

Meat as a Bad Habit:

A Case for Positive Feedback in Consumption Preferences Leading to Lock-In

Joshua Frank¹

FIREPAW (The Foundation for Interdisciplinary Research and Education Promoting Animal Welfare, Inc.)

Abstract: The concepts of path dependence and lock-in have received growing acceptance but have generally been thought of as driven by positive feedback on the supply side of the economy. A case through example is made here of how endogenous preferences positive feedback in utility from consumption, social considerations, and institutional considerations can all lead to path dependence and the persistence of suboptimal consumption choices. The case here specifically relates to meat consumption and utilizes behavioral, institutional, as well as neoclassical approaches to justify the conclusion. It is argued that increased meat consumption, which at one time may have had positive value has developed increasingly negative consequences both at the individual and social level. Negative impacts include health consequences, low production efficiency, and environmental damage, among others. Nevertheless, preferences for meat are maintained by multiple factors including historical dependence of tastes, socially established meanings of consumption choices, and institutional inertia.

JEL Number: O33, D12, A14

Key words: Path dependence, lock-in, endogenous preferences, meat

¹ Address: FIREPAW, Inc. 228 Main St. , #436, Williamstown, MA 01267-2641, email:

info@firepaw.org Phone: (518) 462-5939; Fax (518)658-0979

I. INTRODUCTION

There is growing acceptance in economics of the concept that history matters. The consumption and production choices of a society depend not just on what maximizes social utility, but on the particular course of evolution that society took to reach that point. David (1985) and Arthur (1989) pioneered the concept of technological lock-in. The concept of path dependence has also been extended to an acknowledgement of how history matters for institutions and how these institutions in turn determine economic choices (North, 1990). But in general, most of the discussion of path dependence and lock-in have been focused on its effect on productive capacity and on the supply side of the economy.

It is argued here that self-reinforcing tendencies, path dependence, and lock-in can occur on the consumption side of the economy as well as in production. The term “path dependence” is intended here in its broadest sense. Although the argument for path dependence is best known for its application to technology, an analogous argument can be made for institutions in general in that relatively small differences can be self-reinforcing and can lead societies down very different social and economic paths even if they start in similar economic positions. It is path dependence in this broad institutional sense that has been argued by North (1990) as an important explanation for international income disparities. Consumer choices can become “locked-in” to a path even if that path is inferior in that it produces a lower social utility than its alternatives. Endogenous preferences and positive feedback in utility from consumption, along with social, institutional, and behavioral factors can lead to path dependence and the persistence of suboptimal consumption choices.

The primary focus of this paper will be on examination of this concept through a particular example. Specifically the case is made here of how meat as a consumption choice in developed nations in particular may be “locked in” as the dietary focus in society. It is argued that increased meat consumption, which at one time may have had positive individual and social (human) utility has developed increasingly negative consequences both at the individual and social level. Negative impacts include health consequences, low production efficiency, environmental damage, among others. Nevertheless, preferences for meat are maintained by historical dependence of tastes, socially established meanings of consumption choices, and institutional inertia.

II: AN OVERVIEW OF THE CONSUMPTION OF MEAT

1. A Brief Background of Meat

Meat has evolved to be a preferred food source because of its social significance and its nutritional content. However, in contemporary affluent societies with modern factory farming techniques, meat has more adverse health consequences than its alternatives and it has negative social impacts.

It is no accident that the word for gustatory sensations, “taste”, is the same word as that used to describe idiosyncratic preferences in general. The two meanings of this word highlight the particularly arbitrary and personal nature of food choices. Food selection has been shown to be influenced by socioeconomic and demographic characteristics such as race, income, education, region, and household size (Cronin et al., 1982; Kant et al., 1991; Lutz et al., 1993; Nayga, et al., 1999; Patterson et al., 1995; Smallwood et al., 1995). This is consistent with arguments previously made by social scientists that food is not driven merely by chemical properties, genes, and sensory apparatus, but rather is driven by powerful social and cultural considerations (Falk, 1991).

There is clearly to some extent a genetic component to food tastes. For example, the bitter taste of propylthiouracil (PROP) varies both genetically as well as by culture and environment and has been associated with preferences for food and beverages. “Nontasters” have higher preference for high-fat and sweet foods (Duffy, 2004). “Supertaster” women have lower preferences for grapefruit juice, green tea, brussel sprouts and some soy products (Drewnowski et al., 2001). These biologically-based preferences can also be markedly different in children than they are for adults (Mennella et al., 2005). However, the role of social relations and culture in food choice is also quite clear. These social influences may date further back in our evolutionary history than many are aware—even rats have been shown to have taste preferences that are socially learned (Honey et al., 2004).

Even if there is a genetic component to human preferences for meat, it is quite clear that these preferences are quite flexible. The types of meat products preferred vary widely across cultures, with the various products often having quite distinct tastes. Research on individual food sources from bean-curd to dried figs to bushmeat demonstrate the prominent role of culture and institutions in creating tastes that tend to be stable across generations (Milius, 2005; Mintz & Tan, 2001; Nesci et al., 2004). This in turn implies that the preference for meat and other food

choices are “path dependent” in that prior personal and societal preferences affect current choices.

Historically, meat was a preferred source of nutritional content. Meat is also what nutritionists sometimes refer to as a “core food item”. In other words, it is not just a food item we eat, but a central food item around which we build our entire meal. For most of human history, starvation and malnourishment were facts of life. Meat’s dense nutrient content combined with its association with wealth and privilege led to it being considered a preferred food source. Meat was historically highly valued both because it was a difficult food source to acquire and because of its nutritional abundance (Willard, 2002). Meat is also statistically associated with wealth and privilege in modern times when looking across countries. Although there are regional and cultural differences, the most important determinant of per capita meat consumption across present-day countries is wealth, with higher wealth being associated with greater meat consumption (Speedy, 2003). Within the United States, higher income is associated with greater consumption of beef, pork, chicken, and fish (Park et al, 1996). Income elasticity for all of these meat products was found to be positive but less than one. Furthermore, the income elasticity was higher for people in poverty than for higher income households. Therefore, it appears that meat consumption increases with income, but the rate of increase tends to flatten at higher income levels. Over time in the United States since 1970, meat and poultry expenditures have been increasing, however their level as a percentage of disposal of personal income has been declining over time (American Meat Institute, 2005).

Given its historical value and association with privilege, its association with good nutrition and health, and its central position in our diet, it is not surprising that the consumption of meat has strong ingrained positive associations in much of the world. Among other things, meat consumption is perceived as a measure of social and economic development (Worldwatch Institute, 2003). In examining the sociological meaning of meat in America, Willard (2002) concluded that meat is not only associated with masculinity, stamina, and vitality, but from a cultural perspective meat consumption is perceived as a good investment for the body, family, economy, and the land. According to Smil (2002), meat is a nearly universal symbol of affluence, and in most cultures meat acquisition is still considered a sign of success and the sharing of meat continues to be used as a method for creating personal and social bonds. Thus, meat can be considered to be what Hirsch (1976) refers, to as a “position good”, a good that signals a person’s rank in the social hierarchy. Although this may still be true to some extent in

modern developed nations, it was particularly true in earlier times in all societies and in less wealthy countries today.

However, the overwhelmingly positive symbolic meaning meat has historically had in society is in need of revision. The high levels of meat consumption prevalent in Western nations have a wide range of negative consequences at both an individual and social level. Negative consequences of our current meat consumption patterns include health effects, production inefficiency, environmental impacts, disease risk, and as some argue, even moral issues.

A. Health Consequences of Meat Consumption

When lack of food is a common issue in a society and proper nutrients are scarce, then meat consumption arguably has health benefits. However in developed countries this is no longer the case. According to the American Dietetic Association, meat is not necessary to meet current recommendations of key nutrients and avoiding meat in diets conveys a number of health benefits including lower levels of saturated fat, cholesterol, and lower average body mass indices, among other things (American Dietetic Association, 2005). Most commonly consumed sources of meat contain high levels of cholesterol (Anger & Brown, 1990). There is a well-established link between cholesterol consumption and heart disease (Dawber, 1980; Keys 1980; Johansson et al, 1996). Meat consumption is also associated with obesity which has a well-established link to heart disease as well as other chronic illnesses (Hu & Willett, 1998). Meat consumption has been associated with higher rates of heart disease, cancer, diabetes, hypertension, arthritis, and appendectomies (Appleby et al., 1999; Fraser, 1999). The direct health care costs attributable to meat eating in 1992 for the United States was estimated to be between \$28.6 billion and \$61.4 billion from illnesses including hypertension, heart disease, cancer, diabetes, gallbladder disease, musculoskeletal disorders, and foodborne illness (Barnard et al., 2002).

B. The Efficiency of Meat Production

Meat production, when conducted on a limited scale, can be an efficient use of resources in that it can take advantage of grazing land that cannot be efficiently used for crop production and it can also take advantage of otherwise useless byproducts of crop production for human consumption such as straw. However, when land that can be devoted to producing crops for human consumption is instead devoted to animal agriculture, meat is generally an inefficient method for producing the calories and nutrients needed by humans (Stull & Broadway, 2003).

The laws of physics and biology dictate that energy is lost when moving up the food chain. Therefore, it takes a larger quantity of input to produce a given amount of animal protein than it takes to produce the plant protein that those animals feed on. Meat is considered a high protein food, yet between 80 and 96 percent of the protein in the cereals and grains fed to animals is not converted into edible protein (Smil, 2002). The production of beef is among the least efficient processes with only 4 percent of the protein being converted. Heavy meat diets require greater land, water, energy, and other resources than producing a comparable nutritional value based on low or no-meat diets (Carlsson-Kanyama & Faist, 2000; Duchin, 2004). A study in the Netherlands found energy use requirements to vary by a factor of ten between animal and vegetable products (Dutilh & Kramer, 2000). Producing a pound of animal protein requires about a hundred times as much water as producing a pound of vegetable protein (Rice, 2005).

It is interesting to note that despite being much less efficient to produce the raw materials, a pound of ground beef in many cases costs the same or less at a retail outlet than a similar quantity of plant-based “veggie burger” products. Although the causes of this discrepancy have not been well-researched, there are multiple possible explanations for this phenomenon. First, as will be discussed later, modern large-scale animal agriculture operations may be adept at taking advantage of externalities and creating an artificially reduced price. Second, beef may have significant economy of scale advantages over a grain-based burger. Even if production costs are lower for the grain-based burger, marketing and distribution costs could tip the scales in favor of beef. In addition, if we are comparing society’s current preference for a meat-based diet to a counterfactual scenario where non-meat diets dominate, then the production cost of a grain-based burger may drop dramatically due to economies of scale and commodification of what is now a niche market. Furthermore, on the demand side of the equation, “veggie burgers” are currently a niche market, with purchases likely skewed toward health-conscious and environmentally-conscious individuals who may have higher income and a low elasticity of demand. This in turn could lead to higher prices until these products become mass market items rather than niche market foods. In addition, since the market and consumer consciousness of what a meal “should” taste like is dominated by meat-based products, grain-based burger producers typically devote significant production and product development resources towards replicating a meat-like taste rather than allowing these products to bring out their own more natural flavor and texture which consumers might find equally pleasing if they did not have a pre-existing conditioning towards meat-like textures and flavors.

C. Environmental Issues and Externalities

When used as a fertilizer at an appropriate level, livestock and poultry manure can provide valuable organic material and nutrients for crop and pasture growth (Ribaud et al, 2003). In fact, in one regional survey of farmers, the benefits of manure use were on average found to be greater than the costs, although views of manure were highly subjective and subject to variation (Hoag et al, 2004). However, those same nutrients can degrade water quality if overapplied and under current prevailing intensive methods, meat production is an important contributor to groundwater pollution (World Watch Institute, 2003).

Current environmental regulations do to some extent limit the environmental harms from meat production. Nevertheless, Ruhl (2000) wrote that “there is simply no rational relationship between the magnitude of the environmental harms farms cause and the response of environmental law”. EPA regulations enacted since then (in 2003) require farms to meet new standards when disposing of manure. The most intensive of these farms, designated as “Concentrated Animal Feeding Operations” (CAFOs), incur significant costs under these new regulations (Ribaud et al, 2003). While these CAFOs make up only 5 percent of feeding operations, they produce over 65 percent of excess nutrients. Many states have enacted air pollution provisions beyond those required by federal law (National Research Council, 2003). Most states have also implemented regulations to control other environmental impact of animal feed operations and CAFOs (Ribaud et al, 2003).

Other environmental damage that has been linked to meat consumption includes deforestation and grassland destruction, fresh water depletion, wastewater disposal, energy consumption/global warming, land use, diseases, and biodiversity loss (World Watch Institute, 2004). Methane emitted from livestock also contributes to greenhouse gases, with 22 percent of human-caused methane emissions coming from livestock (EPA, 2002). Meat-based diets (and red meat diets in particular) cause more greenhouse gas emissions than other diets, and changing one’s diet can have as much effect in changing greenhouse gas emissions as changing one’s vehicle from an SUV to a more fuel-efficient vehicle (Eshel & Martin, 2006).

Due in large part to negative effects on the local environment, factory farms (particularly concentrated hog feeding operations) have been found to significantly reduce the value of neighboring properties. The decrease in nearby property values for housing and land near animal agriculture facilities has been found in several studies and in some cases the decrease in value was as much as 40% (Murbarak et al., 1999; Pamquist et al., 1997; Park et al., 1988). Rates of

physical and mental illness have both been shown to be higher for people living near an intensive livestock operation (Wing & Wolf, 2000). Pretty et. al. (2005) found that in the UK the external cost per kilogram produced was far higher for meat than for other foods, with beef/veal producing externalities costing 30 to 100 times as much as the externalities for cereals, fruit, and vegetables.

All of these externalities suggest that concentrated animal feeding operations have a false appearance of efficiency due to artificially reduced prices brought about by “cost shifting”. The costs of health problems, traffic, social problems, and pollution are transferred onto the local community. In addition to shifting costs out to society as a whole, these agricultural activities also can produce an inaccurate appearance of efficiency by receiving subsidies. Lopez (2001) found that political contributions from agriculture are highly effective at generating subsidies. The analysis found contributions both from commodity groups (such as the beef industry) and from supporting industries (such as feed manufacturers) to have an impact. Lopez concludes that not only do these rent-seeking activities shift consumer surplus to producers, but also they cause a net loss to society from these agricultural activities.

D. Social and Ethical Issues

The process of creating animal products using factory farming methods has negative health consequences at a social level. Approximately eight times as much antibiotics are fed to livestock as are used for humans, with most of these antibiotics being used to promote growth (Union of Concerned Scientists, 1997). This contributes to the evolution of antibiotic-resistant bacteria, making human illnesses harder to fight and increasing the probability of disease epidemics. Animal products can also lead to epidemics by bringing viruses into the human population that are normally hosted by non-human animals. SARS, avian influenza, pig virus, and even AIDS are all thought to have been brought to the human population through meat production or consumption-related contact with animals.

Meat slaughtering and processing also presents labor issues. Workers in this field suffer from a high fatality rate, high rates of repetitive stress disorders from making the same single movement thousands of times a day, and turnover rates as high as 100 percent a year (Eisnitz, 1997 and Schlosser, 2001). The meat and poultry industry has one of the highest death and injury rates of any industry and depends on a high portion of non-citizens to maintain its labor force (GAO, 2005). Workers are also negatively effected by air pollution at facilities and illness associated with direct contact with ill or diseased animals (Walker & Lawrence, 2004).

Modern concentrated animal feeding operations also create fundamental changes in the social structure of rural communities. Often these changes are detrimental (Stull & Broadway, 2003).

In addition to the ethical consequences for humans of meat consumption, there is growing recognition that we need to give at least some ethical consideration to the consequences of our actions to animals. Philosophers such as Singer (1975) and Regan (1983) argue that the exploitation of sentient beings for human benefit is simply wrong regardless of the benefits it might bring.

2. Why Meat Changed

Although it could be argued whether a strictly meat-free diet is optimal, there is little doubt that the high level of meat intake prevalent in most developed nations is not optimal. As Smil (2002) has argued, “moderation of high Western meat intakes has no known downsides as there are no scientifically demonstrable advantages to the prevailing intakes”.

Meat has grown to dominate meal selection despite these heavy costs. This has occurred primarily because of information constraints, general changes in technology/trade, and changes in the production process that intensified externalities. Perhaps the most important change in the structure of meat production has been the advent of “factory farming”. The animal agriculture methodology that most consumers envision is still the idyllic family farm, where animals roam relatively freely in fenced-in areas in the open air, with a barn for shelter when needed, natural grain-based food, and a relatively benign life before slaughter. As recently as 1950, traditional farming methods were generally used in most industrialized countries (Fraser et al., 2001). But in today’s intensive confinement agricultural facilities, economies of scale have grown to dominate. Four companies control 81% of beef production, 59% of pork production and 50% of poultry production in the United States (Stull & Broadway, 2003). Millions of animals frequently live together in a single massive facility. Typically they have barely have enough room to move, they often never see daylight before being shipped to slaughter, and they are treated strictly as units of production rather than living beings. But outside of the treatment of the animals, factory farming methods create large externalities and artificially reduce prices. According to conservative author Matthew Scully who researched and viewed factory farming techniques in person while researching his book Dominion, “Factory farming is a predatory enterprise, absorbing profit and externalizing costs, unnaturally propped up by political influence

and government subsidies much as factory-farmed animals are unnaturally sustained by hormones and antibiotics,” (Scully, 2005).

Another recent change is the availability of alternatives. It was only in the last century that developments in processing of one of the most versatile alternative sources of protein, the soybean, made this vegetable protein source digestible and palatable enough for widescale use (Mintz & Tan, 2001). International trade has also greatly expanded the food options available to the typical consumer, including growth in the availability of non-meat, high protein food sources. Fresh fruit- and vegetable-based products are available year-round. In addition to soy products, other high protein non-animal-based food sources such as seitan (a wheat-based product) or mycoprotein (fungus-based and marketed under the product name “Quorn”) have either been developed or recently marketed on a large-scale to Western consumers. Improvements in technology in the processing of food also allow a larger range of permutations of non-meat foods to be created including converting lower protein density food sources into higher protein density sources.

Changes in information about health consequences have also changed the costs presented by meat. Knowledge regarding heart disease, cancer, diabetes, and other illnesses recently linked in research to meat change the cost/benefit equation for meat consumption. Although these costs may have always existed, costs that were unknown to both scientists and the general public clearly did not previously factor into consumer decisions. There is also a growing knowledge base regarding the environmental consequences of meat consumption. Some of the negative externalities from meat production may have only recently become important due to the growth of factory farming. However, others may have always existed to some extent (such as greenhouse gas production) but only recently have been widely accepted in the scientific community to be problems.

Changes in consumer attitudes and preference functions may have also altered the costs related to meat consumption. As lifespans are extended, late-life health consequences that in one period may have been considered to be of minor importance may now receive greater weight. Sensitivity towards environmental issues has also increased over time (Dunlop, 1991).

When all of these changes are taken into consideration it becomes quite plausible that meat consumption in an earlier period was perceived to have far more benefits than costs. Later, as consumer attitudes, market structure, and information changes, the costs may well outweigh the perceived benefits. However, society’s consumption behavior cannot simply massively switch as the cost-benefit equation changes. As the next section will explore, food choices have a wide

range of positive feedback mechanisms, leading to path dependence and possible lock-in where consumption of the food in question can continue long after its costs outweigh its benefits.

III. THE MULTIPLE LEVELS OF PATH DEPENDENCE

1. “Individual” level positive feedback

A “Rational Addiction” Model of Consumption Lock-In

A generalized rational addiction model is used as a starting point here in describing a “habit”. This is done not because a rational addiction model is thought to accurately represent human behavior, but rather because it demonstrates that even when economic actors are assumed to be perfectly rational and institutional and behavioral aspects of economic decisionmaking are excluded, neoclassical economic assumptions can yield path dependence of consumption.

Becker and Murphy (1988) define an “addiction” in mathematical terms assuming rational, utility-maximizing behavior. According to their formulation, a good has the potential if consumed to be addictive if it exhibits “adjacent complementarity”—that is consumption in the current period raises consumption in the next period. Although the term “addiction” as defined by Becker and Murphy does apply to meat consumption (they specifically mention eating as one of the behaviors subject to addiction), the term “habit” will be used in general here.

Though not necessarily “happy” under Becker and Murphy’s rational addiction model, addicts are supposedly more satisfied than they would have been if they had been prevented from taking the addictive substance. Therefore, for the authors, such addiction is generally consistent with behavior that is optimal. However, it only takes a slight extension of their model, without contradicting any of their assumptions, to lead to behavior that is not optimal socially nor individually.

Even if we assume that adults make perfect, rational decisions, a child introduced to such an addiction at an early enough stage cannot be said to have made a rational decision. To take an extreme example, consider a “crack baby” born addicted to drugs. Surely this baby did not make a rational choice, yet their preferences will be subject to the addiction they were born with. Even a more typical young child is born into numerous consumption choices, with the initial decision made by default for the child by the parents. If these goods exhibit addictive properties (i.e. adjacent complementarity), then by the time the child is able to act as a rational maximizer, they may already be stuck on the consumption track of certain addictive goods. Furthermore, the

decision to consume these goods may not have been optimal if the child had been a perfectly rational and informed independent decisionmaker at birth.

Though parents generally try to act in the best interests of their children, this is not the same as acting as rational optimizers on behalf of their offsprings' interests. First, there are issues of limited knowledge of another individual's preferences. Second, having an interest in a child's welfare is not necessarily the same as having the same level of interest in that child's welfare as that particular child does. And perhaps most importantly, there exist goods that are generally consumed at the household level rather than the individual level. Sometimes this is due to indivisibility of the good where the unit of consumption is not the individual but the family (Cosgel, 1997). At other times it is due to economies of scale in the household production function.

Examples of indivisibility of goods at the household level include the house itself and many of its amenities. Food choices are an example of where economies of scale in the household production function come into play. Theoretically, if every member of a family with multiple children had different food preferences, a completely unique meal could be cooked for every member of the household. However, it is more efficient when preparing a meal at home to prepare the same set of foods for every member of the household. Even for food ordered away from home, the choices available at a particular establishment will be a small subset of all possible choices and quite likely will fall within a certain type of food. Therefore, if certain preferences in food follow the rational addiction model, these traits will tend to be passed down across generations. This will occur even if all adults are rational and it is widely recognized that the foods in question have harmful properties. Once these foods have become preferred tastes by at least some segment of society, the parents in this segment will already have these preferences and therefore often serve the same food to their children, and the children will develop a preference for these foods before they have a chance to make a rational choice for another option, making these preferences potentially self-perpetuating across generations.

In a stable environment, it could be argued that this type of lock-in would not occur because whatever harmful effects a food choice or other product has would prevent it from becoming preferred by much of society in the first place. However, as already shown in the case of meat, both knowledge and the actual impact of a product's consumption can evolve over time. A product that had positive effects on health and society in one set of circumstances can become harmful after the economy and society has evolved into a different set of circumstances.

It should be noted that a rational addiction model is used as the starting point here merely to demonstrate that even under assumptions that are arguably unreasonably restrictive, positive feedback mechanisms could lead to a sub-optimal path in meat consumption. However, at the same time, it is important to acknowledge that this sort of reductionistic neoclassical approach to consumption preferences has some major shortcomings and has been criticized sharply by social economists. Pietrykowski (2004) points out that much information is lost when consumption is portrayed using the neoclassical approach as merely a function of income and relative prices. Yuengert (2001) discusses a number of problems with a rational addiction model. Addicts (or potential addicts) often take actions to shrink their budget set. People often express a desire to rein in consumption of addictive goods but fail to do so or regret the consumption choices they make. A rational addiction model does not allow for the possibility that people do not act in their best interest. Such models also are void of social content in that they do not yield any insight into social influences on preferences and choice (Cosgel, 2005). Simon (1978) has argued in general that economic models which assume economic agents are fully rational, maximizing actors fail to take into account both the cognitive limitations of human beings and the evidence of how people actually make choices in practice. Explanations of consumption choices based on rational behavior and the individual as the sole level of analysis also fail to provide any understanding of the causes and dynamics of preferences (Hodgson, 1994). Rational explanations of all behavior also cannot be empirically tested in that they are non-falsifiable (Hodgson, 2003). As Knox (1960) points out, the traditional economic assumption of “known and ordered wants” runs contrary to the findings and opinions of the great majority of psychologists that human behavior is considerably influenced by non-rational considerations. Some of the motives for desiring certain goods may be subconscious, or different from the declared motives. This psychological view of consumer choice contradicts a rational addiction framework, but it does provide further possible avenues for positive feedback leading to increased meat consumption.

B. Other Models of Habit

Time independence in preference functions is a key assumption in many models of consumption. Hicks (1965) has argued that this assumption is counterintuitive and that there is likely to be strong complementarity between consumption in successive periods. Ryder & Heal (1973) modeled optimal economic consumption assuming intertemporal independence, which can be thought of as habit formation, with the utility of current consumption depending on

consumption in prior periods. They find that adding this assumption can cause the optimal path to differ substantially. Alonso-Carrera et al. (2004) similarly use a function where the utility of current consumption depends on prior consumption and also add to this dependence of utility on the consumption of neighbors. With the presence of this externality in combination with intertemporal dependence, the authors find that the equilibrium can be inefficient. As discussed previously, there is good reason to believe that both intertemporal dependence and multiple externalities exist for meat consumption. It should be noted that intertemporal dependence in both studies mentioned was based on the assumption of global or aggregate habit formation. In recent years this has become a relatively common addition to macroeconomic models. Habit formation of a similar nature on the level of individual goods can mean something quite different than habit formation at the level of consumption for all goods combined.

Pollak (1970) constructed a model of intertemporal dependence at the level of the individual good, referring to this intertemporal dependence as ‘habit formation’. This model differs in design from the model of addiction used by Becker & Murphy (1988). However, in both cases the history of consumption can alter future consumption, leading to path dependence in consumption. Aizenman & Brooks (2005) provide some empirical evidence that taste (in this case for beer or wine) is subject of habit formation and that convergence of preferences can be slowed by the perseverance of these habits.

Veblen (1899) gave a central role to habits of thought in guiding economic behavior. Habits and instincts rather than rational choice tended to guide behavior in Veblen’s perspective. These habits evolve from goal-directed behavior intended to satisfy certain instincts to become ends in themselves. Although in Veblen’s evolutionary perspective habits could change in the long-term, habits and institutions had a persistence to them which allowed them to continue to hold sway long after they cease to serve their original purpose (i.e. as well-functioning means of satisfying certain instincts).

According to Heiner (1983), when facing complex decisions, due to their limited cognitive capacities humans tend to construct rules to restrict the flexibility of choices. Heiner (1985; 1988) later expands this concept to conclude that agents will choose not to use information sources too distant from their local experience. For modern consumers with an almost limitless selection of food choices, this may imply a tendency for choices to tend to stick to past patterns, even when expanded options and new information on the consequences of longstanding options becomes available.

According to Commons (1934), in normal situations, people tend to act in traditional or habitual ways. Humans will only actively make choices or attempt to optimize behavior when they face new or unique problems. Simon (1959) also emphasized that given human cognitive limitation, there is a tendency of people to settle for choices that have been used in the past when they are working well enough (“satisficing”). Optimizing behavior at best only occurs when current patterns of behavior (which could be thought of as the equivalent as “habits” in the framework of Veblen and others) are yielding unacceptable results. Turning to the specific example of meat consumption, people are unlikely to make major changes to long-established dietary patterns (which involves shopping choices, cooking knowledge and selection of entire meals) unless they have a rather dramatic reason to do so (such as advice from a physician following a heart attack or a major shift in ethical perspective).

North (1993b) stated that part of the explanation for path dependence comes from the way that perceptions limit choice sets. These perceptions of agents come from mental constructs that are “partly a result of their cultural heritage, partly the result of the ‘local’ everyday problems they confront and must solve, and partly a result of non-local learning” (pg. 2). In terms of food choices such as meat, consumers may not even perceive the range of choices available to them, even as the choices and information expands. Instead they may tend to stick to previously established patterns.

Psychological mechanisms can also work to prevent negative information from breaking apart an established habit. Cognitive dissonance (Festinger, 1957) causes either beliefs or behaviors to change when the two conflict. In cases where habits run deep and people are reluctant to give them up, it may be easier to change perceptions or beliefs. This can take the form of discounting risks (such as the health risks of eating large quantities of meat), or creating rationalizations to avoid facing contentious issues. Dolfsma (2002) observes that when there is a perceived tension between values and “the institutional furniture that mediates consumption behavior” on the other hand, there will be pressure for change. When this happens, either the institutional setting or the values subscribed to will change. Thus, if negative information about meat’s social, environmental, and ethical consequences build slowly over time, each of these pieces of information may be insufficient to change prevailing institutions and behaviors. Instead, these pieces of information may be dismissed sequentially since they conflict with prevailing institutions and habits.

Teasing apart the various definitions of “habit” and intertemporal dependence that have been used, it seems that there are really two issues of importance: One is the role of past consumption

history in shaping future preferences. This, for example, is what is argued by Becker and Murphy (1988) and Pollak (1970). And these conceptions of a habit or addiction can lead to positive feedback and lock-in in meat consumption. However, these conceptualizations treat habit as simply the maximization of a slightly altered utility function. This perspective can be thought of as treating habit as part of taste or preference formation. An alternative perspective would be to treat habit as something beyond utility maximization where behavior patterns perpetuate themselves even when they do not necessarily maximize utility. Both levels of habit (i.e. both “rational” taste formation and non-rational habit formation) are forces that likely cause positive reinforcement and therefore path dependence in the consumption of meat.

In addition to these mechanisms, knowledge and skill can also act as self-reinforcement mechanisms at the individual level. Prior consumption choices generate experiential knowledge that can lead to repeated behavior. Familiarity with meat products make these choices come to mind more readily in future decisions. In addition, lack of knowledge regarding alternatives can limit their usage. Preparation of food can also be considered a skill, and knowledge and experience making certain dishes reduce the household production cost of preparing these foods, helping to perpetuate the preparation of these dishes.

2. “Social” level positive feedback

At the social level, there can be positive feedback from personal utility being linked to the consumption choices of others. This can be thought of as feedback from the social acceptance of a consumption choice or a “bandwagon effect” (Leibenstein, 1950). This straightforward mechanism has received some attention in economic literature. In another example of a neoclassical economic model that included social factors, Janeba (2004) constructed an economic model of international trade with a demand function that included “cultural identity”. Cultural identity, was modeled to be the dependence of a consumer’s utility function on the consumption choices of others within the same group (or “culture” here). The results suggest that free trade is not always Pareto improving.

There can also be more complex sociological routes to positive feedback. Our consumption choices send messages to others and we adapt our consumption choices in light of others’ perceptions of us (Cosgel, 1994). Consumption can be thought of as a “conversation” with institutionally established meanings (Cosgel, 1997). The consumption of specific foods take on sociological meaning beyond its flavor and nutritional content. This meaning can be linked to

the personal identity of the consumer, which in turn can lead to positive feedback in consumption choices. At the same time, the refusal to consume a specific product, such as meat, also communicates certain messages. Often these messages can be considered a challenge to prevailing societal beliefs and therefore may cause friends and families to react harshly to such consumption choices, creating negative social feedback and again helping to perpetuate existing choices. Barr & Chapman (2002) found that a lack of social support was a common reason for former vegetarians to start eating meat again. Social pressure can be an important factor in reinforcing existing food consumption norms. In a study of people who had become vegan (i.e. made a decision to avoid all animal products including dairy products), research subjects reported great social resistance for their behavior from family members, friends, and acquaintances making choosing and maintaining a diet that differed from the majority of society very difficult (McDonald, 2000). With consumption of food in many cultures often being a social activity, dietary choices that differ from the norm are often noticeable and can cause social pressure to conform.

Economist Geoffrey M. Hodgson has emphasized that habit is more complex than economists have previously treated it. According to Hodgson, habit is more than just serially correlated behavior, inertia, or a positive relationship between past and current consumption. Rather, habit is a propensity to behave in a certain way under certain situations. This propensity can lie unused for long periods of time. Hodgson also emphasized the importance of “downward causation” which is often ignored in economic theory (Hodgson, 2003). That is, institutions and social forces affect individual behavior and habits. Causality goes from the aggregate to the individual level as well as working from the individual to the aggregate level. Thus, social forces drive individual habits. We typically have constraints on our actions and form habits while under these constraints. Even when these constraints are removed, the habits we have formed create a predisposition to behave in the same way (Hodgson, 2004). Thus, someone who is raised in a society with certain dietary norms, may continue to maintain those norms even when food choices expand and new information and conditions suggest a change in diet is warranted.

There is more than just a simple direct “bandwagon effect” link between personal utility and the consumption choices of others. Rather, what we choose to consume and to refrain from consuming has important social meanings. These social meanings go beyond the direct utility we receive from a good; they help to define who we are, both in the eyes of others and to ourselves. Consumption is an important component defining social identity (Friedman, 1990).

Consumption is not only a material reflection of identity, it is also it signals how one perceives oneself and wants to be perceived and it can further shape identity by establishing or precluding access to work opportunities and social circles (Starr, 2004). Media and advertising also have a central role in establishing the perceptions and images from which identity is constructed. Advertising can also inhibit the self-correcting learning processes that would otherwise return consumers to a rational state (Redmond, 2000). Media representations affect perceptions of personal attributes considered to be desirable, such as physique, gender presentation, attention to style, and race or class attributes which in turn play an important role in crafting identity. The social meaning of consumption working through identity can create powerful feedback mechanisms, with the social meaning of a consumption choice becoming more deeply ingrained in society with its repeated use to signify that meaning. There are a number of social feedback mechanisms that can reinforce consumption choices. Socialization and enculturation--via family, community, school, religion, media, and other sources--help to crystallize "preferences" through such mechanisms as discipline, reinforcement, modeling (Starr, 2004).

Hodgson (2003) discusses the ability of learning to change individual capacities and preferences. Tastes can be acquired, such as in the case of a work of art after exposure to it. However, in Hodgson's perspective, this acquisition of taste is a social phenomenon where the reconstitution of taste is driven by the socioeconomic system. Thus, the socioeconomic system is not just the aggregate sum of individuals, but it also reconstitutes and moulds the individual. Causality runs in both directions, unlike neoclassical economic thinking.

The consumption of meat has deep-seated social meanings, perhaps more so than for any other type of food consumption (Willard, 2002). These consumption meanings are connected to being "masculine" or being "successful". Meat is associated with virility, power, masculinity, and the "heart" or "essence" of a matter, while vegetables are associated with less desirable characteristics such as dullness, passivity, monotony, inactivity, and femininity (Adams, 1990). Furthermore, these meanings are also linked to the formal institutional (i.e. organizational) level of feedback, where firms linked to the production of these goods (such as a large chain of restaurants that sells mostly hamburgers) spend billions of dollars to reinforce positive social meanings.

In Veblen's (1899) framework for consumption, consumption is used socially to signify status and wealth. Excessive consumption of positional good to communicate status as described by

Veblen, can have particularly deleterious social and environmental consequences (Paavola, 2001). The consumption of meat at one time was a sign of wealth and this is still true in developing countries. Meat is now readily available and often eaten on a daily basis in wealthier nations. Therefore, the value of meat as a “conspicuous consumption” good in many countries may seem to be diminished. However, the conspicuous consumption value of a good can be transferred from simply having the good to higher quality or quantities. For example, cars at one time were in themselves a sign of wealth. But even where they have become ubiquitous, the possession of certain types of cars or certain numbers of cars in a household can still represent conspicuous consumption. Furthermore, even when a formerly rare good becomes widely available, it could still have an inverse conspicuous consumption effect, where the lack of that good (such as a car) could be taken as a sign of a lack of wealth. Thus while meat consumption may no longer represent wealth in many countries, the lack of meat may still be associated with a lack of wealth. Furthermore, as previously discussed, deeply reinforced associations (arguably a form of “habit”) could take a long time to die.

The act of consumption is not just an instrumental activity but also a way to express socio-cultural values. Dolfma (2004) has identified certain goods as more prone to having symbolic meaning than others. These symbolically important goods, according to Dolfma, include food. The consumption of these goods communicate messages to the relevant audience. Though the socio-cultural values expressed in a society’s institutional settings by these goods can change over time, they are likely to be persistent. According to Dolfma (1999), food consumption habits signal how one wants to be seen, what resources one commands, and what one’s values are. Shipman (2004), also recognizes the increasing non-physical “ingredients” in food, as marketers and advertisers raise their level of expenditures on the symbolic goods embedded in staple foods and other food items. Pietrykowski (2004) points out that food consumption has multiple social implication and communicates ethnicity, regional affiliation, values, aspirations, gender, and care. Fischler (1988) also points out the social meanings signified in food. Fischler additionally observes that the increasing industrialization of agriculture and the increasing distance between the producers and consumers of food has an impact on consumer identity.

Sociologists have also recognized habit as vital to the structure of society. Two of the most influential sociologists, Emile Durkheim and Max Weber, both considered habit to be of great importance. According to Durkheim, customs, merely through regular recurrence, can become binding social norms (Camic, 1986). This certainly could be applied to meat eating, which has a long history as a customary food choice in many societies. Breaking away from this choice

requires defying not only the individual's prior behavior, but also group norms and habits that can be socially binding.

3. "Firm and Market" level positive feedback

Economic and firm-level institutional factors can lead to positive feedback through the influence of large institutional interests, through the power of media and marketing to influence cultural norms, and through scale economies.

Researchers in political science and economics have made a strong case that institutions can be subject to path dependence in part due to the influence of firms and other organizations (e.g. lobbying groups). Arguments for institutional inertia in the political science arena have been made by March and Olsen (1989) and later by Pierson (2000), among others. The argument is based both on the inherent resistance of both norms and formal rules to change, and the growth of practices by both state and societal actors who have a stake in preserving the status quo and therefore resist change (Banchoff, 2002).

Economist Douglass North (1990, 1991) also argues that institutions exhibit a large degree of path-dependence. According to North, institutions can be self-reinforcing due to network externalities, economies of scope, and complementarities within the institutional matrix. Or, "in everyday language, the individual organizations with bargaining power as a result of the institutional framework have a crucial stake in perpetuating the system" (North, 1993a pg. 3).

Firms in multiple stages of meat production have a powerful influence on our political process and in turn receive monetary and regulatory benefits. Subsidies to ranchers using public land amount to half a billion dollars a year (Oppenheimer, 1996). However, this is only a small portion of ranching and animal agriculture, with the total subsidy for all of animal agriculture being much higher. Economic subsidies to animal agriculture include taxpayer funded predator control, weed control, disease control, irrigation and drought relief, provision of basic services to thinly populated ranching/farming communities, providing public land at below market prices, fencing along highways to protect rancher livestock, active promotion of products by government agencies, and direct monetary subsidies (Wuerthner & Matteson, 2002). According to Durning and Brough (1991), livestock products receive two-thirds of OECD countries' total agricultural subsidies. In addition, crops that are most often used to feed livestock, including feed grains and soybeans receive much of the remaining subsidies, indirectly subsidizing livestock production further. Subsidies for feed growers are particularly common in the United States.

The subsidies for the meat industry do not end there. There are also subsidies by omission, where political influence allows negative externalities caused by the meat production process to continue with at most, minor intervention. Despite considerable evidence of industry pollution and other negative externalities, powerful vested institutional interests have arguably kept these costs from being internalized to the extent that they have been in other industries (Ruhl, 2000). Some of the efforts by the federal government to study antibiotic-resistant bacteria released by factory farming and to make industry firms responsible for wastewater discharges have been shelved in response to efforts from the agribusiness lobby (Kennedy & Schaeffer, 2003).

The Government Accountability Project, a government watchdog group contends that the USDA suffers from agency capture and does the bidding of meat producers rather than serving the interests of the American public (Hegeman, 2004). As an example they cite the case of a cattle producer who wanted to voluntarily test all of his cattle for mad cow disease. Under pressure from major meatpackers, the producer was actually prevented from testing his meat for disease by the United States Department of Agriculture. Clearly, exerting pressure to actually prevent the generation of information that is considered valuable by parties in a market transaction is typically not the type of action considered socially optimal by economists. And it is an odd role for government to take unless it is serving certain limited special interests.

Powerful organizational interests not only have political influence, but the power to help shape the public's perceptions. It has been argued in sociology that organizations have great power through their discourse to establish what is accepted as truth and reality in a society (Foucault, 1978) and that high levels of meat consumption in particular have been maintained by the discursive practices of the industry (Glenn, 2004). For example, in the 1980's when negative information regarding the health impact of beef began to surface, the National Cattlemen's Association conducted a \$30 million marketing campaign to counteract these negative associations (Willard, 2002).

Knight (1924) acknowledged that the desire to consume goods does not necessarily come from an inherent desire for these goods but rather is largely manufactured by the competitive system itself. Part of the power of organizational interests to shape preferences and even perceptions comes directly from marketing and advertising efforts. Starr (2004) notes that economists have given surprisingly little attention to the role that the mass media can have in shaping preferences, with a common reason given for this lack of consideration being that with the high volume of advertising to which people are exposed and its widely-recognized manipulative intent, the effects of individual product messages on consumer preferences seem

likely to be weak. However, even if it is true (though it quite possibly is not) that individual product messages only have a weak effect on consumer preferences in general, this may not be true for a larger category of commodity products (such as meat), where the messages do not compete so directly with each other nor signal manipulative intent as strongly by emphasizing specific brands. One result of this is demand that is propped up in part by intensive product promotion. Advertising has been shown to effect the food preferences and habits of children (Institute of Medicine, 2006). Dalmeny et al. (2003) estimates that for every dollar spent by the World Health Organization to prevent diseases caused by Western diets, over \$500 is spent by industry to promote these unhealthy diets. The long-term presence of animal agriculture on an extremely large scale has resulted in organizational interests from ranchers to slaughterhouses, to retailers, and restaurant chains with a strong vested interest in maintaining the status quo.

But organizational influences which shape perceptions of reality go well beyond explicit marketing campaigns. When a category of consumption goods has played such a prominent role in society for such an extended period of time, the messages that tacitly promote those goods are ubiquitous. From movies showing “normal” households eating (and therefore helping to define) a “normal” dinner, to news reports that define what is acceptable as much by what they fail to condemn or take note of as by what they do highlight as controversial, the media influences are pervasive and powerful. With the exception of when an explicit and conscious effort is made by these institutions to not condone a certain type of consumption (as in the case of smoking cigarettes), the media tends to reinforce prevailing consumption choices.

The power of scale economies to positively reinforce the popularity of a certain brand or category of good is well known to economists. However, it is worth noting that in the case of meat (and probably many other consumer goods) the influence of scale economies goes well beyond reducing costs. Significant scale economies can exist in the ability to advertise a good and generate demand. In addition, information about the availability, preparation, nutritional content, and utility of consumption (taste) of alternatives to meat are severely limited by their relative lack of economies of scale. Scale economies also exist in distribution. Meat products are displayed prominently and can be obtained easily at any grocery store. However, access for the average consumer to many alternatives is limited and the placement of these alternatives when present at a grocery store is suboptimal. Therefore, consumers may not know where these products are even if they exist in the store they patronize or may not receive the cues or reminders that marketing data has shown to influence consumer product choices. As Knox (1960) points out, “it is clear that consumers' preferences can only be satisfied within the

limits of what producers decide to offer”. Thus, to the extent that producer and retailers do not give consumers easy access to alternatives, prevailing consumer choices are self-perpetuating. Dobb (1940) noted that most of the preferences in the market may well be second best preferences compared to the choices that would have been made if alternatives that currently do not exist in the market had been made available. This may well be the case for meat consumption, although it is additionally argued here that food preferences are subject to habit, reinforcement of tastes, and other feedback mechanisms that make it difficult for alternatives to take hold in the minds of consumers, even if they were given access to these alternatives.

IV CONCLUSION

There are costs to meat consumption at both the individual and societal level. In addition, the perceived benefit to consumers from meat consumption stems in large part from positive feedback due to personal habit, cultural patterns, and endogenous tastes. Given a different historical path, along with the current state of knowledge regarding the negative effects of meat consumption and the ample alternatives, there seems little reason to believe that meat consumption would dominate our dietary patterns to the extent it does today.

Although it could be debated whether a strictly non-meat diet is necessarily optimal, it would be difficult to dispute that current levels of meat consumption in most Western nations in excessive. The current heavy level of meat consumption perpetuates itself through positive reinforcement mechanisms at the individual, social, and economic/organizational levels. At an individual level, tastes in food can be self-reinforcing and influenced by diets provided during childhood. Habits, knowledge and skills can also perpetuate food choices beyond their effects on taste. At a social level, interpersonal utility dependence can cause positive feedback. In addition, food choices can develop important social meanings which influence identity and future societal-level food choices. At an organizational and economic level, economies of scale, the influence of powerful organizational interests, and the role of the media in shaping society also act to perpetuate meat consumption.

It is argued here that given current knowledge of the consequences of meat consumption, current environmental conditions, and current availability of alternatives, the costs of this product would outweigh its benefit in most cases but for the influence of the self-reinforcing mechanisms described above. In this sense, meat consumption is “path dependent” or even perhaps “locked-in”. However, the analysis is intended to go beyond just meat and is

generalizable to consumption choices in general. It is likely that there are quite a few other consumption choices that are “locked in” and perpetuate themselves even if they are not currently optimal. This lock-in depends not on technology as much as on social, psychological, organizational, and economic factors that have not previously received much consideration in terms of their role in creating path dependence.

One obvious question this begs is: if meat consumption is, in fact, suboptimal yet locked in, is there a case for policy intervention? Certainly a case could be made for policy intervention that would lead to “de-locking”. However, such a policy argument would be purely a theoretical exercise. If the arguments presented here about organizational influence are at least partially accurate, then there is very little likelihood that an overt policy to reduce meat consumption would ever occur. Or perhaps at the very least it would not occur until general public opinion has already been dramatically altered. In other words, policy change would likely not occur until consumption choices have already in large part de-locked.

V. REFERENCES

- Adams, C. (1990) *The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory*, Continuum Publishing, New York.
- Aizenman, J. & Brooks, E. L. (2005) "Globalization and Taste Convergence: The Case of Wine and Beer", National Bureau of Economic Research, Working Paper 11228, March.
- Alonso-Carrera, J., Caballe, J., & Raurich, X. (2004) "Consumption Externalities, Habit Formation and Equilibrium Efficiency", *Scandinavian Journal of Economics*, 106(2): 231-251.
- American Dietetic Association (2005) "ADA Position Statement on Vegetarian Diets", http://www.eatright.org/Public/GovernmentAffairs/92_17084.cfm.
- American Meat Institute (2005) "Meat and Poultry Facts", pg. 49.
- Anger, S. R. & Brown, J. L. (1990) "Cholesterol and fat content of wild game," *The Nutrition Letter*, 8: 11-12.
- Appleby, P. N., Thorogood, M., Mann, J. I., & Key, T. J. (1999) "The Oxford Vegetarian Study: an overview", *American Journal of Clinical Nutrition*, 70(3): 525S-531S
- Becker, Gary S. & Murphy, Kevin, M. (1988) "A Theory of Rational Addiction", *The Journal of Political Economy*, 96(4Suppl.): 675-700.
- Arthur, B.W. (1989) "Competing technologies, increasing returns, and lock-in by historical events", *The Economic Journal* 99, 116-131.
- Banchoff, T. (2002) "Institutions, Inertia and European Union Research Policy". *Journal of Common Market Studies* 40(1): 1-21.
- Barnard, N. D., Nicholson, A., & Howard, J. L. (1995) "The Medical Costs Attributable to Meat Consumption", *Preventive Medicine*, 24(6): 646-655.
- Barr, S. I. & Chapman, G. E. (2002) "Perceptions and practices of self-defined current vegetarian, former vegetarian, and nonvegetarian women", *Journal of the American Dietetic Association*, 102(3): 354-360.
- Camic, C. (1986) "The Matter of Habit", *The American Journal of Sociology*, 91(5): 1039-1087.
- Carlson-Kanyama, A. & Faisht, M. (2000) "Energy use in the food sector: A data survey", AFN, Naturvardsverket, Stockholm, <http://www.infra.kth.se/fms/pdf/energyuse.pdf>.
- Commons, J. R. (1934, reprinted 1990). *Institutional Economics*, Transaction Publishers, New Brunswick.
- Cosgel, M. (2005) "The Socioeconomics of Consumption: Solutions to the Problems of Interest, Knowledge, and Identity," University of Connecticut Department of Economics Working Paper Series, Working Paper 2005-46.

- Cosgel, M. M. (1997) "Consumption institutions," *Review of Social Economy*, 55(2): 153-171.
- Cosgel, M. M. (1994) "Audience Effects in Consumption, Economics and Philosophy", 10: 19-30.
- Cronin, F. J., Krebs-Smoth, S. M., Wyse, B. W., & Light, L. (1982) "Characterizing food usage by demographic variables", *Journal of the American Dietetic Association*, 81: 661-72.
- Dalmeny, K. Hanna, E. & Lobstein, T. (2003) "Broadcasting Bad Health, International Organization of Consumer Food Organizations", <http://www.foodcomm.org.uk>.
- David, P.A. (1985) "Clio and the economics of QWERTY", *American Economic Review* 75, 332-337.
- Dawber, T. R. (1980) *The Framingham Study*, Harvard University Press, Cambridge, MA.
- Dobb, M. (1940) *Political Economy and Capitalism*, London: Routledge.
- Dolfsma, W. (1999) "The Consumption of Music and the Expression of Values: A Social Economic Explanation for the Advent of Pop Music?" *American Journal of Economics and Sociology* 58(4): 1019-1046.
- Dolfsma, W. (2000) "Mediated Preferences—How Institutions Affect Consumption," *Journal of Economic Issues*, 36(2): 449-457.
- Dolfsma, W. (2004) "Paradoxes of modernist consumption--reading fashions", *Review of Social Economics*, 62(3): 351-364.
- Drewnowski, A., Henderson, S. A., & Barratt-Fornell, A. (2001) "Genetic taste markers and food preferences", *Drug Metabolism and Disposition*, 29(4): 535-538.
- Duchin, F. (2004) "Sustainable Consumption of Food, Rensselaer Working Papers in Economics", Number 0405, <http://www.rpi.edu/dept/economics/www/workingpapers/>.
- Duff, V. B. (2004) "Association between oral sensation, dietary behaviors and risk of cardiovascular disease", *Appetite*, 43(1): 5-9.
- Dunlap, R. (1991) "Trends in public opinion toward environmental issues: 1965-1990", *Society and Natural Resources*, 4.
- Durning, A. & Brough, H. (1991) "Taking Stock: Animal Farming and the Environment", *Worldwatch Paper Number 103*, July, Washington ,DC.
- Dutilh, C. E. & Kramer, K. J. (2000) "Energy Consumption in the Food Chain: Comparing alternative options in food production and consumption", *Ambio*, 29(2): 98-101.
- Eisnitz, G. (1997) *Slaughterhouse: the Shocking Story of Greed, Neglect, and Inhumane Treatment Inside the U.S. Industry*, Prometheus Books, New York.

EPA (2002) Ruminant Livestock and the Global Environment, May 31.

Eshel, G. & Martin, P. A. (2006) "Diet, Energy, and Global Warming", *Earth Interactions* 10(9).

Falk, P. (1991) "Homo culinarius: Towards an Historical Anthropology of Taste", *Social Science Information*, 30(4): 757-790.

Festinger L (1957) A theory of cognitive dissonance. Stanford University Press, Palo Alto, California.

Fischler, C. (1988) "Food, Self and Identity," *Social Science Information* 27(2): 275-292.

Foucault, M. (1978). *The history of sexuality: Volume 1: An Introduction*, New York, Pantheon.

Fraser, D., Mench, J., & Millman, S. (2001) *Farm Animals and Their Welfare in 2000*, in *The State of the Animals in 2001*, Chapter 6, p. 87-99, Humane Society of the United States, Washington DC.

Fraser, G. E. (1999) "Associations between diet and cancer, ischemic heart disease, and all-cause mortality in non-Hispanic white California Seventh-day Adventists", *American Journal of Clinical Nutrition*, 70(3Suppl.): 532S-538S.

Friedman, J. (1990). "Being in the World", *Theory, Culture and Society* 7: 311-328.

GAO, (2005) "Safety in the Meat and Poultry Industry, while Improving, Could be Further Strengthened", United States Government Accounting Office, GAO-05-96, January.

Glenn, C. B. (2004) "Constructing consumables and consent: A critical analysis of factory farm industry discourse", *Journal of Communication Inquiry*, 28, 1.

Hegeman, R. (2004) "Mad cow case focused public attention on food safety", Associated Press, December 21.

Heiner, R.A. (1983) "The origins of predictable behavior", *American Economic Review* 83, 560-595.

Heiner, R.A. (1985) "Origin of predictable behavior: further modeling and application", *American Economic Review* 75, 391-396.

Heiner, R.A. (1988) "Imperfect decisions in organization: toward a theory of internal structure", *Journal of Economic Behavior and Organization* 9, 22-44.

Hicks, J. (1965) *Capital and Growth*, New York, Oxford University Press.

Hirsch, F. (1976) *Social Limits to Growth*, Cambridge, MA: Harvard University Press.

Hoag, D. L., Lacy, M. G., & Davis, J. (2004) "Pressures and Preferences Affecting Willingness to Apply Beef Manure on Crops in the Colorado High Plains", *Journal of Agricultural and Resource Economics*, 29(3): 461-480.

Hodgson, G. (1994) "The Return of Institutional Economics", in N. Smelser and R. Swedberg (eds) *The Handbook of Economic Sociology*, Princeton N.J.: Princeton University Press.

Hodgson, G. M. (2003) "The hidden persuaders: institutions and individuals in economic theory", *Cambridge Journal of Economics*, 27: 159-175.

Hodgson, G. M. (2004) "Reclaiming habit for institutional economics", *Journal of Economic Psychology*, 25(5): 651-660.

Hu, F. B. & Willitt, W. C. (1998) "The Relationship Between Consumption of Animal Products and the Risk of Chronic Diseases: A Critical Review", Harvard University Medical School, Cambridge, MA.

Institute of Medicine (2006) "Food Marketing to Children and Youth: Threat or Opportunity?" National Academies Press, Washington D.C.

Janeba, E. (2004) "International Trade and Cultural Identity", National Bureau of Economic Research, Working Paper 10426, April.

Johansson, I. et al, (1996) "The Norwegian diet during the last hundred years in relation to coronary heart disease", *European Journal of Clinical Nutrition*, 50: 277-283.

Kant, A.K., Schatzkin, A., Block, G., Ziegler, R. G., & Nestle, M. (1991) "Food group intake patterns and associated nutrient profiles of the US population", *Journal of the American Dietetic Association*, 91: 1532-7.

Kennedy, R. F. & Schaeffer, E. (2003) "An Ill Wind from Factory Farms", *New York Times*, September 20.

Keys, A., (1980) "Seven Countries: A Multivariate Analysis of Death and Coronary Heart Disease", Harvard University Medical School, Cambridge, MA.

Knight, F. H. (1924) "Some Fallacies in the Interpretation of Social Cost," *Quarterly Journal of Economics*, 38: 582-606.

Knox, F. (1960, reprinted 2005) "The doctrine of consumers' sovereignty," *Review of Social Economy*, 63(3): 383-395.

Leibenstein, H. (1950) "Bandwagon, Snob, and Veblen Effects in the Theory of Consumer Demand", *The Quarterly Journal of Economics*, May, 183-207.

Lopez, R. A. (2001) "Campaign Contributions and Agricultural Subsidies", *Economics and Politics*, 13(3): 257-279.

Lutz, S. M., Blaylock, J. R., & Smallwood, D. M. (1993) "Household characteristic affect food choices", *Food Review*, 16: 12-18.

Lynne, H. P., Varley, K. R., & Galef Jr., B. G. (2004) "Effects of ethanol consumption by adult female rats on subsequent consumption by adolescents", *Appetite*, 42(3): 299-306.

March, J. & Olsen, J. (1989) *Rediscovering Institutions: The Organizational Basis of Politics* (New York: Free Press).

McDonald, B. (2000) "Once You Know Something, You Can't Not Know It: An Empirical Look at Becoming Vegan", *Society and Animals*, 8(1).

Mennella, J. A., Peppino, Y., & Reed, D. R. (2005) "Genetic and Environmental Determinants of Bitter Perception and Sweet Preferences", *Pediatrics*, 115(2): 216-222.

Milius, S. (2005) "Untangling the influences of hunger, wealth, and international commerce", http://www.terra.com.br/istoe/1795/ciencia/1795_eles_existem_logo_eles_pensam.htm.

Mintz, S. W. & Tan, C. B. (2001) "Bean-curd consumption in Hong Kong", *Ethnology* 40(2): 113.

Murbarak, H., Johnson, T. G. & Miller, K. K. (1999) "The Impacts of Animal Feeding Operations on Rural Land Values", Report R-99-02, College of Agriculture, Food and Natural Resources, University of Missouri, Columbia, May.

Nayga, R. M., Tepper, B. J., & Rosenzweig, L. (1999) "Assessing the importance of health and nutrition related factors on food demand: a variable preference investigation", *Applied Economics*, 31: 1541-1549.

Nesci, F. S., Nicolosi, A., & Privitera, D. (2004) "Regional Marketing of Dried Fig-Based Products: An Exploratory Consumer Study", *Mediterranean Journal of Economics, Agriculture and Environment*, 3(1): 55-60.

North, D.C. (1991) "Institutions", *Journal of Economic Perspectives* 5(1), 97-112.

North, D.C. (1990) *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press.

North, D.C. (1993) "The new institutional economics and development", Washington University Working Papers Series, #9309002.

North, D. C. (1993) "Five propositions about institutional change", Washington University Working Papers Series, #9309001.

Oppenheimer, T. (1996) "The Rancher Subsidy", *The Atlantic Monthly*, January p. 26-38.

Paavola, J. (2001) "Towards Sustainable Consumption: Economics and Ethical Concerns for the Environment in Consumer Choices," *Review of Social Economy*, 59(2).

Palmquick, R. B., Roka, F. M. & Vukina, T. (1997) "Hog operations, environmental effects and residential property values", *Land Economics*, 73: 114-124.

- Park, D., Lee, K. & Seidl, A. (1988) "Rural Communities and Animal Feeding Operations", Department of Agricultural and Resource Economics, Colorado State University, Fort Collins.
- Park, J. L., Holcomb, R. B., Raper, K. C., Capps, O. (1996) "A Demand Systems Analysis of Food Commodities by U.S. Households Segmented by Income", *American Journal of Agricultural Economics*, 78: 290-300.
- Patterson, B. H., Harlan, L. C., Block, G. & Kahle, L. (1995) "Food choices of whites, blacks, and Hispanics: data from the 1987 National Health Interview Survey", *Nutrition and Cancer* 23: 105-19.
- Pierson, P. (2000) "Increasing Returns, Path Dependence, and the Study of Politics", *American Political Science Review* 94(2), 251-267.
- Pietrykowski, B. (2004) "You are what you eat: the social economy of the slow food Movement", *Review of Social Economy*, 62(3): 307-321.
- Pollak, R. A. (1970) "Habit Formation and Dynamic Demand Functions", *The Journal of Political Economy*, 78(4): 756-763.
- Pretty, J. N., Ball, A. S., Lang, T., & Morison, J. I. L. (2005) "Farm costs and food miles: An assessment of the full cost of the UK weekly food basket", *Food Policy*, 30: 1-19.
- Raul, J. B. (2000) "Farms, Their Environmental Harms, and Environmental Law," *Ecology Law Quarterly*, 27.
- Redmond, W. H. (2000) "Consumer Rationality and Consumer Sovereignty", *Review of Social Economy*, 58(2).
- Regan, T. (1983) *The Case for Animal Rights*, University of California Press, Berkeley.
- Ribaudo, M., Gollehon, N., Aillery, M., Kaplan, J., Johansson, R., Agapoff, J., Christensen, L., Breneman, V., & Peters, M. (2003) "Manure Management for Water Quality: Costs to Animal Feeding Operations of Applying Manure Nutrients to Land," United States Department of Agriculture, Economic Research Service, Agricultural Economic Report Number 824.
- Rice, P. (2005) *101 Reason Why I'm a Vegetarian*, Lantern, New York.
- Ryder, H. E. & Heal, G. M. (1973) "Optimal Growth for Intertemporally Dependent Preferences", *Review of Economic Studies*, 40(1).
- Schlosser, E. (2001) *Fast Food Nation*, Houghton Mifflin Co, New York.
- Scully, M. (2005) "Fear Factories: The case for compassionate conservatism—for animals", *The American Conservative*, May 23, 7-14.
- Shipman, A. (2004) "Lauding the leisure class: symbolic content and conspicuous consumption", *Review of Social Economics*, 62(3): 277-289.

- Simon H.A. (1959) "Theories of decision-making in economics and behavioral science," *American Economic Review* 99: 253-283.
- Simon, H. A. (1978) "Rationality as a Process and Product of Thought," *American Economic Review* 68(2): 1-16.
- Singer, P. (1975) *Animal Liberation*, The New York Review, New York.
- Smil, V. (2002) "Eating meat: evolution, patterns, and consequences", *Population and Development Review*, 28(4): 599-645.
- Smallwood, D. M., Bloylock, J. R., Lutz, S. & Blisard, N. (1995) "Americans spending a smaller share of income on food", *Food Review*, 18: 16-19.
- Speedy, A. W. (2003) "Global Production and Consumption of Animal Source Foods", *Journal of Nutrition (Supplement)*, *Proceeds of the conference Animal Source Foods and Nutrition in Developing Countries*, 4048S-4053S.
- Starr, M. A. (2004) "Consumption, identity, and the sociocultural constitution of 'preferences': reading women's magazines", *Review of Social Economy*, 62(3): 291-305.
- Stull, D. D. & Broadway, M. J. (2003) *Slaughterhouse Blues: The Meat and Poultry Industry in North America*, Thomson/Wadsworth, Belmont, CA.
- Union of Concerned Scientists (2003) *Food and Environment: Antibiotic Resistance*, June 16.
- Veblen, T. (1899, reprinted 1994) *The Theory of the Leisure Class*, New York: Penguin Books.
- Walker, P. & Lawrence, R. S. (2004) "American Meat: A Threat to Your Health and to the Environment", *Yale Journal of Health Policy, Law, and Ethics*, 4(1): 173-182.
- Willard, B. E. (2002) "The American Story of Meat: Discursive Influences on Cultural Eating Practice", *Journal of Popular Culture*, 36(1): 105-118.
- Wing, S. & Wolf, S. (2000) "Intensive Livestock Operations: Health and Quality of Life Among Eastern North Carolina Residents", *Environmental Health Perspectives* 108.
- World Watch Institute (2003) "Factory farms spread", *Ecologist*, 33(6): 9.
- World Watch Institute (2004) "Now, It's Not Personal!" *World Watch Magazine*, July/August 2004.
- Wuerthner, G. & Matteson, M. (2002) *Welfare Ranching: The Subsidized Destruction of the American West*, Foundation for Deep Ecology, Sausalito, CA.
- Yuengert, A. M. (2001) *Rational Choice with Passion: Virtue in a Model of Rational Addiction*.

