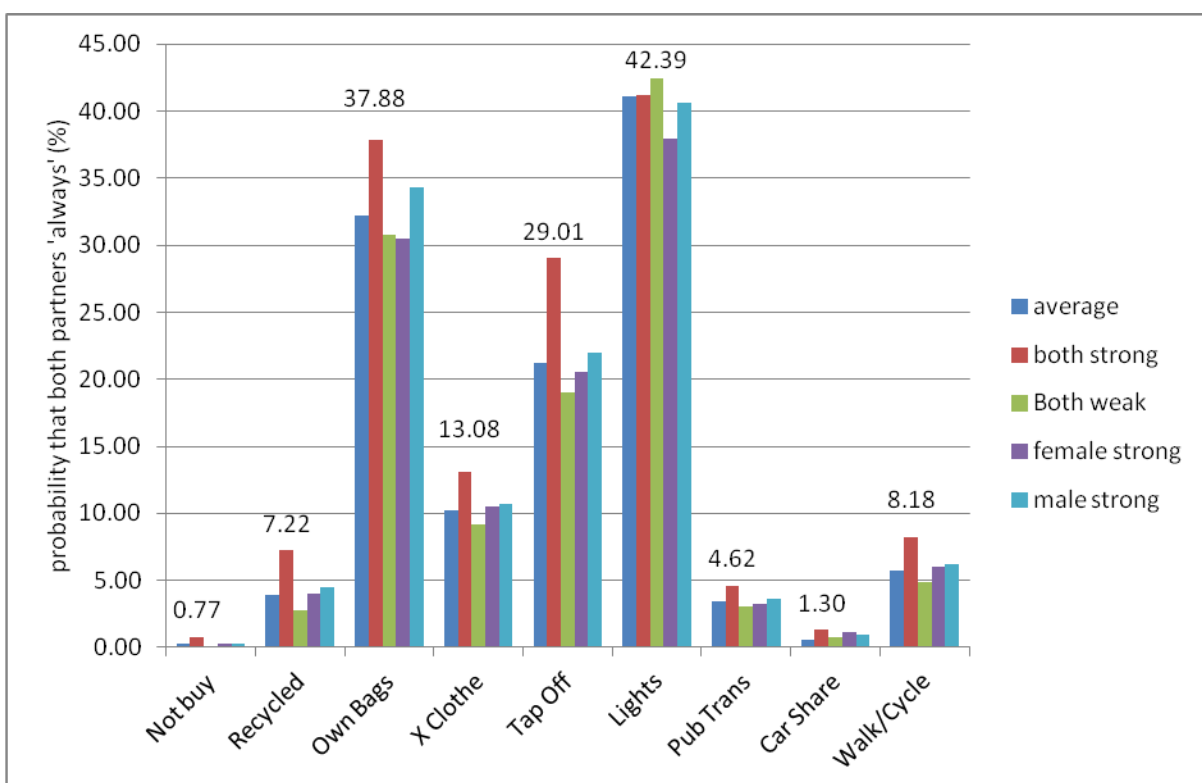


Figure 2 – Joint predicted probabilities of sustainable behaviour conditional upon ideological matching between couples

67% of all couples in this study match in terms of their ideological beliefs providing some support for the idea that couples are more likely to share similar beliefs about the environment. Figure 2 plots the average joint predicted probabilities, derived from the main models (1-9), for four couple types (1) couples who are both strong believers in climate change (2) couples who are both weak (3) and (4) couples who are ideologically opposite. What figure 2 shows clearly is that the chances of both partners acting sustainably is higher for many behaviours when both partners are ideologically strong, but this could be either the

result of independent main effects or the result of partner influence. To identify whether partner's ideology has an impact on own behaviour the four hypotheses stated under H₃ (H_{3.1-4}) are tested by re-running models 1-9 using different reference categories for shared ideology. Using 'female strong, male weak' as the first reference category H_{3.1} and H_{3.4} are tested (tables 7, 8 & 9). H_{3.1} is accepted where the coefficient for shared strong ideology for females is positive and significant, indicating that the probability of behaving sustainably for a woman, who has strong beliefs in climate change, is increased if her partner shares her views (compared to if he opposes them). Similarly H_{3.4} is accepted where the coefficient for shared weak ideology for males is negative and significant, indicating that a man who has weak beliefs in climate change is even less likely to behave sustainably if his female partner shares his weak views (compared to if she opposes them).

Using 'female weak, male strong' as the second reference category for shared ideology H_{3.2} and H_{3.3} are tested (tables 10, 11 & 12). H_{3.2} is accepted where the coefficient for shared weak ideology for females is negative and significant (compared to the reference category) and H_{3.3} is accepted where the coefficient for shared strong behaviour for men is positive and significant (relative to the reference category).

Table 7 – Simultaneous regression comparing the main effects on the purchase behaviour of a strong female who has a strong rather than weak partner and a weak male who has a weak rather than strong partner (controlling for social environment and ideological exchange)

	Model 1b Excess Packaging		Model 2b Buy Recycled		Model 3b Own Bags Shopping	
	Female	Partner	Female	Partner	Female	Partner
Shared Ideology (ref female strong, male weak)						
Both weak	-0.317**	-0.077*	-0.216**	-0.077*	-0.098**	-0.035
	[0.035]	[0.038]	[0.033]	[0.034]	[0.035]	[0.035]
Male stronger	-0.192**	0.214**	-0.055	0.114*	-0.030	0.149**
	[0.047]	[0.048]	[0.043]	[0.044]	[0.048]	[0.046]
Both strong	0.092*	0.372**	0.164**	0.244**	0.113*	0.222**
	[0.043]	[0.047]	[0.042]	[0.042]	[0.046]	[0.044]
P (correlation)		0.391		0.506		0.590
Log-likelihood		-14754		-19672		-16951
N		7,643		7,584		7,669

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

Table 8 – Simultaneous regression comparing the main effects on the energy and water saving behaviour of a strong female who has a strong rather than weak partner and a weak male who has a weak rather than strong partner (controlling for social environment and ideological exchange)

	Model 4b Extra Clothing		Model 5b Turn off Taps		Model 6b Switching off Lights	
	Female	Partner	Female	Partner	Female	Partner
Shared Ideology (ref female strong, male weak)						
Both weak	-0.053 [0.033]	-0.061 [0.033]	-0.098** [0.035]	-0.019 [0.035]	0.018 [0.036]	0.085* [0.037]
Male stronger	-0.015 [0.044]	0.042 [0.044]	-0.048 [0.048]	0.099* [0.047]	-0.016 [0.048]	0.115* [0.049]
Both strong	0.083* [0.042]	0.121** [0.042]	0.129** [0.046]	0.247** [0.045]	0.109* [0.046]	0.068 [0.047]
P		0.283		0.322		0.242
(correlation)						
Log-likelihood		-20840		-18703		-14484
N		7,655		7,670		7,671

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

Table 9 – Simultaneous regression comparing the main effects on the transport behaviour of a strong female who has a strong rather than weak partner and a weak male who has a weak rather than strong partner (controlling for social environment and ideological exchange)

	Model 7a Public Transport		Model 8a Car Sharing		Model 9a Walk/Cycle	
	Female	Partner	Female	Partner	Female	Partner
Shared Ideology (ref female strong, male weak)						
Both weak	-0.067* [0.034]	0.001 [0.035]	-0.128** [0.036]	-0.001 [0.037]	-0.087* [0.032]	-0.044 [0.033]
Male stronger	-0.045 [0.046]	0.116* [0.046]	-0.091* [0.049]	0.040 [0.050]	-0.042 [0.044]	0.092* [0.043]
Both strong	0.016 [0.044]	0.169** [0.044]	0.016 [0.046]	0.125** [0.048]	0.105* [0.042]	0.156** [0.042]
P		0.548		0.450		0.387
L-likelihood		-17740		-15133		-20960
N		7,669		7,670		7,670

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

With respect to H_3 for all purchase and energy related behaviours $H_{3.1}$ is accepted. Women who believe in climate change are significantly more likely to avoid products with excess packaging, buy recycled goods and take their own bags shopping if their male partners support their ideological views rather than oppose them (table 7). They are also significantly more likely to wear extra clothing rather than put the heating on, turn off taps to save water and switch off the lights in rooms that are not being used if their male partners similarly support their ideological views (table 8). For travel behaviour, although all effects are positive

and broadly in line with the stated hypothesis only the coefficient for walking/cycling is both positive and significant (table 9, model 9a) suggesting H_{3,1} can only be reliably accepted for this travel behaviour.

For a man who is a weak believer in climate change, having a weak rather than strong female partner has a negative effect upon all purchase behaviours (table 7) and most energy and transport behaviours apart from switching off lights (table 8) and using public transport (table 9). However for only 2 out of these 7 behaviours this effect is significant. Men who have weak beliefs in climate change are significantly less likely to avoid products with excess packaging (table 7 model 1b) and buy recycled goods (table 7 model 2b) if their female partners share similar weak beliefs (rather than strong beliefs). This suggests H_{3,4} should be accepted only for these two behaviours.

Table 10 – Simultaneous regression comparing the main effects on the purchase behaviour of a weak female who has a weak rather than strong partner and a strong male who has a strong rather than weak partner (controlling for social environment and ideological exchange)

	Model 1c Excess Packaging		Model 2c Buy Recycled		Model 3c Own Bags Shopping	
	Female	Partner	Female	Partner	Female	Partner
Shared Ideology (ref female weak, male strong)						
Both weak	-0.068 [0.044]	-0.184** [0.042]	-0.162** [0.039]	-0.191** [0.039]	-0.125** [0.043]	-0.292** [0.042]
Female stronger	0.030 [0.048]	-0.149** [0.046]	0.055 [0.043]	-0.114** [0.044]	0.192** [0.047]	-0.214** [0.048]
Both strong	0.143** [0.054]	0.073 [0.049]	0.219** [0.047]	0.130** [0.047]	0.284** [0.050]	0.157** [0.050]
P (correlation)		0.372		0.506		0.589
Log-likelihood		-14756		-19678		-16959
N		7,643		7,584		7,669

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

Table 11 – Simultaneous regression comparing the main effects on the energy and water conservation behaviour of a weak female who has a weak rather than strong partner and a strong male who has a strong rather than weak partner (controlling for social environment and ideological exchange)

	Model 4c Extra Clothing		Model 5c Turn off Taps		Model 6c Switching off Lights	
	Female	Partner	Female	Partner	Female	Partner
Shared Ideology (ref female weak, male strong)						
Both weak	-0.038	-0.103**	-0.049	-0.117**	0.034	-0.030
	[0.039]	[0.039]	[0.042]	[0.042]	[0.043]	[0.043]
Female stronger	0.0148	-0.042	0.048	-0.099*	0.016	-0.115*
	[0.044]	[0.044]	[0.048]	[0.047]	[0.048]	[0.049]
Both strong	0.098*	0.079	0.177**	0.149**	0.124*	-0.047
	[0.047]	[0.047]	[0.052]	[0.051]	[0.052]	[0.052]
P (correlation)		0.372		0.506		0.589
Log-likelihood		-14756		-19678		-16959
N		7,643		7,584		7,669

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

Table 12 – Simultaneous regression comparing the main effects on the transport behaviour of a weak female who has a weak rather than strong partner and a strong male who has a strong rather than weak partner (controlling for social environment and ideological exchange)

	Model 7a Public Transport		Model 8a Car Sharing		Model 9a Walk/Cycle	
	Female	Partner	Female	Partner	Female	Partner
	Model 7b Public Transport		Model 8b Car Sharing		Model 9b Walk/Cycle	
Shared Ideology (ref female weak, male strong)						
Both weak	-0.022	-0.115**	-0.037	-0.041	-0.045	-0.136**
	[0.041]	[0.041]	[0.045]	[0.045]	[0.040]	[0.039]
Female stronger	0.045	-0.116*	0.091	-0.040	0.042	-0.092*
	[0.046]	[0.046]	[0.049]	[0.050]	[0.044]	[0.043]
Both strong	0.061	0.053	0.107*	0.085	0.148**	0.064
	[0.050]	[0.049]	[0.053]	[0.054]	[0.048]	[0.047]
P (correlation)		0.372		0.506		0.589
Log-likelihood		-14756		-19678		-16959
N		7,643		7,584		7,669

** denote significant at 95% level of confidence for $|p| \leq 0.005$. * denote significant at 95% level of confidence for $|p| \leq 0.05$. Robust standard errors in parenthesis

For men who are strong believers, having a female partner who shares similar strong beliefs (rather than weak) also has a positive effect upon all behaviours apart from switching off lights (tables 10, 11 and 12). However for only three of these behaviours, effects are significant enabling $H_{3.2}$ to be reliably accepted. Men who are strong believers in climate change are significantly more likely to buy recycled goods (table 10, model 2c), take their own bags when shopping (table 10, model 3c) and turn off taps to save water (table 11, model 5c)

if their female partners are also strong believers rather than weak believers in climate change.

For a women who is a weak believer in climate change, having a similarly weak male partner (rather than stronger) (tables 10, 11 and 12) show the reported coefficient for all behaviours apart from switching off lights (table 11, model 6c) is decreased which is broadly in line with the stated hypothesis ($H_{3,3}$). However, this effect is only significant for buying recycled goods (table 10, model 2c) and taking own bags shopping (table 10, model 3c) therefore $H_{3,3}$ is reliably accepted only for these two purchase behaviours.

In summary findings suggest that the sustainable behaviour of couples living together is affected by ideological matching, although there is some variation both in terms of gender and within and between behavioural domains. Ideological homogamy (both partners either strong or weak believers in climate change) does affect the probability of individual sustainable behaviour but this is conditional upon the behavioural domain being observed. For all purchase related behaviours the observed effects, although not all significant, are generally in line with the stated hypothesis for both men and women. For energy and water conservation behaviours, however, the noticeable exception to expected effects is for switching off lights. Here for both men and women who are weak believers in climate change, having a weak rather than strong partner increases the probability of engagement in this behaviour. One possible explanation is that this behaviour is only marginally determined by individual or shared beliefs in climate change. Figure 1 shows that people living on low incomes have the highest probability (51%) of engaging in this behaviour compared to either, an average couple (41%), an ideologically strong couple (41%) or an ideologically weak couple (42%). Table 4 also confirms there is a weak negative association between this behaviour and both strong individual and shared ideology. For travel behaviour findings are again broadly in line with the stated hypothesis for both men and women.

With respect to gender differences, positive ideological homogamy (both partners are strong believers in climate change) significantly increases female sustainable behaviour in more behaviours overall than male (7 out of 9 observed behaviours compared to 3 out of 9 for males) suggesting this type of endorsement by a partner particularly moderates female sustainable behaviour. This could reflect differences in their relative influence within the

relationship with men holding more influence. The theory of cognitive dissonance is applied to explain inconsistencies in environmentally responsible behaviour by Thøgersen (2004). Overall he concludes that people desire to behave consistently with their beliefs and values and it could also be the case that women have a greater propensity to resolve dissonance between beliefs and behaviours within the partnership.

3.1.5 Do Partners Influence each other's behaviour and does this depend on the Nature of Social Interaction between them? (Formal Testing of H₄)

In this study I am also concerned with directly testing the theory that where couples are ideologically opposed and less likely to match in terms of their behaviour, their mutual behaviour is influenced by the ideologically stronger partner. One possible mechanism through which this could take place is through the exchange of ideas and beliefs within the partnership. This could be in the form of discussion or debate on issues related to climate change or the exchange of ideas as to how to equitably modify lifestyle. For two purchase behaviours (buying recycled goods, taking own bags shopping) and one energy behaviour (switching off lights when rooms not in use) there is some evidence to suggest ideologically weaker partners may be influenced by their stronger partners. Interaction terms reported are positive and significant for the effects of stronger female ideology upon male behaviour for two of the purchase behaviours (models 2a and 3a in table 3a) and for the effects of stronger male ideology on female behaviour and for one of the energy behaviours (model 6a in table 4a). In order to formally test H₄ joint predicted probabilities that couples "very often" and "always" buy recycled goods, take their own bags shopping and switch the lights off are derived from the respective models. Using a linear fit, these predicted values are plotted separately against frequency of ideological exchange for three couple types. (1) couples where the female is ideologically strong but the male is weak (2) couples where the male is strong but the female is weak and (3) couples where both partners are weak (reference category).

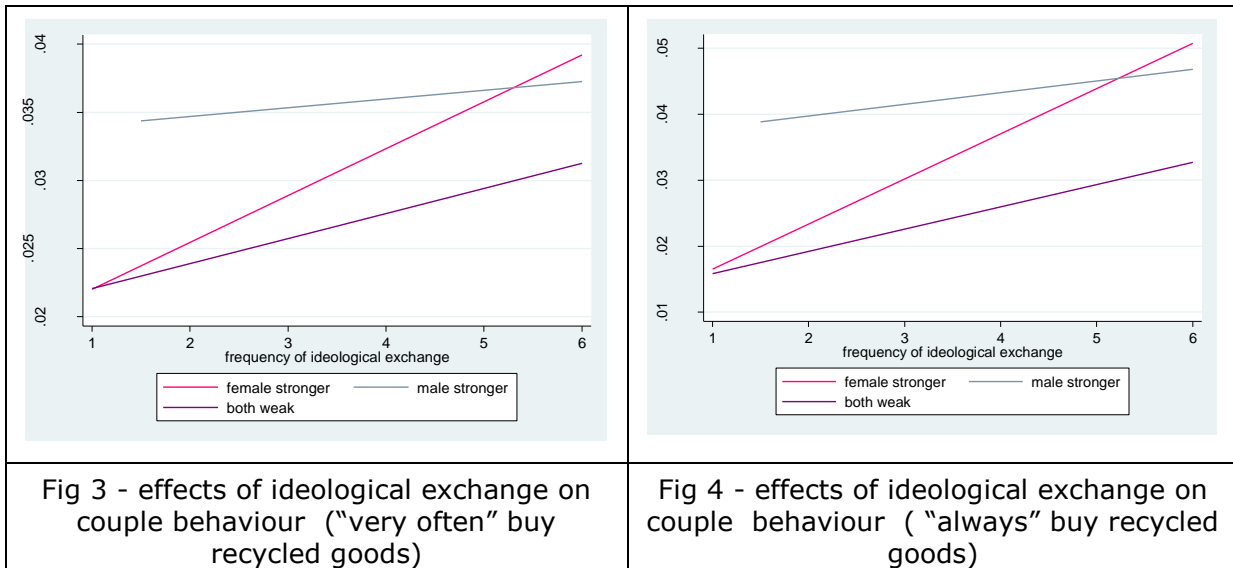


Fig 3 - effects of ideological exchange on couple behaviour ("very often" buy recycled goods)

Fig 4 - effects of ideological exchange on couple behaviour ("always" buy recycled goods)

Figures 3 & 4 – Discrete change in joint predicted probability of buying recycled goods for 1 unit increase in frequency of ideological exchange
Ideologically opposed couples (ref group both partners ideologically weak)

Figures 3 and 4 illustrate the effects of increased ideological exchange on the probability that couples buy recycled goods. In both graphs as ideological exchange increases for all three couple types, the joint predicted probability that they "very often" (fig 3) and "always" (fig 4) buy recycled goods also increases suggesting that concordant behaviour increases for all couples as they interact more. As to be expected there is a much flatter linear relationship for ideologically weak couples who already share similar views. Of particular interest is that the relationship between ideological exchange and the probability of buying recycled goods is much stronger for couples in which the female is the ideologically stronger partner. Brynin & Ermisch (2009) suggest that although couple interactions have what they refer to as a 'degree of mutuality' this is unlikely to be equally distributed but varies according to both power differentials and flows of influence between the couple. Findings suggest that for household purchase behaviour the woman has more influence over joint purchase behaviour than their partners.

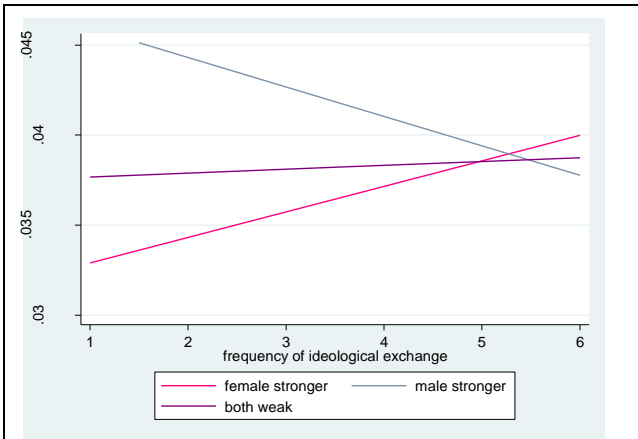


Fig 5 - effects of ideological exchange on couple behaviour ("very often" take own bags when shopping)

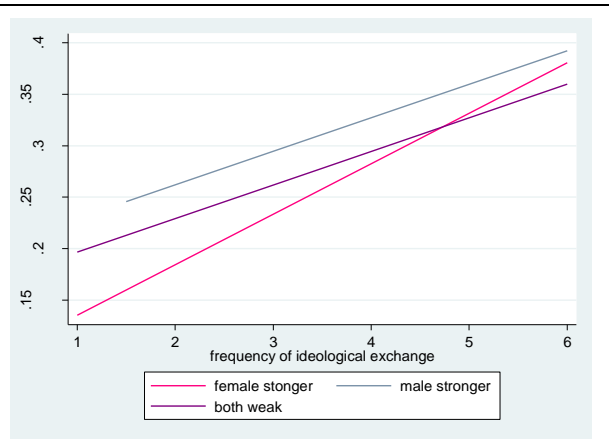


Fig 6 - effects of ideological exchange on couple behaviour ("always" take own bags when shopping)

Figures 5 & 6 – Discrete change in joint predicted probability of taking own bags shopping for 1 unit increase in frequency of ideological exchange
Ideologically opposed couples (ref group both partners ideologically weak)

A similar effect is observed with respect to couples taking their own bags shopping (figures 5 and 6) where the predicted probability of joint behaviour for partners with opposing beliefs is increased more if the female is a strong believer in climate change. Whilst generally these findings fit with the theory put forward by Clarke & Etile (2005) suggesting that some form of behavioural bargaining takes place between couples this research suggests behavioural outcomes depend upon who has more influence within the relationship. Perhaps not surprising women are observed to be more influential in decisions related to household purchases and shopping related behaviours. Research shows that in most households women do more of the non-paid domestic labour including shopping (Bianchi et al 2000) and would be expected to have more responsibility and subsequently have more influence as to what is purchased and how.

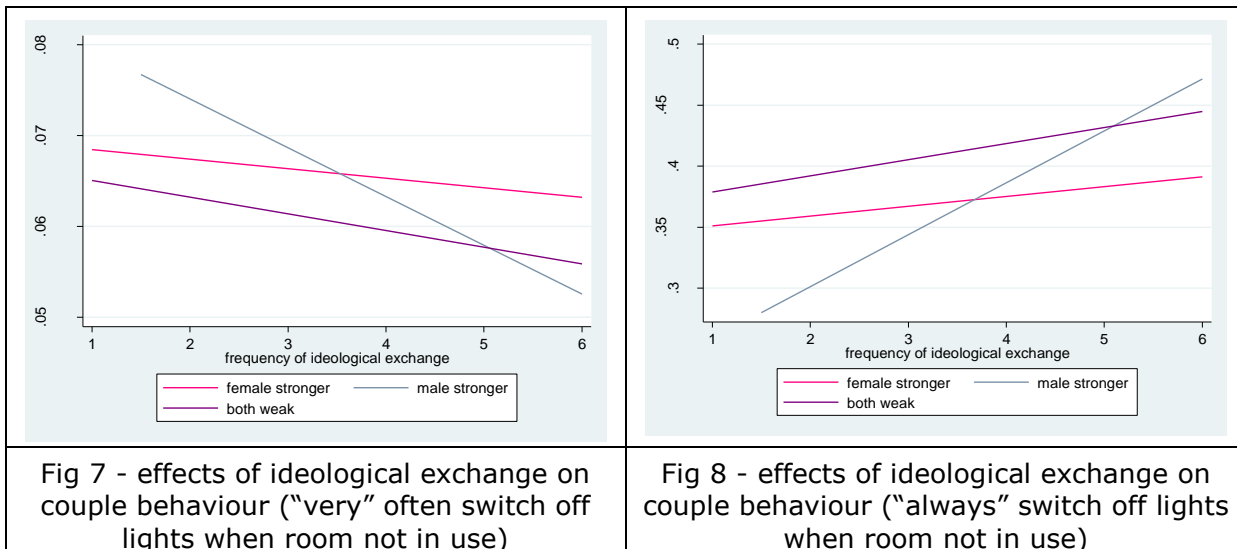


Fig 7 - effects of ideological exchange on couple behaviour ("very" often switch off lights when room not in use)

Fig 8 - effects of ideological exchange on couple behaviour ("always" switch off lights when room not in use)

Figure 7 & 8 – Discrete change in joint predicted probability of switching off lights for 1 unit increase in frequency of ideological exchange
Ideologically opposed couples (ref group both partners ideologically weak)

Figures 7 and 8 illustrate the effects of increased ideological exchange on the probability that couples switch off their lights. Interestingly they show a contrasting effect where male behaviour influences female behaviour more. The linear relationship between ideological exchange and the predicted probability of couples switching off lights becomes positive for all couples as the frequency of the behaviour changes from "very often" to "always". For couples in which the male is the ideologically stronger partner, the change in predicted probability is much larger. Whilst there has been a great deal of research since the late 1970's into the differing attitude and behavioural dispositions taken by men and women towards the environment which is largely inconclusive, what it does support, however, is the finding that that females influence their partner's behaviour within the private sphere of the home. Generally empirical research continues to support the notion that women are more likely to engage with environmental acts related to food purchases, cooking, cleaning and child care, attributed to their domestic role within the household. It is interesting therefore to find that men have more influence over joint behaviour with respect to electricity consumption. One possible explanation relates to income distribution within the partnership. Some theorists suggest that income is likely to be pooled between men and women living together whilst others suggest men and women use their incomes differently (Lundberg, Pollak & Wales 1997). Women might use their incomes for shopping and household related purchases whilst

men might use theirs for fixed payments such as mortgage, fuel and home maintenance. If men are more likely to be responsible for making fuel payments this would explain their greater bargaining power over energy conservation behaviour.

4.1 DISCUSSION

In this study I set out to establish an argument that it is worth studying the family as a social institution because people within it develop similar sustainable or non-sustainable routines of behaviour. Being a close social unit they also have the ability to influence and change each other's behaviour. I tested this theory by examining the relationship between beliefs in climate change and sustainable behaviour for 7,669 men and women living together. These couples either lived alone or with children under age 16 and/or with extended family members over age 16. For all 9 behaviours tested across three major domains of sustainable behaviour I can conclude that couples in these households are likely to be concordant. They are similarly likely or unlikely to behave more sustainably with regards to purchase, energy and transport behaviours. In order to further develop this argument I tested three main mechanisms on these couples which according to Manski (1993) explain how matched behaviour occurs in close social groupings. The first relates to the shared environment in which the couples live and suggests partners behave similarly because they are exposed to the same exogenous factors that shape their behaviour. This is important, particularly with respect to couples that have established less sustainable routines in the home, to determine whether there are some particular barriers that carefully targeted policy interventions might help to overcome. Here I am able to conclude that this mechanism has some explanatory value in terms of matched behaviour with respect to consumption of electricity, heating and water. Couples living in the same physical, technical, economic and social conditions are equally likely to switch off their lights to save electricity, turn off their taps to save water and wear extra clothing to save on fuel bills. The main explanation I offer, which distinguishes these behaviours as particularly more likely to affect both partners equally, draws on the work of Shove (2003) and Gaterslaben & Vlek (1998). Through their research they show that the consumption of energy and water is likely to be common to individuals living in the same household because it is similarly embedded into their collective routines of household

behaviour such as cooking, showering or keeping warm. Heating, lighting and water are also basic raw materials through which Norman et al (1998) suggest a household metabolises and could be seen as a fundamental component of shared lifestyle.

With respect to these three distinctive behaviours my research also suggests that a significant component of this shared environment is income related. Couples on a low income have a 51% probability of always switching off their lights in rooms when these are not being used which is 12% higher than couples on high incomes and more than 10% higher than couples who both are strong believers in climate change. Couples living in Scotland or Northern Ireland, where average electricity charges are higher, are also more likely to be more frugal with electricity use. Couples living in England, where average gas bills are higher, are more likely to wear extra clothing rather than put the heating on. With respect to the policy implications of this finding, although couple behaviour does appear to be moderated by income and price, if this is used as a strategy to encourage more sustainable energy related behaviour within the home these interventions would be unfairly distributed across higher and lower income households. In the United Kingdom nearly 5 million households (21%) are defined as being in fuel poverty and increasing pricing will add to this number. At the same time this strategy would be relatively ineffective on households that have higher incomes and are more able to absorb price increases. Higher income households are also probably more likely to be tied into heavier energy consumption merely through the size of their home. Innovations are required that make these homes greener as well as the individuals living in them. Greener forms of energy, SMART metering or incorporating smaller technological changes in the home such as using low energy light bulbs or room sensors would make small but effective changes. Couples who had young babies were also less likely to compromise on the use of heating suggesting that their responsibilities as parents are a priority and innovations are needed by which these types of homes can be heated more efficiently rather than the heating turned off. The first mechanism also has some value in explaining joint behaviour towards avoiding excess packaging. One possible explanation draws on the ideas put forward by Clarke & Etile (2005), Wells & Lekies (2006) and Kola-Olusanya (2005), Musser & Diamond (1999) that the home is also a place for shared learning about the environment and climate change. Families are

increasingly being asked by local authorities to participate in recycling schemes which Guagnano et al (1995) suggests also affects attitudes towards recycling and possibly by association related issues such as packaging. Some factors have different effects on men and women and this was noticeable in the remaining purchase behaviours and travel behaviours. Women's behaviour only, was significantly affected by the couple having children aged 5-11 in terms of walking/cycling short journeys rather than using the car and avoiding products with excess packaging. Whilst this probably reflects a division between the couple in terms of childcare it also suggests the relationship between mothers and children might be a particular one through which there is some transmission, either directly between mothers and children or indirectly from the school. In their research Evans, Gill & Marchant (1996) find that children have the potential to influence their parent's environmental views and primary school children could be particular messengers.

The second mechanism I tested relates to theories of homogamy, suggesting couples behave similarly because they are ideologically similar. The general pattern which emerges enables me to conclude that homogenous ideological beliefs are important in determining individual behaviour. Men and women who hold strong beliefs on climate change are more likely to behave sustainably across a range of behaviours if their live in partner shares their strong views rather than opposes them. Similarly where they hold weak views they are less likely to behave sustainably when their partners hold similar views. In terms of the significance of these effects, for women their behaviour was positively affected across more behaviours than men and two explanations are offered. The first draws again on Brynin & Ermisch (2009) who suggest that the outcomes of couple interactions vary not only according to the balance of power but also the balance of influence between them. Women may be more likely to seek the endorsement of their partners, particularly for behaviours that involve the introduction of new household routines or spending more money on greener products. It could also mean that their approach to engaging in more sustainable practices is likely to be more collaborative, seeking partner agreement before acting. A further perspective can be drawn from theories of cognitive dissonance (Festinger 1962) which suggests people are sensitive to inconsistencies between their beliefs and behaviour and seek to close any gap, and this may

also be true of household behaviour. This is an important finding because it suggests that men and women in a partnership may also vary in their propensity to resolve inconsistencies between mutual beliefs and behaviours. If women place more value on behavioural consistency, or are more collaborative in their approach to sustainable behaviour change, both theoretical perspectives suggest where they also have the power to act, they are potentially an important social agent for negotiating family behaviour change.

The third mechanism I tested is that through the exchange of beliefs and ideas, couples influence each other's behaviour. Here, I find this mechanism has some explanatory value but only for a few observed behaviours. Where couples are ideologically opposed and there is more likely to be a gap in their behaviour, interacting in terms of exchanging ideas and beliefs increases the probability of similar sustainable behaviour. Interestingly the outcome of this interaction varies. For two of the purchase decisions observed, where the woman was the ideologically stronger partner, she exerted more influence over the joint behavioural outcome than if the male was the stronger partner. In contrast for energy saving behaviour the man had more influence over the joint behaviour. There has been a great deal of research since the late 1970's into the differing attitude and behavioural dispositions taken by men and women towards the environment which is largely inconclusive. What it does support, however, is this finding that men and women might be expected to influence each other's behaviour differently, dependent upon their respective roles within the household. Historically theorised as the hunter gatherer within the household with a more utilitarian attitude towards the environment and responsibility for physical family welfare (Mohai 1992, McStay & Dunlap 1983, Stout Wiegand & Trent 1983) the man might be expected to encourage greater economic behaviour, particularly if he is also the major wage earner and feels more responsible for paying bills. In contrast as the care givers the woman might be expected to influence behaviours that contribute towards the health, safety, comfort and convenience of the family unit (Blocker & Eckberg 1979, Davidson & Freudenburg 1996). What my research particularly adds here in terms of understanding mechanisms for family behaviour change is that men appear to be more responsible and influential for family decisions related to energy and women for greener purchases. The implication for this in

terms of policy is that interventions are likely to be more effective if they are accurately designed and targeted with these gender distinctions in mind.

The argument I attempted to formulate through this research is that people living together in such a close social grouping as the family develop similar routines of behaviour and for couples living together, across all 9 sustainable behaviours this was generally observed. I also suggested that these routines are likely to be greener in households where members have a similar ideological outlook with respect to nature. For most behaviour, the joint probability for couples is higher where they are both strong believers in climate change providing some support for this theory. Furthermore where couples reinforce each other's beliefs, the probability of individual greener behaviour is also increased for both men and women. This suggests that the views of other family members do make a difference to individual behaviour within the household, particularly for women. I further theorised that in families where there is inconsistency in this ideology and likely gaps in behaviour, ideologically stronger family members influence weaker members. This was also a finding in my research although this was found to be dependent on the relative bargaining power. For men and women in the study this was likely to be derived from their relative roles and responsibilities within the home. This is an important finding because it suggests that wives, mothers, husbands and fathers are all likely to have a different part to play in shaping the greener household. Exchange of beliefs was also dependent on the quality of social exchange suggesting that this is a mechanism which is likely to depend on strong relationships between family members. My final argument was that despite holding strong ideological beliefs, couples were likely to face some particular barriers to behaviour change from within their shared lifestyle. Here my findings suggest that the gap between couples, who are both strong believers in climate change compared to those who are weak, varies according to the extent of lifestyle change required. Couples who are ideologically strong as opposed to weak are 8% more likely to take their own bags shopping and 10% more likely to turn their taps off. However they are only 1.5% more likely to use public transport and only 4% more likely to walk/cycle rather than take the car. This suggests that even for couples who are strong believers and support each other's beliefs there are still significant barriers to real sustainable behaviour change.

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