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ENVIRONMENTAL CONCERN, SOCIAL CAPITAL AND THE SOCIAL CONTEXT OF TAILPIPE EMISSIONS-RELATED KNOWLEDGE IN NORTHERN CLIMATES

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UVM Transportation Research Center

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1. Introduction

Approximately a quarter of all greenhouse gases originate from motor vehicle tailpipe emissions (Intergovernmental Panel on Climate Change, 2007). Along with reducing household energy usage, changes in transportation behavior would have the most direct impact on lowering consumer output of greenhouse gases, specifically carbon dioxide. Despite increased levels of awareness surrounding global warming and interest in reducing greenhouse gases in the atmosphere, there is little evidence that people have been willing to make changes in their lives to attain this collective goal. Moreover, it is not clear that consumer-oriented strategies designed to change patterns of consumption – e.g., switching over to more efficient hybrid electric vehicles – will alone be able to reduce emissions to levels necessary to prevent irreversible climate change by the middle part of this century (Hansen et al., 2008).

Researchers in this area have long observed a "rebound effect" or "efficiency paradox" with relation to technological advances in efficiency which result in the increased utilization of the technology in question (Clark and Foster 2001; Greene et al., 1999; Jevons 2001; York and Rosa 2003). In the case of automobiles this has meant that the benefits of greater fuel efficiency have been outweighed by increased vehicle ownership and greater miles per year driven by the average driver (Portney et al., 2003). That technological improvements alone have not been able to reduce overall CO2 emissions draws our attention to the motivations people have, if any, to reduce vehicle emissions as a matter of daily practice. Our work on this project has thus been motivated by three central questions: What do people know about vehicle tailpipe emissions? How does social context inform this knowledge and concern about environmental impacts, more generally?; and How do knowledge of vehicle tailpipe emissions and environmental concern grounded in social context affect individual transportation behavior?

1.1 Social knowledge and transportation

It has become increasingly evident that social context is essential to an understanding of transportation-related behavior. Living in an industrial as opposed to a post-industrial region, for example, has been correlated with more negative attitudes toward public transportation (Bamberg et al., 2007), and the role of "travel socialization" has been shown to have significant influence on transportation expectations – specifically, the number of cars in a family household has been positively correlated with the desire of children to want to drive a car (Baslington, 2008).

More broadly, within the dominant normative context of consumer culture, cars take on particular significance as a means of "conspicuous consumption" (Veblen 1899), a wasteful strategy of keeping up appearances with peers through spending most likely to occur where there exist high levels of social inequality (Bell 2009; Schor 1998). In societies with a high degree of social mobility and thus some degree of status ambiguity, consumer products – automobiles being a quintessential example of this – work to convey status and imply social

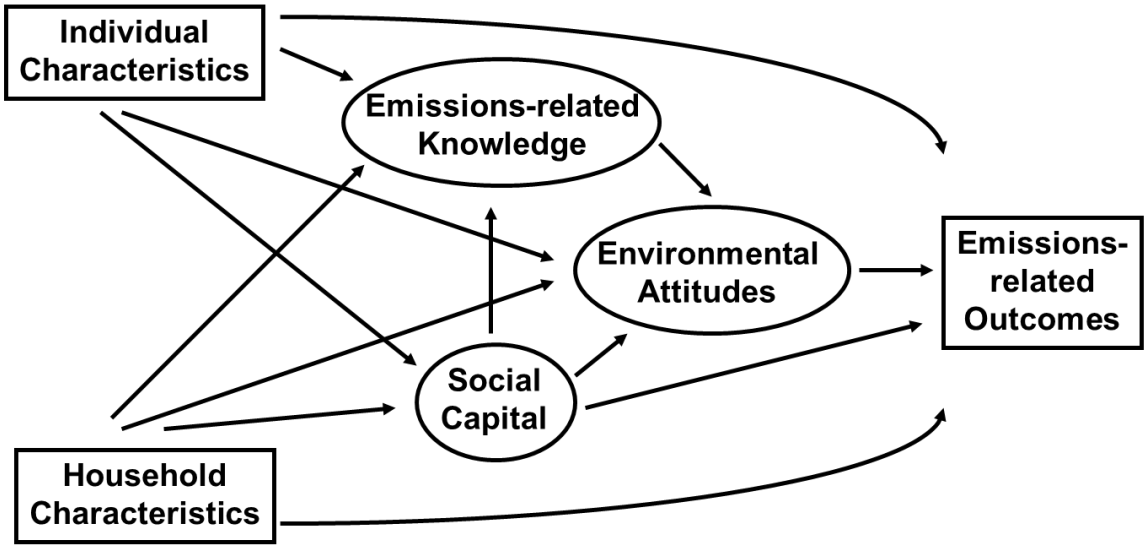
and cultural meaning far beyond the rational utility of the product itself (Bourdieu 1984; Sheller and Urry 2000; Sheller 2004).

The closely tied concerns of energy efficiency and emissions carry with them specific challenges with regard to understanding the consumer decision-making process. Since energy usage and the waste it produces are not always directly visible, consumers often work with a kind of "folk" understanding of exactly what they use and emit (Kempton and Montgomery, 1982; Stern, 1986). Car owners, for example, have been shown to be reliably inaccurate at calculating their vehicle's miles per gallon (Turrentine and Kurani, 2007). Consistent with Veblen's take on consumer culture, even the purchase of low-emissions/high-efficiency hybrid electric vehicles has been found to be made more on the basis of conveying a sense of environmental mindedness to others than an actual calculation of efficiency or fuel-savings relative to other energy-efficient cars, or whether the purchase price could be justified by lower fuel costs over the life of the vehicle (Heffner et al., 2007).

Fortunately, there is genuine concern in the population about the environmental and health impacts of carbon emissions, and conversations about climate change, transportation, and the price of energy are taking place. By tapping into the sociological literature on social capital this study provides both an ethnographic and quantitative approach to the social origins of concern about the environment and our effect on it through transportation. Our hypothesized path model (**Figure 1-1**) predicts that social capital will have both direct and indirect effects on vehicle tailpipe emissions: directly through the social ties necessary to coordinate travel alternatives with others; and indirectly through the effect of social capital on environmental attitudes.

This paper is divided into three major sections. Chapter 2 is based on a series of eight focus sessions carried out in 2009-10 designed to get a baseline understanding of people's knowledge and perception of vehicle tailpipe emissions. Chapters 3 and 4 are based on phone survey data collected at the end of 2010 in an effort to establish in a more generalizable fashion the relationships among knowledge of greenhouse gas emissions, social ties, environmental concern and modal decisions in transportation.

Figure 1-1 Path model predicting vehicle tailpipe emissions



2. Focus group research

Our focus group participants were recruited in Chittenden County, Vermont, the states' most populous county. Vermont's commuting behavior in many ways mirrors that of the U.S. as a whole, specifically with relation to the percentage of individuals driving alone (VT, 75.2 percent; U.S., 75.7) or carpooling (VT, 11.9 percent; U.S., 12.2) to work (Glitman et al., 2008, p. 12). However, largely due to the rural character of much of the state and its relatively small population (approximately 621,000), Vermont residents are much less likely to use public transportation than the rest of the U.S. (0.7 percent versus 4.7 percent nationally), and their average annual vehicle miles traveled (VMT) are more than double the national average (Ibid.). Thus, despite its reputation as a green-conscious state, Vermont's per capita vehicle emissions are actually higher than the national average making it an ideal region to compare stated knowledge of vehicle emissions with transportation behavior. A total of 63 people participated in this research as part of eight focus groups completed in spring 2010. Selected characteristics of this study's focus groups members are listed in **Table 2-1.**

Before participating, each volunteer answered a four-page questionnaire regarding basic demographic information, transportation behavior, and sources of information for a variety of topics, including vehicle emissions. Focus groups ranged in size from 6 to 11 people and lasted from 2 to 3 hours, each session structured around a schedule of 22 open-ended questions. To maintain confidentiality, focus group participants have been given pseudonyms in the text that follows.

2.1 What motivates environmentally sustainable behavior?

Given the available scientific data concerning the deleterious impact vehicle emissions have on human health and the environment, well-informed actors should be motivated to reduce, through the use of more efficient technology or conservation, their own production of greenhouse gases. This has certainly been an underlying assumption among environmental activists seeking to call attention to the mounting crisis of global climate change (See, for example, McKibben 2010). We could go a step further and argue that, in a population with unequal access to good information, the better informed among this population would be more likely to take measures to reduce vehicle emissions.

The connection between knowledge and behavior in the environmental literature, however, is neither direct nor always clear. While a number of studies have found a moderate relationship between an individual's factual knowledge of ecological issues such as climate change and ecologically beneficial behavior (Stuzman and Green 1982; Hines et al., 1986/87; Oskamp et al. 1991) others have found no relationship at all (Maloney and Ward 1973; Schahn and Holzer 1990; Walton et al. 2004).

Table 2-1 Selected characteristics of focus group participants

Characteristic	Count	Percent
Focus Group		
Group 1 (wage earners)	8	12.7
Group 2 (seniors age 60+)	11	17.5
Group 3 (students age 18-25)	6	9.5
Group 4 (college-educated professionals)	6	9.5
Group 5 (park-and-ride commuters)	9	14.3
Group 6 (bicycle commuters)	10	15.9
Group 7 (Old North End residents/lower income)	6	9.5
Group 8 (Hinesburg residents/rural community)	7	10.0
Gender		
Men	29	46.0
Women	33	52.4
(No response)	1	1.6
Educational Attainment		
0-12 years of school	7	11.1
High school diploma or equivalent	5	7.9
Some college	19	30.2
Bachelor's degree or equivalent	19	30.2
Graduate degree	12	19.0
(No response)	1	1.6
All Modes of Transportation Used This Past Week		
Bus	12	19.0
Taxi	2	3.2
Bicycle	17	27.0
Walking	39	61.9
Senior/disabled van	4	6.3
Rideshare/carpool	19	30.2
Drove traditionally-fueled vehicle	46	73.0
Drove an alternative fuel/hybrid vehicle	1	1.6

The field of applied psychology has worked to address the environmental knowledge/behavior lacuna by simply clarifying the meaning of environmental knowledge. Specifically, system knowledge (knowing how an ecosystem operates, including an understanding of environmental problems), procedural knowledge (possible courses of action and behavioral options for the individual), effectiveness knowledge (the ecological benefits of behavioral changes relative to the personal costs associated with them), and social knowledge (the intentions of others and normative beliefs acquired through socialization about what should be done) are all distinctive elements of what is generally referred to in the literature as environmental knowledge (Kaiser and Fuhrer 2003). When these distinctions are made

clear, procedural knowledge and effectiveness knowledge have been shown to have a direct effect on behavior while system knowledge remains indirect, mediated largely through its effect on procedural knowledge (Malony and Ward 1973; Grob 1995; Schahn and Holzer 1990; Frick et al. 2004).

Of the four types of knowledge identified, social knowledge has been given the least attention in part because it is seen as overly subjective. As one study frames it, "Since reference groups and their norms are chosen individually based on personal preferences, standards, and existing social ties, social knowledge can hardly be assessed as a unidimensional achievement and thus cannot be compared with the three other knowledge forms" (Frick et al. 2004, p. 1599n). Social knowledge, the argument goes, does not lend itself to reliable empirical measurement.

The present study represents an effort to integrate the question of social knowledge into the larger question of why people take actions in the area of transportation that would lower their negative impact on environmental outcomes. In agreement with earlier research, we argue that it is the convergence of all four different types of knowledge that best predict environmentally beneficial behavior. However, we pay special attention to social knowledge since: a) it has been relatively neglected in this area of study; b) it allows us to highlight the significant role of social norms and structural constraints in restricting behavioral change; and c) we believe it, nonetheless, provides the greatest insight into under what social contexts a transition to environmentally sustainable practices in transportation might occur.

2.2 Tailpipe emissions as a form of system knowledge

In the first part of the focus group sessions we sought to elicit preexisting conceptualizations of fossil fuel-based emissions which would indicate some degree of system knowledge concerning the relationship between human behavior and environmental outcomes. Initial responses to the question "When you hear the word emissions what comes to mind?" made it clear that vehicle tailpipe emissions were not a matter of urgent concern among our participants. A few like Jim from Group 1 suggested we were asking the wrong people: "I think that we live in Vermont and it isn't nowhere as bad as some of the bigger cities. We seem to be pretty good in this state." The Green Mountain State, of course, is not free of vehicle emissions concerns. A recent study by the Transportation Research Center at the University of Vermont found that limited public transit, long distances traveled in rural areas, and land use development patterns have actually led to per capita transportation emissions in Vermont being higher than the U.S. national average (Glitman et al., 2008:14).

Table 2-2 "When you hear the word emissions, what comes to mind?"

Most Common Responses	Count
Smoke	8
Cars	7
Pollution	7
Large trucks/buses	6
Power plants	6
Asthma	5
Cancer	5
Global warming	4
Carbon Dioxide	2
Greenhouse gases	2

Despite some initial resistance to the idea that Vermont should concern itself with vehicle emissions, after a few moments of reflection, it did not usually take long to come up with some common themes and associations in this regard. For the sake of summary, we provide in Table 2-2 a list of the most common responses during the focus group sessions to the first question, i.e., the count represents the number of focus groups in which this response was made by at least one participant. That the imagery of smoke was the most common association, speaks to the essential quality of visibility necessary for most people to even think about tailpipe emissions:

Barney (Group 2): The black smoke coming out of an 18 wheeler.

Kathleen (Group 4): Sometimes you see the cars with the blue smoke.

Others used different senses to make the same point:

Reggie (Group 1): I drive a motorcycle and you can taste it; more emissions when you get up behind a tractor trailer or a bus.

Tracy (Group 5): Sometimes I'll be caught behind a school bus that really smells and I wonder why public vehicles can't be better – like it's overwhelming what I smell.

Generally, participants did not indicate that they thought about tailpipe emissions unless they could physically sense it. In fact, the top five responses across focus groups to the emissions association question summarized in Table II were all concrete visualizations: smoke, cars, pollution, large trucks/buses, and power plants. This is consistent with current sociological research on environmental concern which demonstrates that, controlling for education, income and other individual-level factors, the tangible regional effects of climate change correlate strongly with the public's concern for climate change. Using a survey conducted in nine U.S. states, for example, Hamilton et al. (2009) found that, net of

ideological characteristics, actual changes in regional temperatures over a 38-year period were associated with respondents' perception of climate change. Similar findings have been found regarding objective measures of air quality and the public's perception of air pollution (Drori and Yuchtman-Yaar, 2002; Elliott et al., 1999; and Jacquemin et al., 2007). Second in salience to visual cues among the participants, were the perceived health effects of tailpipe emissions. The personal at times tragic effects of asthma or cancer, two diseases whose causal origins in modern life are not always clear, were in a few instances tied to vehicle emissions. Here, though the visibility of emissions was less important, there was an awareness that pollutants emitted from motor vehicles had a negative impact on human health.

Hank (Group 8): My wife has asthma and if we pull up at intersections, the fumes really bother her. Sometimes they bother me, but they really get to her. She's puts her hanky over her nose and puts on the air conditioner even though she doesn't like the air conditioner. It does help.

Fred (Group 2): My brother got brain cancer and died at 60 from a brain tumor caused by chemical emissions.

The last three most common associations made with the word emissions – global warming, greenhouse gases, and carbon dioxide – were less connected to their personal impact and would appear to be more direct manifestations of system knowledge in the participants comments. They were also, it should be noted, grounded in the popular media coverage of environmental issues. Global warming, for example, was pointed to as an important political topic with a few people mentioning Al Gore's film, *An Inconvenient Truth*, as a key turning point in the public's awareness of it. The underlying causes of global warming, however, greenhouse gases and more specifically carbon dioxide, only came up in two of the eight focus groups, suggesting most participants did not readily make the connection between vehicle tailpipe emissions and the root causes of global climate change. The relatively low occurrence of system knowledge discussions in the focus groups sessions is not in and of itself particularly discouraging since, as mentioned above, much of the research in this area finds that system knowledge is, at best, a poor predictor of ecological behavior. This same research suggests that specific knowledge about how things are done and whether they are worth the effort serves as a better predictor of behavioral change, points we examine more closely in the following section.

2.3 Can tailpipe emissions be reduced, is it worth it, and do other people matter?

After identifying the main associations people had with the word emissions, we then asked the focus group participants a procedural knowledge question: "How do you think vehicle emissions could be reduced?" The most common answers to this question are listed in **Table 2-3**. Perhaps the most remarkable aspect of the conversations that took place around reducing tailpipe emissions is that very little was said about purchasing more efficient, low-

emissions vehicles. Electric hybrid vehicles, for example, came up only a few times during the focus groups sessions, and when they did it was usually in reference to how unaffordable they are to the average motorist. As Paul in Group 5 quipped regarding his desire to own a hybrid, "The spirit is willing but the wallet is weak." Hybrid vehicles, in fact, provide a primary example of where, though the procedural knowledge of what to do was evident among some participants, the effectiveness of this option was seen as rather low given the personal costs inherent in their use.

Table 2-3 "How do you think tailpipe emissions could be reduced?"

Most Common Responses	Count
Walking	8
Carpooling	7
Bicycling	6
Take the bus	6
Don't drive your car	5
Don't speed	4
Plan your trips	4
Check tire pressure	3
Don't slam on brakes	2
Drive a hybrid vehicle	2

2.3.1 Alternatives to driving alone

Instead, the emphasis was on conservation and reducing the use of motor vehicles. Thus, walking (followed by carpooling, bicycling and taking the bus) came up most frequently among the eight focus groups as a way to reduce tailpipe emissions, even if that was not the primary motivation for doing so.

The conversations and observations that emerge from our focus groups suggest people are unlikely to change their behavior purely on the basis of attaining adequate information related to vehicle tailpipe emissions. Among the 63 participants in this study, if the connection between human behavior and overarching transformations such as climate change was not always made, a general awareness of what vehicle emissions are and their likely effect on air quality and public health was evident. That said, it was also clear that vehicle emissions were not highly prioritized in the decision-making process employed to choose among transportation alternatives where convenience, financial considerations, and even personal appearance were deemed more important.

2.3.2 The role of social knowledge in reducing vehicle tailpipe emissions

One potential source of behavioral change worthy of further attention that emerged from the focus group sessions was the impact and direct influence of social knowledge on reducing carbon emissions. This was evident above when Rebecca mentioned conversations she and her neighbors had with her husband that may have led to him idling less. In that instance, the broader municipal campaign to reduce emissions played a sensitizing role. Perhaps more significantly, the role of large institutions, corporate and public, in incentivizing people to carpool or take public transportation, was an important factor among the participants who used these alternatives in this study.

There is in fact growing evidence that regional public information campaigns in combination with institutional support from government agencies and large private firms may be the best strategy to encourage more sustainable transportation behaviors by providing a favorable social context for change. Successful examples of this include a targeted campaign to encourage carpooling in Atlanta, Georgia (Henry and Gordon, 2003), and a regional effort to promote bicycle commuting in Victoria, Australia (Rose and Marfurt, 2007). By incorporating the institutional mediation of government and large regional employers, programs such as these provide the motivational framework and social context within which behavioral change can take place.

In our focus groups it was also clear that many behaviors which work to reduce vehicle tailpipe emissions were practiced with neither tailpipe emissions nor greenhouse gases in mind. Instead, people were much more likely to practice trip-chaining to reduce costs or to drive the speed-limit to avoid getting fined. In fact, a central theme in the focus groups was that it is not clear that even procedural knowledge, much less system knowledge, of tailpipe emissions and their relationship to climate change is a necessary factor in changing people's transportation behavior.

Good information, which many people in these groups had, did not appear to be good enough to change behavior in the direction of reduced vehicle emissions. Structural factors such as the availability of convenient alternatives, the constraints imposed by distance from work and school, and the additional costs – such as extended daycare, or being late for work – associated with less convenient forms of transportation make reducing vehicle emissions a low priority among the array of demands imposed on households within the contemporary American cultural, economic and geographic landscape.

In the end, effectiveness knowledge which weighed the relative benefits of ecological behavior to personal costs, and social knowledge which refracted behavioral options through the lens of socially acceptable practices and expectations dominated the discussion of why people would work towards reducing tailpipe emissions or not. In the remainder of this paper we will consider in a more quantitative manner the impact of social context on both environmental attitudes and transportation behavior through the lens of social capital.

3. Social capital as a source of novel information

The increasingly vast literature on social capital and social networks has underscored the value for individuals and communities of being connected to other people in a number of different areas, including educational outcomes, job market opportunities, personal health and access to childcare (Coleman 1988; Kawachi et al. 1999; Berkman et al. 2000; Thompson 2009; Röper et al. 2009; Tierney and Venegas 2006; Sanders and Nee 1996). For the sake of clarity and with the specific purpose of understanding the diffusion of environmental concern in society, we focus in this paper on two well-established elements within this theoretical arena that are also grounded in a solid base of empirical research: relational and community forms of social capital.

3.1 Relational social capital

An individual's structure of relationships with others which may be used to garner useful information, material resources, or influence is referred to in the sociological literature as *relational social capital* (Portes 1998; Foley and Edwards 1999; Brunie 2009). Within the relational framework the quality of network ties are crucial, specifically the distinction made between strong ties and weak ties (Granovetter 1973). Strong or bonding ties refer to one's closest relationships where there exists a high degree of mutual affinity and where one may find the most important sources of emotional support in the company of close friends and family. Though obviously important psychologically, the primary weakness of strong ties from the point of view of social capital is that they provide redundant information. The people we are closest to tend to share our views and access common sources of information. In contrast, our weak or bridging ties with acquaintances and people to whom we do not feel especially close are more likely to provide us with a greater variety of information sources and thus challenge our own and status quo perspectives on the world (Granovetter 1973; Burt 1997; McPherson et al. 2001).

Given the dominance in American culture of a social paradigm which tends to value economic growth and free market imperatives over environmental protection (Pirages and Ehrlich 1974; Brown 1981; Cotgrove 1982; Pierce et al. 1992), we hypothesize that people with high numbers of strong ties would tend to have dominant views reinforced and thus have lower levels of environmental concern. In contrast, we expect that a person with a greater number of weak ties would be exposed to a greater variety of perspectives that differ from the dominant paradigm and thus, controlling for other relevant factors, be more likely to have higher levels of environmental concern. Consistent with our theoretical understanding of the effect of social ties, we also hypothesize that having high prestige people within your network of social ties will yield a greater variety of non-dominant paradigm perspectives since people in higher prestige positions, on the whole, have more extensive social networks than those in lower prestige positions (Lin 2001; Lin et al. 2001). That is, having access to people in high prestige position also gives you access to a greater variety of information.

3.2 Community social capital

Stepping back from the quality of an individual's ties with others, the community social capital perspective brings into relief the density of interactions within a network (Brunie 2009). Through the communal lens, a researcher would want to know the propensity of individuals to volunteer, join associations, attend public meetings, and partake in other activities which tend to structure and foster regular face-to-face interactions within a community. While Putnam (1993, 2000) has focused his research on the significance of community organizations such as bowling leagues and the PTA, others have given more attention to other community-level dynamics such as immigrant group solidarity (Portes and Sensenbrenner 1993) and how social norms and sanctions within local communities can foster a sense of trust and personal safety which itself tends to generate higher levels of community social capital (Coleman 1988). From this angle, social interactions are not an end in and of themselves, but rather the basis for mutual trust which both facilitates the exchange of information and other valued resources within a given community (Stolle 1998; Putnam 2000).

The implications of community social capital for environmental issues such as air pollution and tailpipe emissions are multifaceted. The literature on environmental justice provides heroic examples of poor communities that have rallied in solidarity against environmental and public health threats to the places where they live (Bullard 1990; Grengs 2002). It could well be argued, however, that the most successful examples of communal solidarity in the face of environmental threats have come from wealthy communities where political influence and power have assured that unwanted projects are placed out of sight and far from where they live (Bell et al. 2005; Shemtov 2003). Moreover, for many communities economic growth and development often outweigh broader concerns for the environment, especially when levels of civic participation in local government and associations correlate highly with the promotion of business interests.

3.3 Data collection and methodology

Data for this study were obtained through a phone survey of Maine, New Hampshire and Vermont in November 2010, using computer-assisted interview software. Random digit dialing of ground-line telephone numbers and callbacks of the adult population were used to achieve a response rate of 18.5 percent, based on the RR4 standard of the American Association for Public Opinion Research (2009). In all, 1200 surveys were completed. Probability weights have been applied to the analysis in this paper to adjust for design and sampling bias which resulted in a survey sample somewhat older and more male than the target population, according to the U.S. Census. Data analysis was done with STATA 11 using OLS regression.

Forty survey questions concerned the impact environmental attitudes, environmental knowledge, and media consumption have on behavior related to vehicle tailpipe emissions. Additionally, the survey contained a series of questions connected to individual measures of

social capital, including a "position generator" designed to gauge the social tie strength and occupational diversity of the respondent's social contacts. In the present analysis, we focus on an environmental attitude scale based on six statements listed in **Table 3-1** with which respondents were asked to "strongly agree," "agree," "disagree," or "strongly disagree." Responses were reverse scaled when necessary. The values of the constructed index ranged from 0-18, a higher score reflecting greater support for environmental protection.

Table 3-1 Response percentages of questions use in environmental attitude scale

Question	Strongly Agree	Agree	Disagree	Strongly Disagree
1. People like me will have to make major lifestyle changes to solve today's environmental problems.	18.3	50.4	26.8	4.5
2. The development of US energy supplies such as gas, oil, and coal should be given priority, even if the environment suffers as a consequence.	6	29.7	43.7	20.6
3. Stricter environmental laws and regulations are necessary, even if they negatively affect the economy to some extent.	11.8	47.1	33.9	7.2
4. We must use less energy even if it will be hard to do.	22.6	53.4	22.5	3.5
5. To improve air quality and reduce vehicle tailpipe emissions we will all have to drive less and use alternative forms of transportation.	17.1	54.7	22.6	5.5
6. The best way to reduce tailpipe emissions would be for the government to require automakers to produce cleaner cars.	26.3	46.7	23.1	4.1

Our environmental concern questions weigh heavily the economic and regulatory trade-offs associated with environmental protection. In doing so we acknowledge the diversity of approaches to operationalizing environmental concern while stressing the concrete economic trade-offs inherent in efforts to promote conservation among citizens in a consumer-based society (Dunlap and Jones 2002; Klineberg 1998; Guber 1996; Xiao and Dunlap 2007). The six questions that constitute our index of environmental concern are designed to elicit in the respondent's mind the central tension between environmental protection and unchecked economic growth, while underscoring the sacrifices necessary to reduce unsustainable levels of environmental contamination, especially greenhouse gases caused by the burning of fossil fuels (Dietz et al. 2009; Armel et al. 2011). The reliability of the index as measured by Cronbach's alpha was 0.75.

3.4 Control variables

Key demographic information was obtained from survey respondents, including age, gender, educational attainment and employment status (see **Table 3-2**). Age has been shown to correlate negatively with environmental concern – the older one is the less likely one is to be environmentally concerned (Evans & Jacobs 1981; Jones & Dunlap 1992; Barr 2007). Also, women are more likely to have high levels of environmental concern than men (Finucane 2000). This may be partially due to the question of agency and power, as women tend to have less of both these factors relative to men in their everyday lives and are thus more risk adverse vis-à-vis environmental threats (Bickerstaff 2004; Barr 2007).

Table 3-2 Frequencies and means of selected variables

Variable	Count	Percent
Respondent Characteristics		
Gender (male)	550	54.4
Educational attainment		
<H.S. diploma	19	1.9
High school diploma	310	30.7
Some college	247	24.4
Bachelor's degree	206	20.4
Postgraduate degree	229	22.6
Employed full time (>=35 hrs./week)	375	37.1
Household variables		
Children under 18 present	230	22.8
Annual household income		
<$20,000	124	12.3
from $20K to $40K	148	14.6
from $40K to $60K	149	14.7
from $60K to $80K	141	13.9
from $80K to $120K	151	14.9
>=$120,000	89	8.8
No response	209	20.7
	Mean	**Range**
Respondent's Age	58.4	18 to 98
Environmental concern scale (dependent variable)	11	0 to 18
		N = 1011

Most of the research on environmental concern has found that people with higher levels of education are more likely to have higher levels of environmental concern than the less-educated (Jones & Dunlap 1992; Elliott 1999; Barr 2007). We measure educational attainment at five different levels: less than a high school diploma; high school diploma; some college; Bachelor's degree; postgraduate degree. An additional individual-level variable, employment status, is both a source and outcome of interactions with others (Wilson 1996; Portes 1998). Moreover, the amount of time we spend at work and commuting may constrain the amount of time we have to interact with others outside of work (Putnam 2000). We thus use a dichotomous measure of fulltime employment as a control variable in our model.

With regard to household income, higher earners may be able to focus more energy and time on environmental issues than those who are less affluent (Jones & Dunlap 1992; Inglehart 1995). Another body of research challenges this assertion by looking at environmental concern – specifically, environmental risk perception. Those with high self-perceptions of agency and power – in particular, highly paid, well-educated white males – are more likely to dismiss environmental concerns and risks because they have more control in their daily lives and are thus less likely to see the world as a dangerous place than those with a weaker sense of agency and power (Bickerstaff 2004; Kahan et al. 2007).

Gross annual household income is measured with the following categories: "less than $20,000"; "from $20,000 to $40,000"; "from $40,000 to $60,000"; "from $80,000 to $120,000"; and "over $120,000." As is typical for surveys of this sort, there was a high no-response rate for this question (24.9 percent). T-tests between the dependent variable and household income with and without a "no response" category showed no significant differences, nor were regression models with and without missing income cases significantly different. Ultimately, we decided to include a "no response" category for household income in our final model so as to be able to utilize the 209 cases that otherwise would have been excluded as missing data.

Households with children may be especially interested in environmental issues due to concern about child safety and health as well as the future world children will eventually inhabit (Finucane 2000). We use a dichotomous measure of children under the age of 18 present in the household, or not.

3.5 Social capital variables

Relational social capital is measured through a series of 15 questions constituting an innovative gauge of social capital known as the "position generator" (Erickson 1996; Brunie 2009). Originally developed by sociologist Nan Lin to understand the effect of social ties on obtaining employment, the position generator is the most frequently used measure of individual-level social capital (Lin and Dumin 1986; Lin et al 2001). In our survey, a list of 15 occupations ranked in order of occupational prestige was given to the respondent who was then asked to indicate if he or she felt "very close," "somewhat close," "not very close," or had

"no relationship" to someone in each of these positions. **Table 3-3** shows the responses percentages for each occupation at each level of social proximity and a mean and range summary of the three relational capital variables – number of weak ties, number of strong ties, and average social tie occupational prestige – used in our model.

Table 3-3 Percentage of respondents with access to selected occupations by social proximity and the mean and range of relational social capital variables

Occupation (prestige score)*	Very close	Somewhat close	Not very close	Total access
Physician (86)	27.4	29.5	12.8	69.7
College professor (78)	18.7	19.7	14.2	52.6
Lawyer (75)	22.9	22.9	17.7	63.5
Architect (73)	10	14.1	13.4	37.5
Dentist (72)	18.8	23.8	19.3	61.9
Nurse (66)	37.7	28.2	9.6	75.5
Computer programmer (61)	24.9	22.7	13	60.6
Police officer (60)	21.8	16.9	14.6	53.3
Electrician (51)	25.1	21.6	17.7	64.4
Mail carrier (47)	12.7	24.5	21.6	58.8
Car mechanic (40)	24.8	28.7	16.6	70.1
Security guard (37)	8.9	10.1	13.5	32.5
Bus driver (32)	9.2	16.4	17.7	43.3
Supermarket cashier (29)	14.6	21.1	19.1	54.8
Janitor (22)	12.9	17.4	12.8	43.1
Relational social capital summary			**Mean**	**Range**
Number of strong ties ("very close")			3	0-15
Number of weak ties ("somewhat close and "not very close")			5.5	0-15
Average social tie occupational prestige			55.1	0-78
* Prestige scores come from the GSS codebook, Appendix F (Davis, Smith and Marsden, 2007).				

In addition to its relative ease of application in survey research, the use of the position generator is well grounded in social theory. Measures of occupational prestige have been used as consistent measures of status in the social sciences since the 1960s (Erickson, 1996; Lin et al, 2001). A set of studies has emerged over the last two decades which meld earlier occupational prestige research with network theory (Erickson 1993; Lai et al, 1998; Lin and Dumin, 1986; Moerbeek and Need, 2003). An underlying assumption here is that the quality

of social networks makes a difference in one's ability to make advantageous decisions. Cronbach's alpha for the 15 relational social capital questions utilized here was 0.85.

Questions concerning community social capital are largely based on the short form survey of community social capital established by political scientist Robert Putnam and his associates at Harvard's Saguaro Seminar (see Table 4). They include: "How many times in the past month have you had a friend over to your home?"; "How many times in the past month have you attended a public meeting in which there was a discussion of local issues?"; and How many times in the past month have you volunteered?" These questions are an attempt to reflect the frequency of face-to-face interaction with people in the community. The scale reliability for these three items together was an inadequate 0.61, thus we opted to include all three questions individually in the final model.

3.6 Results

Control variables in the model performed for the most part as expected. The coefficients for age, being male and having fulltime employment were all statistically significant and negatively correlated with the dependent variable (**Table 3-4**). The relationship between educational attainment and environmental concern was mixed at best with only one category, "some college" having a statistically significant, negative effect relative to having less than a high school education. As indicated above, the existing literature finds a declining significance of education for environmental concern. Our model does not contradict that finding. The hypothesized positive effect of having children present in the household also proved insignificant.

The categorical breakdown of household income used in our final model shows that individuals in households in the highest earnings bracket, $120,000 a year and over, were significantly less likely to be concerned about the environment than those living in the reference category of households earning at most $20,000 annually. This portion of the model suggests that those who gain the most financially from the current state of affairs, controlling for other relevant factors, are least likely to accept an economic trade-off to better protect the environment.

Two of our three relational social capital variables, number of weak ties and mean social tie occupational prestige, had significant effects on the dependent variable. The positive effect of weak ties on the dependent variable suggests that individuals with a greater number of "somewhat close" and "not very close" relationships are more likely to favor an economic tradeoff in favor of the environment than those with a smaller number of weak ties. In contrast to strong ties, weak ties provide a greater range of information and opinion, which in and of itself may foster a more critical perspective on the relationship between economic activity and the state of the environment. Moreover, weak ties, or "bridging" relationships, may permit a more broad-minded worldview which comprehends the common challenges we all face, not just those of close friends and family, with relation to environmental degradation.

Table 3-4 Multivariate regression results of relative effects of independent variables on environmental concern

Variable	coef.	beta
Respondent characteristics		
Age	**-0.03*** **	**-0.16**
Gender (male)	**-1.24*** **	**-0.2**
Employment status (full time)	**-0.82** **	**-0.13**
Educational attainment (RC = <H.S. diploma)		
High school diploma	-0.89	-0.13
Some college	**-1.30***	**-0.17**
Bachelor's degree	-0.9	-0.12
Postgraduate degree	-0.75	-0.1
Household variables		
Children under 18 present	0.01	0.001
Annual household income (RC = <$20,000)		
from $20K to $40K	-0.28	-0.03
from $40K to $60K	-0.53	-0.06
from $60K to $80K	-0.44	-0.05
from $80K to $120K	-0.65	-0.07
>=$120,000	**-2.71*** **	**-0.28**
No response	-0.55	-0.07
Relational social capital		
Number of strong ties	-0.59	-0.06
Number of weak ties	**0.13*** **	**0.16**
Mean social tie occupational prestige	**0.03*** **	**0.13**
Community social capital		
Friends over in the past month	**-0.31*** **	**-0.12**
Attend a public meeting past 12 months	0.05	0.02
Volunteered past 12 months	0.02	0.01
Constant	**19.77*** **	
*p < .05		R squared = 0.262
**p < .01		N = 1011
***p < .001		

The mean occupational prestige of the respondent's social ties captured through the position generator was also statistically significant. This implies that people whose social connections have on average a higher social status will have greater environmental concern as measured by our index than those with lower status relationships. Higher status people, it is argued, are themselves better connected and simply knowing them will likely get you better information on important topics such as, presumably, the environment.

The results of the community social capital measures were mixed. Neither the frequency of volunteer activity nor the number of public meetings attended over the previous 12 months was significantly associated with respondents' levels of environmental concern. The one measure that was statistically significant supports the argument that a greater frequency of interactions within a community, measured here by face-to-face visits, is associated with less concern for the environment. We speculated that our measure of friendly visits may have captured some of the effect of strong ties; however, when we removed this variable from the model (not shown) the coefficient for strong ties did not change appreciably in magnitude. Our one statistically significant measure of community social capital thus supports our original hypothesis that community-level interactions would be more strongly associated with support for economic growth than environmental protection.

In the final chapter of our paper we use the same data collected from the northern New England survey to test the association of social capital and environmental concern with transportation behavior, specifically with behavior that would tend to reduce vehicle tailpipe emissions.

4.0 Social capital's effect on reducing vehicle tailpipe emissions

Past studies within environmental sociology have investigated how individual characteristics such as gender, age, income, and other demographics affect environmental behavior, as well as the relationships between environmental knowledge, environmental attitudes, and behavior (Stern et al. 1993; Stern et al. 1995; Stern et al. 1999; Grob 1995; Dietz et al. 1998; Golob & Hensher 1998; Tanner 1999; Nilsson & Kuller 2000; Bagley & Mokhtarian 2002; Kolmuss & Agyeman 2002; Choo & Mokhtarian 2004; Walton 2004; Johanson et al. 2006; Flamm 2009; Kahn & Morris 2009). In most cases, it has been shown that those with pro-environmental attitudes tend to engage in more environmentally-conscious behavior, such as choosing alternative modes of transportation or having more fuel-efficient cars (Stern et al. 1993; Stern et al. 1995; Stern et al. 1999; Dietz et al. 1998; Choo & Mokhtarian 2004; Flamm 2009; Kahn & Morris 2009).

Few studies have investigated the effect of social capital on environmental behavior, and specifically on driving behavior. Within environmental sociology, work on energy conservation after the oil shocks of the 1970s pointed to the significance of local organizations and informal networks as key elements in gaining personal commitment and creating a sense of moral obligation towards that particular public issue (Dietz and Vine, 1982; Heberlein and Warriner 1983; Olsen 1981). Within rural sociology, research in this area has centered on rural-urban differences, including social ties to agriculture which might inform respondents' attitudes towards environmental stewardship and farmland preservation (Berenguer, Corraliza, and Martin 2005; Fortman and Kusel 1990; Freudenburg 1991; Lowe and Pinhey 1982; Tremblay and Dunlap 1978; Sharp and Adua 2009).

This group of studies contributes greatly to the prediction of outcomes via social contexts, and in particular social capital. However, past studies' reliance on only particular social ties such as those to environmental activists, farmers, etc. can be limiting. In this study we seek to test the assertion that the quantity and quality of social ties to people across a wide range of backgrounds (measured here by occupational prestige) inform the degree to which individuals behave environmentally with regard to their transportation choices, independent of other theoretically relevant demographic and contextual variables. Specifically, we seek to determine which factors influence an individual's choice to drive a hybrid vehicle, a compact car, or a transportation mode other than driving alone.

4.1 Logit models and additional explanatory variables

Along with explanatory variables used in the section on environmental concern above, we include in our three dichotomous logit models of transportation decisions a set of additional variables described briefly below.

4.1.1 County-level data

All three states, Maine, New Hampshire and Vermont, include a large number of rural communities, many of which have been affected disproportionately by current high levels of unemployment. Both low population density and high unemployment, a proxy measure of county-level economic conditions, should make it less likely that commuters would have alternatives to driving alone to work. We thus include in this analysis county-level measures of population density and unemployment, obtained from the year 2000 U.S. Census and the Federal Bureau of Labor Statistics (2010), respectively. In a similar social structural vein, we include information provided by the people surveyed concerning their estimated miles to work from home. Presumably, the further one lives from the work, the fewer the alternatives will be to commuting alone.

4.1.2 Generalized social capital

The ability of people to cooperate with and trust in others, is not restricted to trust in individuals a person knows, but rather reflects a widespread and generalized trust in the integrity of others (Newton 1997; Uslaner 1998; Brunie 2009). This particular characteristic of social life, it may be argued, should discourage people from driving alone and make it more likely that they engage in cooperative transportation activities such as carpooling. Our measure of *generalized social capital* is a straightforward and standard question in surveys on social capital (Putnam 2000) – "Do you strongly agree, agree, disagree or strongly disagree with the following statement: Generally speaking, most people can be trusted?"

4.1.3 An egg or garden tool?

In our set of questions concerning collective social capital we've added the following: "How many households in your neighborhood would you borrow an egg or garden tool from?" This was done in an attempt to better capture the cooperative spirit among respondents that might more strongly be associated with a willingness to not drive alone to work.

4.1.4 Environmental knowledge and concern

Beyond measuring attitudes towards environmental issues, we also posed a knowledge-specific statement about tailpipe emissions to which the respondent answered true or false: "All cars, vans, pickups, and SUV's pollute about the same amount for each mile driven." Additionally, we included in the three logit models our earlier index of environmental concern, this time as an independent variable.

4.1.5 Transportation Behavior

Our dependent variables concerning transportation behavior and the reduction of vehicle tailpipe emissions centered on the following dichotomous variables: Does the respondent commute to work alone in a vehicle or not?; does the respondent use as his/her primary vehicle a hybrid vehicle, or not?; and does the respondent use as his/her primary vehicle a compact car, or not?

4.2 Results

4.2.1 Commuters who drive hybrid vehicles

The coefficients and odds of our three logit models are displayed in **Table 4-1**. Among individual characteristics, none were significant in predicting whether or not a commuter drives a hybrid car as their primary vehicle. However, household income was positively correlated with this outcome. Because hybrids contain new technology, they tend to be more expensive and thus more easily affordable for those with higher household incomes. They may, in some cases, also be considered a status symbol. These findings are backed up by the literature which asserts the connection between higher income and more pro-environmental behavior (Golob & Hensher 1998).

Among the community social capital questions, borrowing an egg or garden tool from a neighbor was positively correlated with owning a hybrid vehicle. It could be assumed that the more people interact with their neighbors and other peers, the more likely they are to exchange new information and ideas (Portes 1998; Erickson 1996 and 2003; Brunie 2009), including information about cars and other purchases, rising gas prices, energy efficiency, and environmental concerns. These findings could also reflect an example of "keeping up with the Jones's" or competitive consumption in an eco-friendly sense, a hypothesis worthy of further research.

4.2.1 Commuters who drive compact cars

Among individual characteristics, both age and educational attainment appeared to be positively correlated with commuters driving a compact car. The older one was, the more likely he or she was to drive a compact car, though the effect was weak. This contradicts previous research by Evans and Jacobs (1981), Jones and Dunlap (1992), and Barr (2007), which showed that younger people are more likely to be environmentally concerned, which often correlates with more pro-environmental behavior (Stern et al. 1993; Stern et al. 1995; Stern et al. 1999; Dietz et al. 1998; Choo & Mokhtarian 2004; Flamm 2009; Kahn & Morris 2009). It also contradicts past research that has shown specifically that younger people are more likely to behave more pro-environmentally (Tanner 1999) and specifically are more likely to own smaller cars (Choo & Mokhtarian 2004).

Table 4-1 Estimated coefficients of logistic regression models for commuting in a hybrid vehicle, in a compact car and by not driving alone

Variable	Drives a hybrid car	Drives a compact car	Does not drive alone
Respondent characteristics	coef.	coef.	coef.
Age	-0.15	**0.05****	-0.013
Gender (male)	0.43	0.35	0.60
Educational attainment	-0.48	**0.76*****	-0.23
Environmental concern	0.22	-0.06	**0.16***
Vehicle emissions knowledge	-0.28	0.97	-0.20
Household variables			
Children under 18 present	0.79	0.55	-0.26
Annual household income	**0.80***	**-0.47*****	0.04
County-level effects			
Population density	0.003	-0.001	**-0.004***
Unemployment	-1.38	-012	**-0.84*****
Miles to work	-0.01	**0.03****	**-0.15****
Relational social capital			
Number of strong ties	-0.25	0.10	0.04
Number of weak ties	0.16	0.06	-0.04
Mean social tie occupational prestige	0.019	-0.02	0.01
Community social capital			
Borrow an egg or garden tool from neighbors	**1.72***	-0.005	-0.02
Friends over to visit, past month	0.74	-0.12	-0.25
Public meetings attended, past 12 mths.	0.18	**-0.31****	0.07
Volunteered, past 12 mths.	-0.56	**0.33***	0.05
Generalized social capital			
Generalized trust	2.31	0.02	0.09
Constant	-9.88	-4.55	4.72
N	438	437	441
log-likelihood	-31.116	-119.466	-135.231
Chi-square	57.61***	59.1***	46.6***
df	18	18	18
Pseudo R-squared	0.478	0.212	0.240
*p < .05, **p < .01, ***p < .001			

The more highly educated commuters were, the more likely it was that they drove a compact car. People who are more highly educated have been shown to be more environmentally concerned (Jones & Dunlap 1992; Elliott 1999; Barr 2007), and, as mentioned above, environmental concern has been shown to correlate with environmental behavior. Past literature has also drawn direct connections between higher education and more pro-environmental behavior (Golob & Hensher 1998; Kolmuss & Agyeman 2002, Choo & Mokhtarian 2004).

Annual household income was shown to negatively correlate with whether or not a person owns a compact car. It could be hypothesized that because compact cars tend to be a less expensive option than other models, those with lower incomes would more easily be able to afford a compact car than, for example, a sports utility vehicle.

The number of miles to work a respondent drives had a weak positive correlation with compact car ownership. The more miles a person has to drive, the more gas he or she must put into the car. The rising cost of gasoline has made long drives increasingly expensive and compact cars tend to get more miles to the gallon than larger sports utility vehicles or trucks.

There was a negative correlation between public meeting attendance and owning a compact car. This is an area in need of further investigation, but it would seem that this particular form of civic participation is more likely to be associated with pro-development than pro-environmental attitudes. Interestingly, when we removed the public meeting variable from the model (not shown) the negative coefficients of age and the top household income category both increased in magnitude, suggesting that older respondents and those living in households earning $120,000 or more were more likely to attend public meetings than younger respondents and those in lower income brackets, respectively (Spearman's rho was -0.04 for the public meeting variable and age, and 0.10 for the public meeting variable and the dichotomous top income bracket category by itself).

Volunteerism was shown to be positively correlated with owning a compact car. Those who volunteer give more to the community, and may weigh more heavily collective environmental concerns in their calculations for transportation than those who do not volunteer. Volunteering may require more transportation as well, making a compact car the most fuel-efficient choice.

4.2.1 Commuters who don't drive alone to work

Our results showed that respondents who were more environmentally concerned were more likely to take other transportation modes into consideration besides driving alone. Past studies have shown that environmental concern correlated with environmental behavior. Those who are more environmentally concerned may wish to cut down on overall energy use by carpooling with others or using public transportation. These respondents may also put the wellbeing of the environment before their own personal comfort preferences. Notably, this was the only environmental behavior variable for which environmental concern had any explanatory value.

Population density had a weak negative effect on the likelihood of choosing alternatives to driving alone. This contradicts the assumption that those who live in more densely populated areas are more likely to use alternative modes, such as public transportation, which is more common in areas with high population densities. County-level unemployment also had a negative effect on the likelihood of choosing an alternative mode. Those who live in a county with high unemployment are more likely live in an economically depressed area with few options for public transportation, ride sharing, and other alternative modes. These

respondents may also believe that environmental priorities could come at the cost of the economy, making driving alone less of a concern.

The number of miles a person drives to work had a negative effect on taking modes other than driving alone into consideration. Those who drive more miles to work likely have fewer options when it comes to taking alternative modes such as biking, carpooling, or public transportation since they work far from their place of residence.

Contrary to our expectations regarding social capital, the number of weak ties respondents had, the occupational prestige of social ties had no significant effects on the behavior variables. Environmental concern also had no significant effect on hybrid or compact car ownership.

5. Conclusions

Beginning with the focus groups, these sessions suggest that possessing an understanding of vehicle emissions and their impact on people and the environment is not necessarily a good predictor of transportation behavior. These findings are consistent with research in applied psychology which suggests that knowledge of environmental issues in and of itself may have a limited effect on individual behavior given strong situational constraints (Kaiser and Fuhrer, 2003).

If it turns out that factual knowledge of the issues is not the determining factor in reducing emissions, our focus then shifts to the social contexts, including structural constraints and normative expectations that allow for and motivate change in individual behavior. When participants in the present study discussed behavioral change and transportation alternatives, the conversation often came back to the interactions people had with others within their family, coworkers or circle of friends. One participant, Samantha (Group 4), was perhaps most direct when she noted, "I don't like change I wouldn't do it without my friend." That was in the context of explaining under what circumstances she might consider riding the bus, but it suggests that people are often reluctant to try something new without the consultation and/or support of people they know and trust. A new direction in transportation research should more directly examine the social context of informed decision-making among transportation alternatives.

The phone survey data collected for this research from three states in northern New England adds a more generalizable dimension to the social context of transportation decisions, though it should be interpreted cautiously. Beyond the geographic limits of the survey, we would have preferred to have had greater racial and ethnic diversity in the sample, and for future research we hope to address some of the inherent biases associated with phone survey research. Longitudinal data comparing changes over time in levels of social capital with changes in environmental concern would also provide a much stronger empirical basis for the arguments forwarded here.

It is also worth pointing out that, though three of our social capital variables were statistically significant, the largest in magnitude on the basis of standardized coefficients, "number of weak ties," was not larger than the standardized coefficients for "age," "gender," "some college" or ">=$120,000" in annual household income. Social capital was simply not the dominant force in our model for environmental concern. We do believe, however, that this study represents a step forward towards a better understanding of the social origins of environmental concern, especially given the fact that our measures of relational social capital in particular were the only two coefficients to have a statistically significant positive relationship with the dependent variable.

Our findings are thus largely consistent with the literature on in this area while providing a key sociological insight: our connections to other people are linked with our attitudes towards environmental/economic trade-offs. Specifically, the number of a respondent's weak ties, presumably associated with exposure to a greater diversity of information and opinion, was an important predictor in our model of environmental concern. Our measures of community

social capital produced somewhat less interesting results with a greater number of friendly visits over the previous month being associated with less willingness to make an economic trade-off in favor of the environment. This suggests that, from the perspective of environmental concern, not all forms of social capital are positive and that some forms of community interaction are associated with resistance to environmental protection, especially when framed as a potential brake on economic growth.

Shifting the focus from environmental attitudes to transportation behavior, many of the findings in this paper were consistent with both our hypotheses and previous research in this area, though several exceptions were notable. Household income, for example had a positive effect on hybrid ownership but a negative effect on compact car ownership. Age and educational attainment had positive effects on compact car ownership but no significant effects on hybrid ownership or the choice to drive alone. Environmental concern had a positive effect on choosing modes other than driving alone, but surprisingly no effect on hybrid or compact car ownership. Frequent interactions with neighbors was found to be positively associated with ownership of a hybrid vehicle but had no effect on the other behavior variables. Attending public meetings had a negative association with compact car ownership and volunteerism had a positive one, suggesting that the type of community participation one becomes involved in is connected to the kind of car you drive. Despite these interesting associations, none of our measures of either relational social capital or generalizable social capital had any statistically significant effect on our three measures of transportation behavior.

The inclusion of social capital variables in our models provided a unique way of looking at what prompts people to behave in a pro-environmental fashion not seen in previous studies. Social capital, in its simplest terms, refers to our connections with others. These connections, or networks, can provide us with new and useful information (Portes 1998; Foley & Edwards 1999; Brunie 2009), not only for professional advancement, but also for personal intellectual and moral development. These connections do not only help to establish communal solidarity within groups (Putnam 2000), but may also serve to challenge our perspectives (Granovetter 1973; Burt 1997; McPherson et al. 2001) about the environment and other important issues. Although our results showed fewer significant correlations between the social capital and behavior variables than we had hoped, the influence of our relational capital measures on attitudes suggests that social capital's effect on transportation is primarily indirect and mediated by its direct effect on environmental concern. Future research incorporating national-level data and structural equation modeling will likely shed additional light on this matter.

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