

UC Davis

Research Reports

Title

Symbolism In Early Markets For Hybrid Electric Vehicles

Permalink

<https://escholarship.org/uc/item/0v04n3rg>

Authors

Heffner, Reid
Kurani, Kenneth S.
Turrentine, Thomas S.

Publication Date

2007

SYMBOLISM IN EARLY MARKETS FOR HYBRID ELECTRIC VEHICLES

Reid Heffner, Kenneth S. Kurani, Thomas S. Turrentine
Institute of Transportation Studies, University of California, Davis

ABSTRACT

This study explores the symbolic meanings for hybrid electric vehicles (HEVs) being appropriated and communicated by the vehicles' owners. As symbolic meanings are shown to be important to HEV purchase and use, understanding both the meanings and the social processes in the construction of these meanings is essential for policy makers and others hoping to promote "green" vehicles. HEVs embody new combinations of meanings in the vehicle market. Many observers who fail to recognize this struggle to explain why some people want HEVs. They may characterize HEV buyers as naïve about calculating payback on fuel economy, or call HEVs "a badge of honor" or status symbol. This research breaks through such simplistic categorizations. Through the telling and analysis of HEV buyers' own stories this research takes a robust approach to understanding the creation and spread of new meanings and development of markets. Household buyers of the first generation of HEVs told these stories in semi-structured home interviews. Their stories are analyzed by drawing upon semiotics to explore the formation and structure of meanings. In particular, the study explores how widely recognized social (denotative) meanings are connected to more personal (connotative) meanings.

Keywords: consumer, hybrid electric vehicle, market, narrative, semiotics, symbols

“...the time-honoured distinction is between the cognitive (knowing), the affective (feeling) and the conative (acting) aspects of behavior...These concepts are inferences drawn from the same, holistic, observable behavior; such constructs exist in the eye of the beholder only...”

Derbaix and Vanden Abeele (1985)

A PROBLEM: WHY WOULD ANYONE BUY A HYBRID ELECTRIC VEHICLE?

Hybrid electric vehicles (HEVs) are a new and fairly radical change in motor vehicle technology. HEVs may reduce oil consumption and greenhouse gas emissions through increased fuel economy. HEV models available in the US from 1998 to 2006 achieve fuel economy increases of 10 to 30 percent when compared to similar size vehicles, with commensurate reductions in emissions of the greenhouse gas carbon dioxide. Further, some of these HEVs are among the few gasoline-powered vehicles that meet California's (and thus the nation's) most stringent standards for motor vehicle emissions of criteria pollutants. As such, HEVs are the first widely acknowledged and marketed "green" vehicles and have received a large amount of attention from the media and analysts. Eight years after their introduction to North America sales of HEVs are modest; they accounted for less than 2% of US new light-duty vehicle sales in 2005, with four manufacturers offering HEVs in only a few body styles. Still, sales of some HEVs have outpaced even their manufacturers' expectations.

Much of HEVs' benefits are collective: millions of people buying less polluting and more economical cars can produce cleaner air and reduce the risk of climate change and war, but no single HEV buyer can have much impact. Individual, private benefits of reduced expenditure on fuel are routinely shown to be less than the vehicle purchase price premium of the hybrid vehicle over a non-hybrid alternative (see for example USDOE 2001, Edmunds.com 2005, White 2005, Wilson 2005). If private financial benefits are illusory and collective benefits not achievable by individual consumers, why would any individual consumer buy an HEV? Hopes that HEVs, and by extension any new technology that promises collective benefits, can be successfully mass marketed depend on answers to such a question.

Derbaix and Vanden Abeele (1985) encourage us to seek answers in the "holistic, observable behavior" of HEV buyers. The method used here is to go as far toward observation and elucidation of the holistic behavior of HEV purchase and use as we are able to within the limits of the methodology used for this study: semi-structured, post-purchase, in-home interviews with HEV buyers. Criticisms of HEV buyers on the grounds their purchase makes no private financial sense blame HEV buyers for cognitive shortcomings (or at least, shortcuts). Epithets such as environmentalist, do-gooder, or liberal—with obvious affective overtones—are substituted for

HEV buyers' seeming lack of cognition. One premise of this study is that HEV buyers are neither more nor less capable of making private financial calculations than are any other automobile buyers. People are assumed to organize and express memory, experience, plans, a unified sense of self through time and across contexts, and some decision-making in narrative form (McAdams, 1996). This narrative form—fundamentally, storytelling—is open to an exploration of meanings and how those meanings are incorporated into peoples' stories about their lives, just as the things that symbolize these meanings—in this case, HEVs—are incorporated into peoples' lived experience.

This study investigates the emerging set of meanings consumers associate with HEVs. The approach is to explore what hybrid (and other) vehicles mean to their buyers, and in this way, let consumers tell that part of their narrative that motivated, or is motivated by, their purchase and use of an HEV. This paper provides the details of individual household stories and maps the semiotic territory households describe. The results are based on interviews conducted during 2004-5 at the homes of twenty-five early buyers of HEVs. While this small sample may not represent all early buyers of hybrids, we observe behaviors and beliefs across our sample that would lead us to hypothesize such behaviors are probably common to most (early) HEV buyers. We further observe that some behaviors are missing entirely from our sample that transport researchers working within an economic model of behavior would have assumed are widespread.

An Approach to Understanding Symbols

Exploring product purchase and use behavior through understanding what products and their uses mean—or, symbolize—is common in consumer research, but less developed in transportation research. The paradigmatic approach in transportation to consumer behavior regarding new energy and environmental technology is statistical modeling of large-scale data sets based on the assumptions of the rational actor model from economics, e.g., discrete choice modeling. Examples across three decades include Beggs and Cardell (1980), Calfee (1985), Bunch *et al* (1993), and Santini and Vyas (2005). In such an approach, a rational actor is assumed to choose options that maximize utility subject to the actor's preferences, knowledge of alternatives, and budget. This approach is amenable to quantitative analysis and provides a framework for statistical modeling and prediction.

Within the field of transportation, there has been some analysis of symbols as they relate to motor vehicles. Authors such as Flink (1988) and Marsh/Collett (1986) acknowledge that motor vehicles are symbols, but offer little empirical evidence for their claims, and do not apply theoretical concepts from semiotics to generate a more rigorous assessment of symbolic meaning. In his examination of vehicle symbolism in Nazi Germany, Sachs (1992) conducts a more detailed analysis, but relies entirely on the history of advertising and includes little ethnographic content. Other researchers, often using conceptual frameworks from psychology, focus on whether symbolic meaning exists in automobiles and whether it impacts behavioral intentions. Research by Grubb and Hupp (1968), Grubb and Stern (1971), and Malhotra (1981) confirmed the existence of “image attributes” or symbolic meaning in motor vehicles; Sirgy (1985) and Erickson (1996) extended these findings, linking symbolic meaning to consumers’ behavioral intentions. Yet none of these researchers conducted a thorough examination of the symbolic meanings themselves. Rather than working with subjects to uncover what a particular vehicle symbolized, these studies instead tested for sets of predetermined meanings. The same criticism can be made of Steg, et. al. (2001). While Steg’s work provides tremendous insight into how symbolic meaning may influence automobile use, the study relied on predetermined meanings rather than applying techniques from semiotics to explore all relevant symbolic meanings subjects may have attached to their motor vehicles.

There is risk in assuming we know what a particular product symbolizes to consumers. In fact the work reported here is, in small part, a remedy to a prior study in which Turrentine and Kurani (2007) erroneously (as will be shown) assumed that early buyers of HEVs must have been primarily interested in higher fuel economy. In particular, new products can be problematic since symbolic meanings take time to become associated with the product and communicated to a large number of consumers. At the time of this study, HEVs were still relatively new in the automobile market, and therefore were likely to have been in the process of acquiring novel meanings or combinations of meanings. Therefore, this study does not begin with a set of symbolic meanings whose relevance is tested on HEV buyers. Instead, this study begins only with the assumption that HEVs may serve as symbols, giving study participants significant freedom to define and elucidate the symbolic meanings of their vehicles.

Unlike much of the previous transportation literature, this study is grounded in semiotic theory from anthropology. Heffner, Turrentine, and Kurani (2006) examine the relevance of semiotics to transportation research, and review several theoretical approaches to human-object relations including conspicuous consumption, self-congruity theory, and symbolic interactionism. The authors contrast these theories with a more comprehensive approach they call *products as self-creation* based on the theories of Giddens (1991), Csikszentmihalyi and Rochberg-Halton (1981), and McCracken (1998a). In *Products as self-creation*, consumer goods such as automobiles serve as essential tools for individuals to define themselves and the cultures in which they live. The approach closely resembles a developing field in academic marketing research called Consumer Culture Theory (CCT), which examines consumer behavior as a cultural act rather than an just economic one (see Arnould and Thompson, 2005 for a review of CCT).

Heffner, Turrentine, and Kurani (2006) make two main observations about semiotics and automobile markets: motor vehicles can symbolize ideas other than mobility and many of these ideas relate to self-identity. By selecting a particular vehicle, people can define and communicate who they are, expressing interests, beliefs, values, and social status. While any automobile can serve as a symbol, past research indicates that symbolism is particularly strong in vehicles that use new types of technology. Symbolic meanings were particularly relevant to early buyers of battery electric vehicles (BEVs) (Gjøen and Hård, 2002) as well as HEVs (OEC, 2003; Turrentine and Kurani, 2007). In the case of HEVs, many buyers acknowledge the role of their vehicles in self-identity. In one survey, 31 percent of HEV buyers said they purchased an HEV because the vehicle “makes a statement about me” (CNW, 2006); another study reports that some HEV owners purchased their vehicles “to demonstrate their values” (OEC, 2003).

Symbols are used by consumers in the construction of personal identity. Giddens (1991) argues that in the absence of the guidance provided by traditional culture, individuals in the modern world are left with the task to develop a *narrative of the self*—a biography connecting past experience and actions with present circumstances and outlining a path for the future. Development and maintenance of the self-narrative permeates the individual’s life, affecting

everything from day-to-day behaviors to long-term life plans. Thus, decisions such as which vehicle to purchase are influenced not only by practical concerns, but also by the need to construct and express one's self-narrative.

In a complementary line of thought, Becker (1992) has proposed that households should be viewed not as passive consumers of goods, but as producers of consumption. In other words, households invest preferences, time, resources, and goods to produce meaningful consumption events. We believe HEV buyers are engaged in the production of meanings. These meanings relate to the owners' identities, and are communicated to other people through the display of a symbol (the HEV).

The goal of this research was to understand the meanings that were being developed, appropriated, and communicated by buyers of the vehicles. It was assumed that such symbolic relations are important and that consumers, media, and automobile manufacturers are actively engaged in the formation and transmission of these meanings. These meanings were assumed to be important to understanding consumer behavior that confounded analyses based either solely on functionality or on a narrow interpretation of economic rationality. Again with caution inspired by Derbaix and Vanden Abeele, we do not as yet parse these symbols and their meanings into cognitive categories (attitudes, beliefs, norms, etc), emotions, or acts. It is important to first fully describe these meanings before efforts to classify them, perhaps as a prerequisite to studies of the market that would gauge the full market potential of hybrid vehicles and inform policies to achieve social goals.

OBJECTIVES AND METHODS: ASKING QUESTIONS ABOUT SYMBOLS

This study examined 25 households that purchased a Honda Insight, Honda Civic Hybrid, or Toyota Prius. The vehicle purchases occurred between 2002 and early-2005, and participating households were interviewed between November 2004 and March 2005. The typical interview lasted two hours; it involved two researchers and members of the household who were involved in the vehicle purchase. Interviews were conducted in participants' homes using a semi-structured protocol, and all sessions were audio-recorded. With one exception, the households resided in northern California, USA.

Semi-structured interviews were used for two reasons. First, HEVs are new types of automobiles. McCracken (1988a) notes that qualitative research methods are particularly effective in evaluating new products since they allow participants to use their own terminology and value frameworks. Second, qualitative interview techniques overcome some of the challenges to examining symbolic meaning and its effect on behavior. Zaltman and Coulter (1995) warn that consumers can have difficulty interpreting and explaining the symbolic meanings attached to a product. Individuals may also deliberately conceal symbolic meanings or downplay their importance. The tendency of individuals to dismiss the influence of symbolic meanings has been observed in prior studies of automobile use (Steg *et al*, 2001) and purchase (Rapaille, 2004).

This study uses McCracken's (1988b) Four-Step Method of Interviewing. Steps one and two of this method generate expected meanings, and step three tests for expected meanings while providing participants freedom to introduce new ones. In Step four, discrete words or phrases are isolated and then linked with other observations to form themes. During analysis, themes are examined across interviews to identify larger patterns among the sample.

The interview protocol included these sections:

1. *Household Vehicle History*: A history of past and current household vehicles, vehicle use patterns and life stages, who uses the HEV, how far and where the HEV is driven, and the vehicle the HEV displaced (or whether the HEV was added).
2. A *narrative* (Mishler, 1986) of the HEV purchase told by the households with limited prompting by researchers. After the narrative is completed, researchers probe about the HEV purchase story, including any functional or symbolic benefits that emerged. Researchers use *planned prompts* (across all interviews) as well as *floating prompts* (customized to each interview) (McCracken, 1988b).
3. *Symbolic Meaning*: A series of questions and exercises designed to assist participants to verbalize symbolic meanings. For example, participants are asked to define a stereotypical HEV buyer and what they themselves say about their HEV to strangers and friends. Some participants also applied a *product personality scale* (Aaker, 1997) to their

HEV to describe how personality descriptors (such as “intelligent” or “cutting-edge”) do or don’t apply to their vehicles. Many participants were asked to discuss visual images they picked prior to the interview to represent their HEVs (Zaltman and Coulter, 1995).

4. *HEV Benefits and Disbenefits*: Particularly in the evaluation of HEV benefits and disbenefits, interviewers used *laddering* methods (Reynolds and Gutman, 1988), a questioning technique that connects product attributes to underlying meanings. Participants identify their perceived or expected advantages to buying an HEV, and explain the importance of these advantages in their own HEV purchase. Researchers prompt discussion about other HEV benefits. The process is then applied to disbenefits.
5. *Stated Tolerance Exercise* (Lee-Gosselin, 1996): Interviewers propose replacing the household’s HEV with another vehicle, and households discuss the conditions that allow or prevent the substitution of this hypothetical vehicle for their HEV. Proffered vehicles are often hypothetical and are customized for each household based on prior information in the interview.

Interviews were analyzed using a framework from Barthes (1967) that classifies meanings as *denotations* or *connotations*. Chandler (2002, p. 140) defines a *denotation* as a “definitional, literal, obvious, or commonsense meaning” associated with a symbol. Most of the denotations outlined in this study will probably not strike the reader as novel precisely because denotations are generally well known and widely shared.

However, a central point in this analysis is that denotations do not provide a complete picture of the HEV’s symbolic meaning and therefore the social and psychological processes motivating purchases. Connotations must also be examined. A *connotation* is a more subjective and personal meaning that connects a denotation to a particular person. Chandler (2002) observes that connotations develop through individual interpretation, and thus vary considerably from person to person. Connotations reveal why a particular denotation is relevant to an individual, and thus provide the link between product meaning and self-identity. For example, a participant may associate the idea of *being an ethical person* with the idea of *preserving the environment*, which is in turn linked to the HEV. The statement she makes with her HEV is not only about the environment; it is also about the ethics that underlie her environmental views. Thus, people don’t

buy HEVs just for their denotations. Buyers also are motivated by the connotations that make denotations such as *preserving the environment* personally relevant.

ANALYSIS: MEET SOME EARLY BUYERS OF HEVs

In our analysis, we are not interested in modeling, simplification, or reduction. We are more interested in what Geertz (1973) called “thick” description—a dense, rich, intentionally complex description providing as much background and context as discussion of any particular behavior of interest. Only by first attempting to see behavior in its full complexity can we hope to know what will be gained and lost when efforts to simplify (and model) that behavior are undertaken.

What follows are representations of four of the interviewed households that illustrate meaning pathways that emerge from the interviews. These four households were chosen because they represent a wide variety of all the meanings—positive and negative—heard across all the households, demonstrate a variety of the complexity in semiotic territory mapped for each of the households, and reveal important processes in creating these semiotic territories including negotiation between household members and vehicle use behaviors. Each household representation includes a graphic and accompanying text. Each graphic is oriented with the vehicle near the top, with links down through specific vehicle features and performance attributes to widely shared denotations, and ultimately to connotations most closely related to personal identity. The graphics and accompanying text are our effort to balance thick description with other goals including the illustration of the variety of the symbols, meanings, values, and identities we heard throughout all our interviews. An overview of all 25 interviews will be presented in the discussion section that follows. All personal names are aliases.

The Lays

Tom Lay is a retired engineer in his 60s who bought a Toyota Prius. Through HEV ownership, he accessed two denotations: the idea of saving money and being a user of the latest technology. Tom made his HEV purchase as he neared retirement and contemplated the changes that would soon occur in his lifestyle. Once retired, Tom would no longer be going to the office each day, but he expected to be busy with part-time consulting work, childcare for his grandchildren, and managing a local youth sports league. The time he would spend in his car and the amount he

would spend on fuel seemed likely to increase. As Tom thought about his prior vehicle, a full-sized pickup truck with a powerful diesel engine, he decided he needed a more comfortable, economical vehicle. Once aware of the Toyota Prius, he knew immediately it was the right choice for him.

A representation of Tom’s HEV purchase and use—the semiotic map created from his interview—is shown in Figure 1. In this map, we have extended Barthes’ framework linking products to identity in two ways. First, we extend the diagram “above” the specific product (Toyota Prius) to a more general class of products (Hybrid Vehicle). We do this because among HEV owners there is disagreement about which vehicles should be included in the “Hybrid Vehicle” category. For example, some participants are uncertain that hybrid SUVs should be included in the “Hybrid Vehicle” category since these larger, heavier vehicles have fuel efficiency that is below many conventional automobiles. Second, we have included specific ideas (often direct quotes) that help link one level of meanings to another.

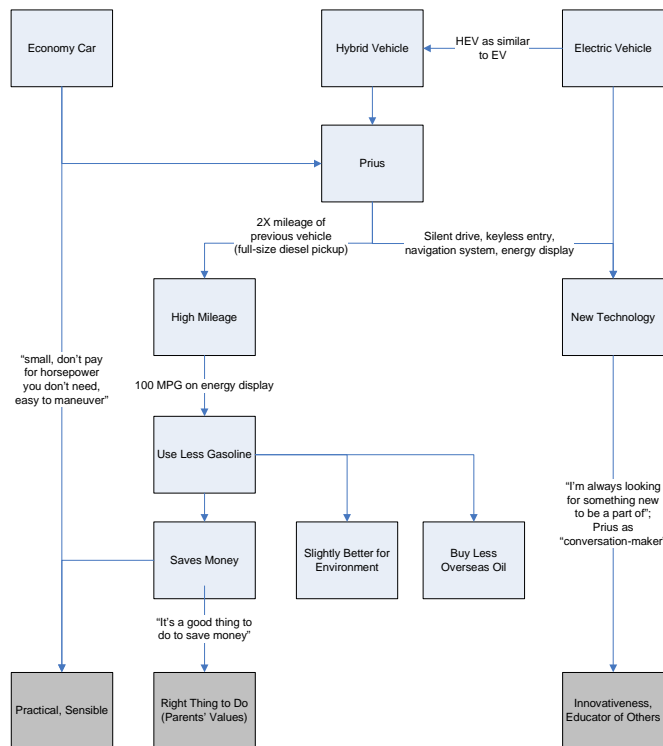


Figure 1: Lay Meaning Map

Tom borrowed meanings for his HEV from two sources. One set of meanings came from BEVs, which Tom had driven occasionally in his job at the local electric utility. Tom remembers when, several years earlier, he drove General Motors electric EV1 for a week. He thought it seemed so advanced relative to conventional cars, and its unique appearance and silent operation often attracted the attention of bystanders. Tom recalls fondly how people approached him to ask about the EV1; even the local police pulled him over to examine the strange new car. Tom answered their questions and offered rides in the vehicle, enjoying

his role as EV ambassador.

A second source of meanings was economy cars, an unusual source of meaning for HEVs among the households we interviewed (most HEV buyers viewed HEVs as very different than conventional compact cars, despite similarities in vehicle size). In the past, Tom had owned several compacts; these cars had seemed poorly-made, but they were fuel-efficient as well as easy to park and maneuver. They had provided transportation without excessive power or amenities, features he thought most people didn't really need anyway.

Tom selectively applied meanings from economy cars and BEVs to create a desirable mix of symbolic meanings in his HEV. For Tom, the HEV was a practical vehicle; it was small, offered modest horsepower, and didn't use much gasoline. In fact, he thought the larger Prius offered better gas mileage than conventional economy cars. Like most households in this study who articulated their HEV purchase in terms of cost savings, Tom acted on symbols of savings rather than financial calculations. He did not conduct a payback analysis, nor does he keep records of fuel expenditures or calculate fuel savings. When he bought his HEV, Tom did not compare it to functionally similar non-hybrid vehicles, although he recognized that cheaper alternatives to his HEV were available. In fact, Tom guessed that he *increased* the price of his HEV by \$10,000 by adding optional equipment, some of which he later acknowledged he did not need or use.

However, Tom believes he is saving money based partly on the fuel economy advantage of his HEV over his pickup truck, an advantage confirmed by the HEV's instrumentation. He explained that he checks his Prius' energy monitor as he drives, and is excited to occasionally see it read 100 mpg: a momentary, but powerful, confirmation of the vehicle's—and his—frugality.

For Tom, saving money is linked to the connotation of *ethics*. Tom characterizes saving money as “the right thing to do,” and explains how his parents' upbringing during the Great Depression led both of them to see saving money as a matter of right and wrong. He also explains how the ethics of saving is part of his own identity: “My parents did instill that in me. I can't get rid of it, it's part of me.” For Tom, the HEV embodies the idea of frugality as an ethical value, and makes it visible to others. “I tell everyone about it,” he confesses. Tom won't save any additional

money by telling others about his HEV, but this interaction does give him a chance to communicate to others about who he is. Tom's Prius tells the world that he is a person with strong personal ethics, and accessing this meaning (rather than attaining specific cost savings) was the main reason for Tom's HEV purchase.

Tom also stressed the meaning of advanced technology. Like the EV1 he drove several years earlier, the HEV represents cutting-edge technology. For Tom, the Prius' silent electric drive, keyless entry, and integrated navigation and energy display provide tangible proof that the vehicle is advanced. Features like the electric drive—combined with the Prius' distinctive appearance—also attract attention like the EV1 did. Tom calls his Prius “a conversation-maker” since people who notice it seem unable to resist asking Tom questions about his vehicle. Tom is happy to teach them about HEVs, and sees himself as a person who adopts new ideas before others. “I'm always looking for something new to be a part of” he explains, reciting a list of items that he bought and groups he supported long before others did. For Tom, the HEV defines him as a visionary person: someone who recognizes the value of new ideas and can introduce others to new ways of doing things.

Tom's HEV purchase illustrates how HEVs offer buyers a unique combination of symbolic meanings that were previously unavailable in the marketplace. Like economy cars, HEVs allowed Tom to access the connotations of practicality and sensibility. In addition, the HEV also provided the connotations of personal ethics and innovativeness. While past economy cars identified Tom as a sensible person, the HEV broadened this definition, communicating that Tom was a practical person with strong personal ethics who was creative enough to experiment with new ways of doing things. His HEV showed that he was concerned about economizing, but he did so through the application of novel technology rather than by simply settling for less performance or comfort in his automobile. Tom is also notable for the meanings he did not emphasize. While he recognized that his HEV could be “slightly better for the environment,” Tom did not stress the environmental meanings of his vehicle, demonstrating that some HEV buyers purchase for reasons that are unrelated to the vehicles' real or perceived environmental benefits.

The Bridgers

Rich and Ellen Bridger are a couple in their 60s; Mr. Bridger recently retired, while Mrs. Bridger still works part-time for a local real estate firm. In addition to their Toyota Prius, the Bridgers also own a full-sized pickup truck, a 4WD Toyota Tundra with a powerful V8 engine. Before buying their Prius, Mr. Bridger used the Tundra as his primary vehicle, but now the Bridgers regularly assign the Prius to whoever has the most driving to do on a particular day. Mr. Bridger still likes having the pickup for hauling, but he gradually has become more concerned about the pickup's poor fuel economy and the consequences of its fuel use.

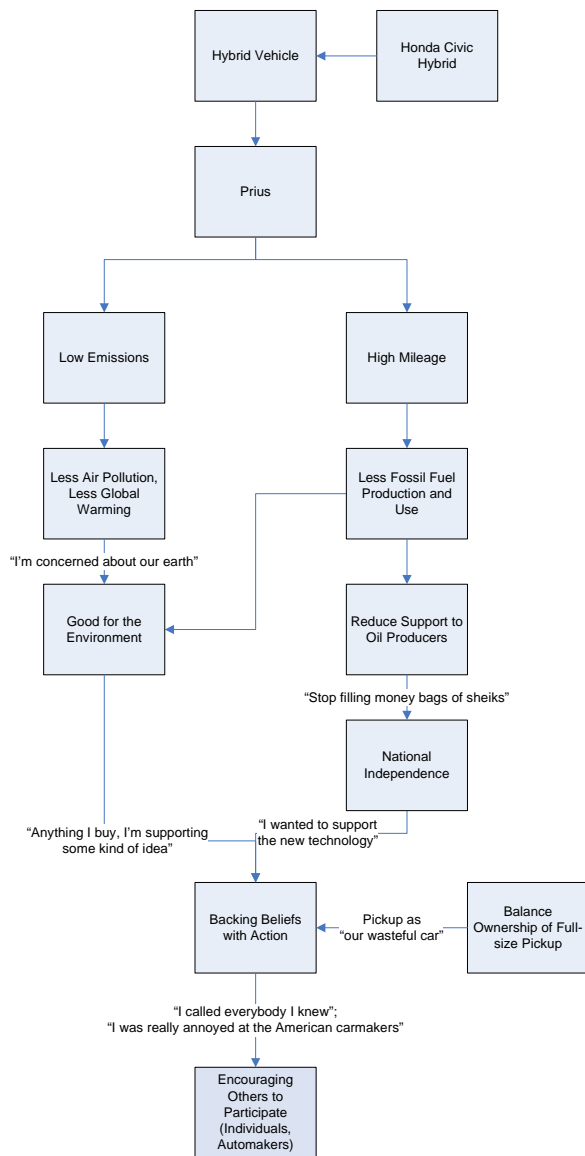


Figure 2: Bridger Meaning Map

For the Bridgers, a “Hybrid Vehicle” category exists that includes the Toyota Prius, Honda Civic Hybrid, and the Honda Insight. While initially attracted to the styling of the Honda Civic Hybrid, the Bridgers wanted to buy a Toyota due to their positive past experience with Toyota vehicles and the more comprehensive warranty that was included with Toyota’s HEVs. When a friend told them about the second-generation Prius that was due to be released, they decided to wait for the vehicle. Seven months later, they took possession of their HEV.

For the Bridgers, the Prius symbolized two ideas: low emissions and high mileage. Low emissions connects to the concepts of less air pollution and lower global warming impacts, and to the denotation that the HEV is “good for the environment.” Both Mr. and Mrs. Bridger express concern for the natural environment, although they differ somewhat

in the intensity of their views. Mr. Bridger believes that while his wife is an “emotional environmentalist,” he is a “practical environmentalist” who supports a rational assessment of environmental issues and balances environmental goals with other objectives.

For Mr. Bridger, one of these other objectives is using less foreign oil. For him, the HEV signifies less fossil fuel production and use, which connects to the idea of sending less money to oil producers overseas. Specifically, Mr. Bridger is interested in de-funding the “oil sheiks” and OPEC governments who he believes manipulate energy prices and finance terrorism. His HEV serves as a symbol not just of consuming less oil, but of gaining independence from foreign governments who are hostile toward the United States.

This balance of meanings can be essential for some HEV buyers. While Mrs. Bridger was attracted to the HEV’s strong environmental meanings, Mr. Bridger was interested in more than just a “green” vehicle. In fact, he explained that occasionally he was concerned that his Prius could portray him as a radical environmentalist rather than the sensible, environmentally-aware Republican he perceived himself to be. For Mr. Bridger, it was important that the HEV have two denotations: environmental preservation *and* independence from foreign oil. The Bridgers’ distinct views became evident when they discussed the expansion of oil production in North America, including drilling in sensitive areas such as the Arctic National Wildlife Refuge (ANWR). While Mrs. Bridger opposed any exploration in ANWR because of the environmental harm it could cause, Mr. Bridger supported what he saw as a more pragmatic approach, noting that oil from ANWR would reduce US dependence on OPEC and probably could be achieved without spoiling the environment. For him, both the environment and national independence were important, and his Prius symbolized both of these ideas.

The Bridgers do agree that buying an HEV was not about saving money: “for us it was not an economic decision” Mr. Bridger explains. They have heard others (including a close friend of Mr. Bridger’s) argue that it isn’t worth it to pay “several thousand” dollars more for hybrid technology, but they feel that these people don’t quite understand what HEVs are all about. While the idea of saving money wasn’t a primary motivation for their purchase, the Bridgers aren’t oblivious to finances. For example, they accelerated the purchase of their HEV in order to

maximize their federal income tax deduction. Interestingly, the federal tax benefit also reinforced the HEV's environmental meaning. In a moment of post-purchase validation, Mr. Bridger was preparing his taxes using a popular tax software product. As the software guided him through the deductions, Mr. Bridger remembers happily affirming that he had purchased a "green vehicle." While he was unsure exactly how much his HEV reduced air pollution, the software confirmed that the vehicle was considered "green" by the U.S. government. Though offered light-heartedly by Mr. Bridger, this story illustrates how symbols come to be reproduced and exchanged in myriad ways.

For the Bridgers, the denotations of national independence and environmental preservation connect to the connotation of backing one's beliefs with action. The couple viewed their HEV purchase as providing support for a new technology that fit with their values. For this household, the Prius also served as a counterweight to their other vehicle, whose poor fuel economy conflicted with the ideas of polluting less and consuming less oil from overseas. Both expressed some guilt about their pickup, the "gas-guzzler on the other side of [the] garage," and acknowledged that it symbolized ideas, such as wastefulness, that were opposite those of the HEV. Mrs. Bridger suggests that the Prius reduces their guilt about owning the Tundra, a vehicle that contradicts so many of their values, beliefs, and goals now given form by their Prius.

The Bridgers' HEV also connects to the idea of community involvement. The couple are members of a church congregation that introduced them to HEVs and includes numerous other HEV owners. Both enjoy educating others about HEVs, and have spent time talking with strangers who inquire about the vehicle. Not only do the Bridgers hope to influence other consumers to make HEV purchases; they also want to cause automakers to produce more HEVs. Through buying an HEV, the Bridgers believe they are sending a message to automobile manufacturers, particularly the American manufacturers who have been slow to develop hybrid technology.

Finally, although the Bridgers talk about "support[ing] the new technology," they are not technophiles. They never talk about the hybrid technology per se (except to mention their concern about the battery); when they do mention specific features, they focus on non-powertrain

elements such as the keyless entry feature. Nor are they loyal to HEVs. This may be because Mr. Bridger has been following hydrogen and fuel cell vehicles. Both the Bridgers are ready for “fuel cells, hydrogen, whatever” the next technology is that will get them closer to their goals of a healthy environment and independence from foreign oil producers.

The Halls

Richard and Diane Hall are professionals in their 40s who have three school-aged children. At the time they purchased their Toyota Prius in 2001, Richard was an executive at a Bay Area technology company and Diane was a full-time mother. Both Richard and Diane see their Toyota Prius as part of a larger category of hybrid vehicles, which includes compact vehicles such as the Honda Civic Hybrid and the Honda Insight, but cannot include large SUVs (even those that incorporate hybrid powertrains). As Richard evaluated HEVs, he wanted a car that clearly stood out as a hybrid vehicle. He liked the unique styling of the Honda Insight, but felt that the Honda

Civic hybrid looked too much like the conventional model and would not be identified as a hybrid by other drivers.

Richard and Diane explained that their Prius was different in two ways: the hybrid powertrain made it more efficient and more advanced. These ideas were represented by the silent, all-electric acceleration from a stop (a feature they nicknamed “stealth mode”). Each time their Prius operated in electric mode, it affirmed the ideas of higher efficiency and technological superiority. High efficiency was not important for its own sake; higher efficiency resulted in less waste and more frugal use of fuel, which led to lower emissions and therefore

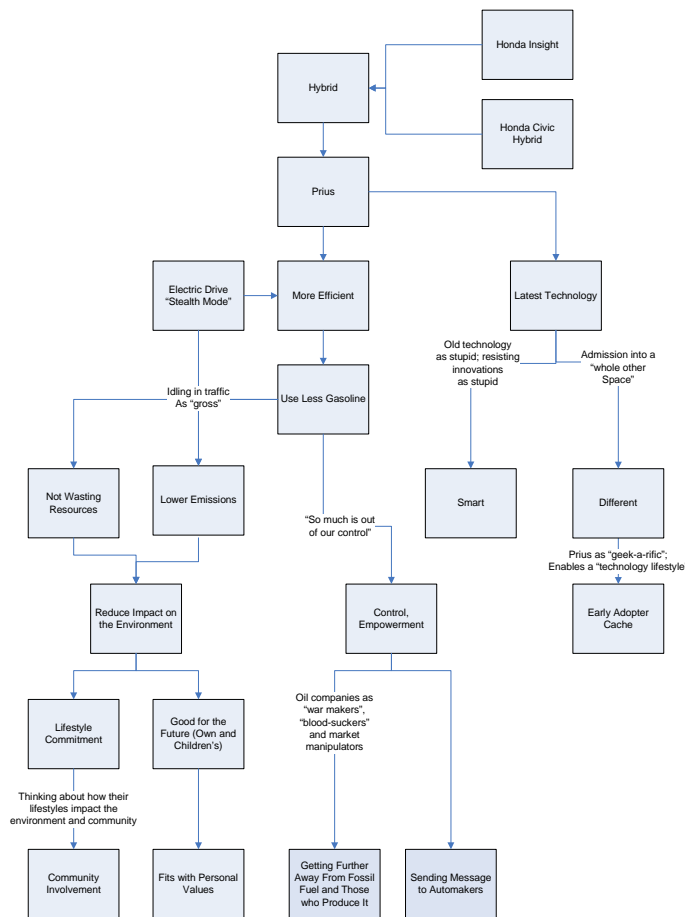


Figure 3: Hall Meaning Map

reduced environmental impact. As Diane explained, doing less environmental harm now meant securing a better future for herself and her children—who would enjoy a cleaner world rather than one that was stripped of its wealth and heavily polluted. Reducing their environmental impact also fit with a “lifestyle” that Richard and Diane had been gradually embracing during the past few years that involved thinking more about the impact their lives had on others. Increasingly, they asked themselves what they could do (or stop doing) to be a more positive influence in the world. As a result, Diane had become more active in local political organizing, Richard had begun looking at investments in clean energy, and both had become more involved in their children's schools.

Higher efficiency also linked to the idea of using less gasoline and being able to control their resource use. “So much is out of our control” Diane explained, bewildered at how little influence she was able to exert over critical things like whether the food her family ate contained chemicals or genetically-modified organisms. For the Halls, using less gasoline meant shifting the balance of power back to the consumer. They felt they were making less of a contribution to the oil companies, who they saw as dishonest warmongers. They also believed that their hybrid purchase made a statement to automakers, rewarding those companies who manufactured environmentally sensitive products.

Being ahead of others, especially peers at work, in a new technology also played a central role for Richard. A self-proclaimed “car guy,” he became interested in HEVs when they first appeared in *Motor Trend* magazine, and visited a dealership to test drive the first-generation Toyota Prius soon thereafter. During his test drive, Richard thought that the Prius was a “geek-a-rific” and an ideal vehicle for someone like himself in a high-technology field. The new technology symbolized two key ideas for him: intelligence and distinctiveness. The technology was “smart” because it was better than conventional vehicles, and it was sure to be adopted in all automobiles over time. Richard said companies that resisted the move to hybrids were stupid; he believes widespread adoption of this innovation is inevitable. Richard also feels that the new technology is distinctive. In fact, it was ultimately this uniqueness that sold Richard on an HEV. While the Prius was much smaller and less powerful than the European luxury cars he was

accustomed to driving, it really stood out. He explains, “the Prius was so different, I had to give it a shot.”

Richard’s HEV immediately attracted attention, something other owners in online user forum had told him would happen. With a smile, he explains how a neighbor’s “jaw dropped” when he silently backed out of his driveway, and how a crowd of curious onlookers gathered around his car while he dropped a passenger at the airport. Richard was pleased that his car was so unique, both in its powertrain, quietness, and styling. In the professional culture of Silicon Valley, tremendous faith is placed in the power of new technologies, and people are often judged according to their ability to visualize and develop new innovations. While interest from strangers was nice, Richard noted it was his colleagues who understood his HEV. Richard explained that “those in the know...who are working on all kinds of higher-tech things” were the ones who recognized that his HEV was not just another compact car.

Still, the meanings of their Prius were problematic for Richard. It was good to be seen as a technological innovator. Being seen as someone doing something good for the environment was fine too, so long as it didn’t go too far. But the Prius was smaller and had lower performance than his 5-series BMW that it replaced. He did not want to be seen as a “tree-hugger” driving an econo-box; he wanted to continue to display himself as a driver interested in performance. To balance the environmental and performance-oriented aspects of himself, he proceeded to drive the Prius “with my foot to the floor” during the first months of ownership.

The Grahams

Ron and Jill Graham are in their late-40s and parents of pre-teen daughter. Ron is a stay-at-home dad and volunteer environmental activist. Jill, a financial services executive, also is concerned about the environment, although she is less involved in environmental preservation efforts than her husband. The Grahams own both a first and second generation Toyota Prius. They also own a pickup truck that was previously Ron’s primary vehicle but is now used infrequently to haul their kayaks to the river, rubbish to the landfill, etc. Both Ron and Jill speak readily about the meaning of their HEVs. They characterize their two Priuses as “symbols” and claim that the vehicles

“made a statement” to others. In fact, Ron and Jill are critical of other HEVs such as the Honda Civic Hybrid that they feel do not communicate meanings as effectively as the Prius.

Figure four illustrates the semiotic map for the Grahams and their HEVs. When the Grahams determined what HEVs meant, they borrowed ideas from another category of vehicles with which they were familiar: battery electric vehicles. According to Mr. Graham, HEVs were “like EVs, but could be used on trips” – essentially electric vehicles with unlimited range.

For the Grahams, the Prius symbolizes “high efficiency,” a meaning that is reinforced by the vehicle’s engine shut-off feature. High efficiency is connected to the idea of lower resource consumption, and lower oil consumption in particular. Consuming less oil was linked to two

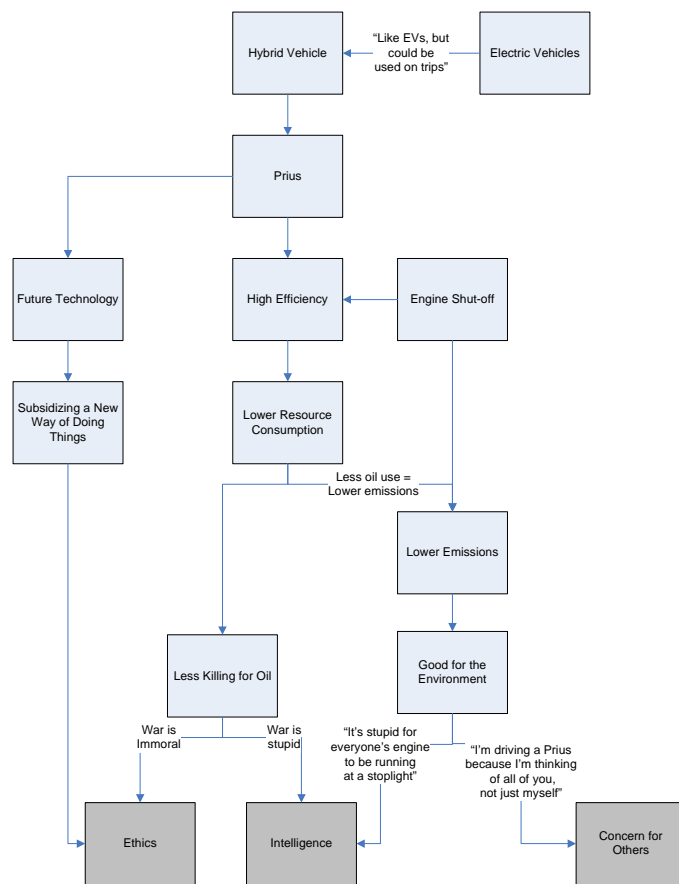


Figure 4: Graham Meaning Map

other concepts. One was minimizing their support for the war in Iraq, which they characterized as “killing for oil.” The other was the idea of lower emissions, which were seen to be good for the environment. Thus, the product attribute of high efficiency was ultimately linked to the denotations of *opposing war* and *preserving the environment*.

The Grahams linked these denotations to three connotations: *ethics*, *intelligence*, and *concern for others*. Through further statements, e.g., “stupid, unethical people wage war,” they linked their choice of a Prius to a contrasting image of themselves as intelligent, ethical people. “When you pick a Prius” Jill explained, “you are thinking of the

broader society, and not just what's in it for you." Wishfully, Ron talked about the improvements that could be made if every family had an HEV, encouraging us to "think about all the pollution that would be saved."

Yet Ron understood that many of his neighbors did not share his enthusiasm. With some irritation, he discussed a recent episode at a local youth softball game. Several owners of large SUVs had ignored parking guidelines, blocked other vehicles, and then responded angrily to the suggestion that they move their vehicles. While the environmental impact of large SUVs concerned him, Ron was more upset about the attitudes of these owners. "Beyond selfish," he said, deeming SUVs the "antithesis" of HEVs and his community orientation.

The Grahams also characterized their HEVs as symbols of intelligence and awareness. Jill explained that HEV buyers look beyond advertising, and consider the political and environmental effects of their vehicle purchase. HEV ownership is smart because it offers a solution to the wide-ranging negative impacts of petroleum consumption. For Ron, intelligence was strongly linked to efficiency: those who conserved natural resources and used them efficiently were intelligent. "Hybrids are intelligence" he explained, "and SUVs are stupidity." Their Prius both facilitates and gives expression to this identity.

DISCUSSION: WHAT ARE ALL THE MEANINGS?

Among the 25 households in this study, five denotations emerged that had major influence on HEV purchases. These denotations are listed in the top row of Table 1. Associated with each denotation is between one and four connotations, shown in the bottom row of Table 1. For example, some households saw their HEVs as symbols of *preserving the environment*, and linked environmental preservation to the ideas of being an ethical person who is concerned about others. No single household expressed all the denotations and connotations shown in Table 1. Further, households were not always influenced by the same connotations, even if they did agree on the same essential denotations. For example, two households may both view *managing personal finances* as the most important meaning of the HEV, but one household may emphasize the *ethics* connotation while the other stresses the connotation of *intelligence/awareness*. Table 1

should not be interpreted as a “model” of the early market for HEVs, but rather as a list of symbolic meanings that were important to early HEV buyers in this study.

Table 1: The Meanings of HEVs among the Sample Households

DENOTATIONS	Preserve the Environment	Oppose War	Manage Personal Finances	Reduce Support to Oil Producers	Embrace New Technology
CONNOTATIONS	Ethics Concern for Others Community Orientation Intelligence / Awareness	Ethics	Maturity / Sensibility Ethics Intelligence / Awareness	Personal Independence National Independence	Individuality Advocate to Manufacturers

Preserve the Environment

Many households acknowledged purchasing their HEVs as a response to environmental concerns. However, few of our households were dedicated environmentalists, and most had only a basic understanding of environmental issues or the ecological benefits of HEVs. Rather than buying their HEVs with measurable environmental goals in mind, most of the households in this study sought symbolic meaning: the idea of themselves as good people whose concern extended beyond their own individual welfare.

Households who emphasized the *preserving the environment* denotation connected this idea of one or more connotations: *ethics, concern for others, community orientation, intelligence/awareness*. For households that view the HEV as a symbol of *ethics*, HEV ownership is a choice between right and wrong. Many owners describe buying an HEV as “the right thing to do” and characterize their vehicles as something they can “feel good about.” As one owner explained, owning an HEV didn’t merely reflect environmental views; it was also a way to show that she was a person with strong ethical values. In addition, this participant viewed her HEV as a mechanism to transmit these values to others. Her children increasingly looked to her as a role model, and she hoped her HEV would demonstrate the “consistency” that existed between her personal ethics and the way she chose to live her life.

Other households viewed their HEVs as symbols of *concern for others*. Buyers characterize the HEV as providing benefits to a group that is larger than the HEV owner, and describe HEV ownership as “altruistic” or as “something you do for the world.” Frequently, the “others” HEV owners are concerned about include their children or grandchildren, i.e., members of future generations who HEV owners predict will be most affected by environmental degradation or other negative consequences of motor vehicle and petroleum use. In addition, numerous households talked about suppressing “selfish” desires for vehicles with more power, luxury, or prestige when buying their HEVs. As one Toyota Prius owner explained, “you don’t buy a Prius to stand out from the crowd. You buy a Prius because you care.”

The connotation of *community orientation* is also associated with HEVs. Many owners view society as a community in which collective issues (environmental issues as well as broader social problems) can be resolved through collaboration. They feel a personal responsibility to solve these issues, and see their HEVs as symbols of their contributions. Many describe the HEV as a symbol of “making a difference.” In addition, they hope that their HEV ownership will set an example for others, causing increased adoption of HEVs and creating a future in which “everyone drives hybrids.” The future they envision not only has an improved environment; it is also enjoys greater cooperation among its inhabitants.

Finally, some households associate their HEVs with the connotation of *intelligence/awareness*. These HEV owners believe they possess a heightened awareness of environmental problems, as well as the intelligence to comprehend the severity of these issues. They express frustration with those who seem to be either unaware or unconcerned about environmental degradation. “People should be better informed,” insisted one participant, who is so zealous about educating others that she offers strangers rides in her HEV and distributes sales brochures to anyone who expresses interest in her HEV.

Oppose War

Numerous households discussed the conflict in Iraq, as well as the history of U.S. military presence in the Middle East. Many were opposed to the Iraq war, not necessarily because they saw themselves as pacifists, but because they questioned the war’s underlying causes. They

characterized U.S. action in Iraq as “killing for gasoline,” the latest example of the United States applying deadly force to secure its share of dwindling petroleum supplies. “Killing for gasoline” seemed unethical to these households and conflicted with their views of themselves as moral individuals. By purchasing HEVs that used less oil, these households could speak out against “war that results from oil dependence.” Thus, HEVs don’t just symbolize *opposing war*. They symbolize opposition to a particular type of war (war over resources) that violates the personal *ethics* of HEV owners.

Manage Personal Finances

Whether HEVs save their owners money has been widely discussed in the popular press (see for examples, Valdes-Dapena (2005) and Consumer Reports (2006)). Most of these analyses compare the costs of an HEV with those of an assumed comparable vehicle, accounting for differences in purchase price, fuel costs over the life of the vehicle, and tax incentives. However, past research shows that few consumers conduct this type of analysis (Turrentine and Kurani, 2007). Among households in this study, no owner (not even those who emphasized the *managing personal finances* denotation) conducted a comparative cost analysis before purchasing their HEV. In addition, only one household consistently tracked the fuel expenses of its HEV. These HEV owners are interested in finances, but rather than performing financial calculations, they appropriate and incorporate symbols of monetary savings into stories about themselves and their HEVs.

Households perceive their vehicles as providing access to three underlying connotations: *maturity/sensibility*, *ethics*, and *intelligence/awareness*. To some buyers, the HEV’s high fuel economy symbolizes a transportation choice for *mature, sensible* people. “I bought it purposely for the mileage” explained one owner, stressing the calculated purpose behind his vehicle choice. The connotation of *sensibility* is particularly important for households that want to balance the environmental meanings of their HEVs. One household proudly declared that their Toyota Prius was an altruistic purchase because it was good for the environment, but then quickly added that “economics drives our behavior.” As with other HEV owners, this household did not calculate whether their HEV actually saved them money. Instead, they were attracted to the vehicle’s ability to portray them as people who care about society but who also make sensible choices. For

young HEV owners, the connotation of *sensibility* is also associated with *maturity*. For example, one young owner noted that people her age typically bought the same vehicles their peers owned; older people, in contrast, focused more on practical concerns such as gas prices and were willing to buy new types of vehicles like HEVs. Thus, her HEV not only symbolized *managing personal finances*; it also identified her as a more mature individual than her peers.

Another connotation linked with *managing personal finances* is *ethics*. For some HEV owners, frugality is an ethical obligation rather than simply a wise financial choice. One participant characterized her cost-consciousness as a personal value that was instilled in her by her parents. “Saving money is always something you have to do,” she explained. *Intelligence/awareness* is also a connotation for some HEV owners, particularly those who believe that gasoline prices will rise in the future. For these owners, HEVs represent an intelligent response to higher prices, and they characterize HEVs as “intelligent,” the HEV purchase as “a smart decision,” and themselves as “smart consumers” or “intelligent people.” These HEV owners also are concerned that the public remains unaware of the coming crisis, so they share their knowledge and awareness with others. While these HEV owners receive no financial gain from their advocacy efforts, educating others about HEVs does reinforce their ideas of themselves as intelligent, aware people who have discovered a solution to a potentially serious financial problem.

Reduce Support for Oil Producers

HEVs also symbolize *reducing support for oil producers*, including multinational energy companies and the governments of oil-producing nations (Arab nations in particular.) These HEV owners accuse oil companies of manipulating domestic and international politics, fouling the environment, and inflating profits by gouging hardworking consumers. In addition, they see Arab governments as generally hostile to the United States, and charge them with engineering oil supply disruptions and supporting Islamist terrorists. The solution for these HEV owners is to use less petroleum so as to minimize the financial payments they make to these companies and countries.

Two connotations are linked to the *reducing support for oil producers* denotation: *personal independence* and *national independence*. Some owners feel that their HEVs make them less

vulnerable to the seemingly unpredictable actions of oil producers, granting them greater *personal independence* from entities they characterize as exploitative, cruel, or malevolent. Some characterize HEV ownership as “empowering,” a feeling that is reinforced as they realize they are making few trips (and fewer payments) to the gas station. Other owners emphasize the connotation of *national independence*. For them, the HEV symbolizes less reliance on unfriendly foreign regimes. “I don’t like being held over the barrel,” explained one owner who was discussing his relationship to OPEC governments, “I want to see them suffer.” Like other participants, this HEV owner was not an expert in energy issues, nor did he have a detailed understanding of which nations supply the United States with oil. For those who see their HEVs as symbols of *national independence*, memories of 1970s oil embargos, combined with recent images of Islamist terrorism, lead to intense distrust of Arab governments.

Embrace New Technology

Many owners were motivated by their perception that HEVs are new, advanced technology vehicles. However, few had more than a rudimentary understanding of the hybrid-electric powertrain. They were more likely to talk about visible features: the engine shut-off, low-speed all-electric mode, or real-time fuel economy displays. Some even pointed to “high-technology” features that are not unique to HEVs, such as the Honda Civic Hybrid’s blue dashboard lighting or the Toyota Prius’ keyless entry system.

Linked to the *embracing new technology* denotation is the connotation of *individuality*. Because HEVs are a new type of vehicle, they distinguish their owners as “a little different” from their peers. One owner explained, “I wanted to make my statement. I wanted to be the one on the block that had the Prius.” He revealed that he was often the first among his friends to try something new, and that he saw innovativeness as an aspect of his identity. Other participants described themselves (and their HEVs) using similar terms. “I get a little bit of pleasure out of being a little ahead of the crowd, or doing something that stands out,” explained another owner. The connotation of individuality was particularly strong for some young HEV owners. One woman who had purchased a Honda Civic Hybrid while still in high school explained how her HEV made her unique among her peers: “I’m excited to be one of the few...a young driver with a hybrid vehicle...no one has one.”

Some owners also see their HEVs as symbols of *advocating to vehicle manufacturers*. By purchasing an HEV, these households see themselves as providing support to automakers that have developed hybrid technology, and punishing those who have not. Many talk about “supporting hybrid technology,” and some characterize their HEV purchase as their “vote” for producing cleaner, more efficient vehicles. One household explained that the \$3,000 price premium of their Honda Civic Hybrid was worthwhile because, while it would never be recouped through fuel savings, paying the premium sent an important message to automakers about consumer demand for HEVs.

WHY WOULD ANYONE BUY A HYBRID ELECTRIC VEHICLE? AN ANSWER.

HEV owners interviewed for this study bought a rich set of meanings symbolized by HEVs in general and their HEV in particular. These meanings relate to aspects of buyers’ identities and are used by HEV owners in the construction of narratives of self-identity. Thus, the HEV not only provides its owner with transportation, it also provides symbolic meanings that owners can incorporate into better stories about themselves (Kurani *et al* 2006).

This study also shows that the symbolic meanings associated with HEVs are multidimensional. HEVs symbolize widely recognized ideas like preserving the environment, opposing war, saving money, reducing support for oil producers, and adopting the latest technology. But these denotations are linked to more personal connotations, such as concern for others, ethics, maturity, national independence, or individuality. Stereotyping HEV owners as “liberal tree-huggers” or “techno-geeks” greatly oversimplifies the rich identities of these individuals, and ignores the importance of connotations in their HEV purchases. For example, most buyers in this study—even those who stressed the environmental denotation—had limited environmental knowledge and history of environmental activism, yet perceived the HEV’s environmental meanings as a means to more personally relevant connotations. Their HEV purchases were about constructing and communicating—through a widely recognized environmental symbol—intelligent, moral people who care about others.

The values HEV owners see in their vehicles varies widely across households. Some owners see themselves protecting their families' futures through reduced pollution and oil use symbolized by the all-electric launch of some HEVs. Others praise themselves for making a sensible, mature choice, a feeling that is reinforced each time the fuel economy display shows a reading of 100 MPG. Some see themselves as part of a technological vanguard, whether or not they can explain how a hybrid drivetrain works. In some households the important symbols include things other than the vehicle. If rising fuel prices stoke anger at oil producers in some households, then HEVs provide the tool to strike back, to exert some measure of personal control. More than just the vehicles' high fuel economy, passing by a gasoline station without having to stop to refuel or telling other drivers at gasoline stations about their HEV are moments during which this control is exerted.

Since this study consulted with only a small sample of HEV owners, it is likely that additional symbolic meanings exist beyond the denotations and connotations identified here. As HEVs persist in the marketplace and as the variety of models expands, established meanings will evolve and new meanings will be added. New buyers may be motivated by novel meanings that were not recognized by earlier buyers. This is already evident. Originally cast as clean air and energy conservation tools for liberal environmentalists, HEVs have been redefined by neo-conservative nationalists as symbols of combating U.S. dependence on foreign oil (Bryce, 2005).

This study suggests that broader perspectives are required to accurately assess consumer behavior. Narrow critiques of HEVs on short-term financial grounds strip away essential symbolic meanings, leaving only easily-quantified functional performance and financial costs. As a result, critics are confused by what they see happening with high-fuel economy HEVs—or more likely, are inclined to describe HEV buyers as confused. This criticism ignores the importance of symbols and their connection to the identities of many HEV buyers, and by extension, the role of symbolism in the market for automobiles in general. Stripping HEVs of their meanings, reducing them to private fuel cost savings, is a normative statement about what people should value and how that value should be assessed. This further strips HEV buyers of the richness of their actual or potential identities and the actions which flow from those identities.

The overall approach used in this paper—a small sample of interviews in which each household was asked a largely customized set of questions related to what a new product means to them—leads to a deeper understanding of the development of markets for products whose value is (primarily or partially) social or environmental. This deeper understanding of the complexity of consumers' efforts to tell better stories about themselves will enhance our ability to shape rather than extrapolate our future.

REFERENCES

- Aaker, J. (1997) "Dimensions of Brand Personality." *Journal of Marketing Research*. Vol. 34.
- Arnould, E. and Thompson, C. (2005) "Consumer Culture Theory (CCT): Twenty Years of Research" *Journal of Consumer Research*. v. 31..
- Barthes, R. (1967) *Elements of Semiology*. Jonathan Cape, London.
- Becker, G. S. (1992) *The Economic Way of Looking at Life*. Available at: <http://nobelprize.org/economics/laureates/1992/becker-lecture.pdf>.
- Beggs, S. D. and N.S. Cardell (1980) "Choice of smallest car by multi-vehicle households and the demand for electric vehicles." *Transportation Research A*, 14A, pp. 380-404
- Bryce, R. (2005) "As Green as a Neocon" *Slate*. Jan. 25. <http://www.slate.com/id/2112608>
- Bunch, D.S. *et al* (1993) "Demand for clean fueled vehicles in California: A discrete-choice, stated preference survey." *Transportation Research A*, 27A, pp. 237-53.
- Calfee, J.E. (1985) "Estimating the demand for electric automobiles using fully disaggregated probabilistic choice analysis." *Transportation Research B*, 19B, pp. 287-301.
- Chandler, D. (2002) *Semiotics: The Basics*. Routledge, New York.
- CNW Market Research (2006) *Hybrid Motivators*. Report #135Q.
- Csikszentmihalyi, M. and Rochberg-Halton, E. (1981) *The Meaning of Things: Domestic Symbols and the Self*. Cambridge University Press, Cambridge.
- Derbaix, C. and P. Vanden Abeele (1985) "Consumer inferences and consumer preferences. The status of cognition and consciousness in consumer behavior theory." *International Journal of Research in Marketing*, v.2, pp. 157-74.

Edmunds.com (2005) "Most Hybrid Vehicles not as Cost-Effective as they Seem, Reports Edmunds.com." Press Release, June 1.

Ericksen, M. (1996) "Using Self-Congruity and Ideal Congruity to Predict Purchase Intention: A European Perspective." *Journal of Euro-Marketing*. Vol. 6, Iss. 1.

Flink, J.J. (1988) *The Automobile Age*. MIT Press: Cambridge, MA.

Geertz, Clifford (1973) "Thick description: toward an interpretive theory of culture," in: *The Interpretation of Cultures: Selected Essays*. Basic Books, New York.

Giddens, A. (1991) *Modernity and Self-Identity*. Stanford University Press.

Gjøen, H. and Hård, M. (2002) "Cultural Politics in Action: Developing User Scripts in Relation to the Electric Vehicle" *Science, Technology, and Human Values*. Vol. 27, No. 2.

Grubb, E. and Hupp, G. (1968) "Perception of Self, Generalized Stereotypes, and Brand Selection." *Journal of Marketing Research*. Volume 5.

Grubb, E. and Stern, B. (1971) "Self-Concept and Significant Others." *Journal of Marketing Research*. Volume 8.

Heffner, R.; Turrentine, T.; Kurani, K. (2006) *A Primer on Automobile Semiotics*. University of California, Institute of Transportation Studies: Davis, CA. Research Report UCD-ITS-RR-06-01.

Kurani, K.S., T.S. Turrentine, and R.R. Heffner (2006) "Narrative Self-Identity and Societal Goals: Automotive fuel economy and global warming policy." In Sperling, D. and J. Cannon (eds.) *Driving Climate Change*. Elsevier: Burlington, MA.

Kurani, K.S, T. Turrentine and D. Sperling. (1996) "Testing Electric Vehicle Demand In 'Hybrid Households' Using A Reflexive Survey." *Transportation Research D*. v. 1 n.2.

Lee-Gosselin, M.E.H. (1996) "Scope and potential of Interactive Stated Response data collection methods." In, *Household Travel Surveys: New Concepts and Research Needs, Conference Proceedings 10*, Transportation Research Board, Washington D.C.

Malhotra, N. (1981) "A Scale to Measure Self-Concepts, Person Concepts, and Product Concepts." *Journal of Marketing*. Volume 18.

Marsh, P. and Collett, P. (1986) *Driving Passion*. Jonathan Cape, London.

McAdams, D.P. (1996) "Personality, Modernity, and the Storied Self: A contemporary framework for studying persons." *Psychological Inquiry* v. 7, n. 4, pp. 295-321.

McCracken, G. (1988a) *Culture and Consumption*. Indiana University Press: City????

McCracken, G. (1988b) *The Long Interview*. Sage: Newbury Park.

Mishler, E. (1986) *Research Interviewing*. Harvard University Press: Cambridge.

Oregon Environmental Council (2003) *Survey of Oregon Hybrid Gas-Electric Car Owners*.

Rapaille, G. C. (2004) *Seven Secrets of Marketing in a Multi-cultural World*. Finish reference.

Reynolds, T. and Gutman, J. (1988) "Laddering Theory, Method, Analysis, and Interpretation." *Journal of Advertising Research*. volume and number?

Sachs, Wolfgang (1992) *For Love of the Automobile: Looking Back in the History of our Desires*, University of California Press, Berkeley.

Santini, D.J. and A.D Vyas (2005) *Suggestions for a New Vehicle Choice Model Simulating Advance Vehicles Introduction Decisions (AVID): Structure and Coefficients*. Center for Transportation Analysis, Argonne National Laboratory. ANL/ESD/05-1.

Sirgy, M. J. (1985) "Using Self-Congruity and Ideal Congruity to Predict Purchase Motivation." *Journal of Business Research*. Volume 13. number?

Steg, L.; Vlek, C.; Slotegraaf, G. (2001) "Instrumental-reasoned and Symbolic-affective Motives for Using a Motor Car" *Transportation Research Part F*. v. 4, pp. 151-169.

Turrentine, T.S. and K.S. Kurani (2007) "Car Buyers and Fuel Economy?" *Energy Policy* Volume 35, Issue 2, pp. 1213-1223.

"The Dollars and Sense of Hybrids" *Consumer Reports*, April 2006.

<http://www.consumerreports.org/cro/cars/new-cars/high-cost-of-hybrid-vehicles-406/overview.htm>

USDOE (2001) "Assessing Hybrid Electric Vehicle Technology." Argonne National Laboratory, Center for Transportation Research. *TransTech*. December.

Valdes-Dapena, P. "Hybrids: Don't buy the hype" *Money*. September 26, 2005.

http://money.cnn.com/2005/09/23/Autos/hybrid_alternatives/index.htm

White, J.B. (2005) "Doing the Hybrid Math: Rising Gas Prices Have Consumers, Auto Maker Calculating the Difference." *Wall Street Journal*, 26 Sept.

Wilson, Kevin A. (2005) "Hyperbolic hybrid fever notches up another degree: GMC's Graphyte concept hybrid SUV." *Autoweek*. June 27.

Zaltman, G. and Coulter, R. "Seeing the Voice of the Customer: Metaphor-Based Advertising Research." *Journal of Advertising Research*. July/August 1995.