

From Bowling Alone to Dining Together: a Sustainability Analysis of Cohousing in
the United States

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For the Children

The rising hills, the slopes,
of statistics
lie before us.
the steep climb
of everything, going up,
up, as we all
go down.

In the next century
or the one beyond that,
they say,
are valleys, pastures,
we can meet there in peace
if we make it.

To climb these coming crests
one word to you, to
you and your children:

stay together
learn the flowers
go light

— Gary Snyder, from *Turtle Island* 1974

Abstract

As sustainability dialogue is leaving theoretical stages and moving into implementation, international discourse remains primarily focused on manufacturing and technological improvement in industrialized countries and the provision of basic needs in developing societies. This approach typically has largely led to structural, top-down initiatives while leaving individual actions and preferences out of the models. Recent discussions, beginning at the UN Conference on Environment and Development, held in Rio de Janeiro in 1992, have begun to acknowledge both the injurious nature of private over-consumption in industrialized countries and the role of the individual as a driving force.

The true impact of personal consumption is being realized with improved life-cycle methodology. When evaluated as a user of both direct energy and indirect energy invested in the production, transportation, and disposal of goods and services, up to 70% of national energy use can be traced to households. By acting as decision-makers, individuals motivate a substantial portion of industrial activities.

As traditional economic theories of utility-maximizing individuals are proving to be incomplete explanations for consumptive behavior, the role of culture and community is increasingly being investigated. A greater understanding of societal drivers is providing a more comprehensive picture of the consumer as a part of a household and greater community with individualized motivations for consumption.

Households have the ability to drive sustainable development by engaging in a variety of consumption-changing initiatives that reduce material and energy flow through households. Motivations vary from economic down-shifting to environmental concerns and social change. To truly result in improved sustainability, such initiatives must facilitate changed consumption in an environmentally, economically, and socially reliable manner. To offer measurable benefits, schemes must also be culturally appealing beyond discrete, niche movements.

This thesis evaluated the ability of cohousing developments in the United States to offer consumers the opportunity and encouragement to reduce household metabolism without sacrificing material comfort expected by the typical American consumer. A sustainability analysis appraised the potential improvements offered by cohousing over conventional urban/suburban neighborhood design. The analysis began with comparative surveys of conventional neighborhoods and cohousing developments. Survey responses were used to develop deep interview questions for continued investigation of cohousing's potential contributions to sustainable neighborhood design.

Survey findings indicated that comparable households in cohousing developments were satisfied with smaller homes and fewer consumer durables than their conventional counterparts. They were significantly more likely to carpool, participate in community organizations, and share products with neighbors. However, the cultural composition of cohousing developments was distinct from the worldviews represented by conventional respondents. Interviews also indicated concerns related to limited representation of varied worldviews in cohousing developments and barriers to acceptance by external stakeholders. While certainly offering improved environmental, economic, and social sustainability, the expansion of cohousing as a neighborhood design is constrained by limited cultural appeal and institutional acceptance.

1	<u>INTRODUCTION</u>	5
1.1	OBJECTIVES	5
1.2	STAKEHOLDERS	6
1.3	SYSTEM BOUNDARIES	6
1.4	LIMITATIONS	7
2	<u>THEORY AND REALITY OF HOUSEHOLD CONSUMPTION</u>	8
2.1	WHY WE BUY	8
2.2	EDITING CONSUMPTION	10
2.2.1	MONEY MATTERS	10
2.2.2	GREEN CONSUMPTION	11
2.2.3	SOCIAL SOLUTIONS	12
3	<u>SUSTAINABILITY ANALYSIS OF COHOUSING</u>	13
3.1	METHODS AND MATERIAL	17
3.1.1	SAMPLE SELECTION	17
3.1.2	STUDY DESIGN	17
3.2	INDICATORS	18
3.2.1	SOCIAL	18
3.2.2	ENVIRONMENTAL	19
3.2.3	ECONOMIC	22
3.2.4	INSTITUTIONAL	23
4	<u>RESULTS AND ANALYSIS</u>	25
4.1	SURVEY	25
4.1.1	SOCIAL	25
4.1.2	ENVIRONMENTAL	27
4.1.3	ECONOMIC	29
4.2	INTERVIEW	30
5	<u>DISCUSSION</u>	32
6	<u>CONCLUSION</u>	34
7	<u>WORKS CITED</u>	35

Appendix I: Survey

Appendix II: Frequency Tables of Survey Responses

1 Introduction

Theories of sustainability have traditionally incorporated aspects of equity and justice, both to co-existing humanity and future generations. As these relatively nascent theories have begun to influence research and dialogue, both impediments and opportunities for realization have become apparent. One area of increasing dialogue is the role of household consumption in industrialized countries and its connection to sustainable development. The UN Conference on Environment and Development held in Rio de Janeiro in 1992 formally acknowledged the environmental degradation resulting from the production and use of consumer goods and the consequently excessive waste output. The resulting Agenda 21 declaration addressed the need to moderate material and energy flows through high consumption households. Emphasis was placed on the goal of cultivating technological efficiency and improved waste management, particularly in industrialized countries (United Nations, 1993).

The subsequent emphasis on ‘cleaner economies’ in international dialogue has continued to promote a technological and market based approach to sustainable consumption (Seyfang, 2004). Receptive governments have engaged in promotion of cleaner production through regulations, profit incentives, and credit trading systems. This technological focus has proven compatible with co-existing goals of economic growth in industrialized countries by promoting industrial efficiency as a means of sustainable development (Fuchs and Lorek, 2004). However, this approach does not substantially address the role of the consumer in fueling excessive material flow. It also ignores the implications of continued harvest of finite resources and arising issues of socio-economic inequality and depletion of natural capital (Halme et al., 2004).

While international debate continues to develop policy drivers for implementation at the state level, communities have harnessed the innovative drive of individuals and collectives to motivate change. Acknowledging the individual’s role as a decision maker has led to many successful bottom-up approaches. In the city of Odense, Denmark, the government was dissatisfied with the meager community response to substantial improvements in urban bicycle riding infrastructure. Planners acknowledged that individuals would make the daily ‘bike or car’ decision based on a variety of personal and cultural factors. Significant increase in bicycle commuting was only achieved after a public relations campaign promoted personal awareness and a bicycle-friendly cultural shift (Edgar Hertwich and Katzmayer, 2003)Hertwich and Katzmayer, 2003}

1.1 Objectives

This thesis will examine the household as another area for individual consumer engagement. Improved life-cycle methodology in the past decade has provided a more comprehensive valuation of ‘household metabolism’, the direct material and energy demands and the indirect resource consumption motivated by household consumption. When evaluated as a user of both direct energy and indirect energy invested in the production, transportation, and disposal of goods and services, up to 70% of national energy use can be traced to households (Moll et al., 2005). A survey of recognized environmental problems in Europe correlated the majority of impacts with consumption of energy, material, and land (Lorek and Spangenberg, 2001). The resulting inability of reduced natural capital to meet the needs of burgeoning populations also impedes sustainable social and economic development (Pimentel et al., 1999).

With household consumption so clearly linked with environmental degradation, and by extension, issues of economic and social welfare, the challenge arises for an operational framework to correct negative impacts or even allow for positive influence of households on sustainable development. One such innovation is the continued growth and adaptation of cohousing developments in industrialized countries. Cohousing developments are defined by their intentional neighborhood layout intended to facilitate community socialization, active resident participation in community governance, investment in communal space and shared goods (McCamant et al., 1988) While cohousing developments exist in Europe (and initially achieved their basic form in Denmark), this paper will focus on communities in the United States due to their existence as autonomous, pioneering movements within a highly contrasting housing market.

Top-down development models and classical economic theory leave little room for individual preference and consumption habits. Therefore, this paper will begin with a review of contemporary research and theories of consumption incorporating personal, cultural, and community influences on consumption. These bottom-up theories elevate the household consumer from a mere end-user to an influential component of sustainable consumption. I will also review several developing pathways to sustainable consumption by households. In exploring contemporary proposals for sustainable households, I will evaluate the potential of cohousing developments to promote positive change. After categorizing indicators for household consumption, I will compare households in cohousing developments and conventional urban/suburban households using surveys and deep interviews.

1.2 Stakeholders

This paper seeks to assess the role of consumers as decision makers responsible for initiating the flow of energy and material in response to their demand for goods and services. Therefore, primary stakeholders are identified as households, both in their role as individual consumers and members of a defined community.

1.3 System Boundaries (Fig. 1)

Households can be defined as contained living spaces willingly occupied by a member or members responsible for activities, including consumption, occurring within the space. Some sort of ownership is generally implied, either through direct possession of property or a formal leasing or renting mechanism.

Consumption is the process through which natural resources are appropriated from the biosphere for human use (Ropke, 1999). Household consumption refers to the energy and material requirements used in building and maintaining a home, the acquisition of goods, food, and services for private use by household members, and personal transport to and from the household (Halme et al., 2004) . Households are directly responsible for consumption of material and energy use in heating, maintaining, and powering their homes and cars, while they are indirectly responsible for the energy and material requirements of the manufacture, transport, and disposal of goods (Moll et al., 2005). A true picture of household consumption can only be achieved by looking at life cycle demands of household goods. The harvesting of components consumes a substantial amount of material never seen by the purchaser, with 90% of the material

waste generated by production never making it into actual products (de Graaf et al., 2005).

Community boundaries are very recognizable within cohousing developments, as neighborhoods are intentionally planned. System boundaries of traditional urban developments are more dynamic and susceptible to multiple definitions. Boundaries can be politically determined based on neighborhood representation in city councils or by containment in a particular school district. For the purpose of this study, a conventional neighborhood will be defined as to allow for comparison with a cohousing development.

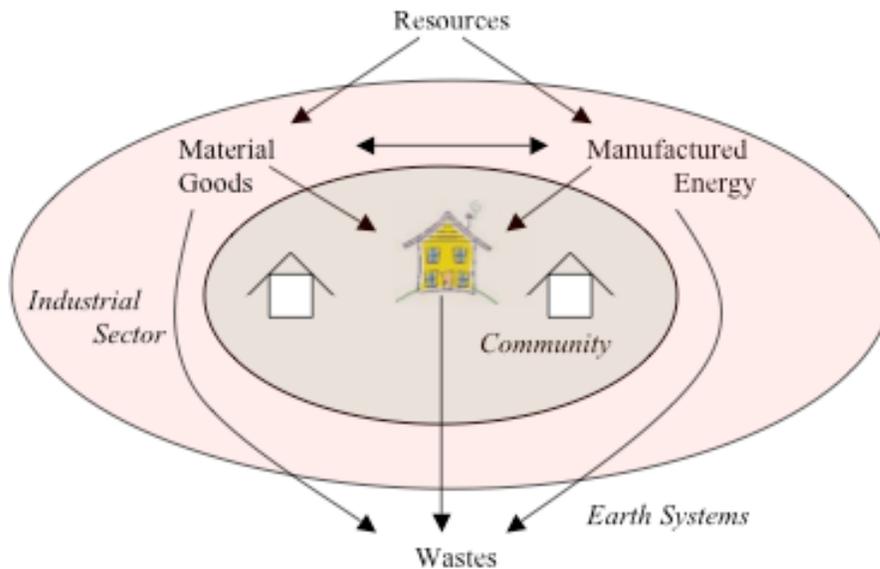


Figure 1: System Boundaries of Household Consumption

(Author's Adaptation from Moll et al., 2005)

1.4 Limitations

Many actors are involved in the development of responsible household consumption. Government agencies and established institutions must provide a framework for evaluation and promotion, including production incentives and information campaigns to provide consumers with reliable information (Maniates, 2001). This thesis, however, assumes that households of similar economic standing and location in urban/sub-urban developments are operating with similar infrastructure, governing framework, and access to information and household goods. Therefore, their decisions and subsequent impacts are comparable.

Modified consumption also has the ability to financially impact producers and retailers; however, this paper does not directly address economics of production and commerce.

The surveys will not directly examine user's daily purchasing habits. Instead, living space of each household and significant characteristics such as income and transportation habits will be used as indicators. The *Indicators* section will discuss the theory and research used to select appropriate indicators. Ownership of common consumer durables, such as dishwashers and laundry machines, will be surveyed to

indicate environmental burden of household operations and the potential for shared ownership or access to diminish material stocks of such products.

Air travel and non-household consumption can also have large environmental impacts, but they will not be examined in this project.

I acknowledge the potential of the rebound effect to nullify positive consumption decisions. If money saved through shared or reduced consumption is spent on increased air travel, for example, no net gains are made (Briceno et al., 2005). I will not directly address rebound consumption; however, interviews with members of cooperative housing developments will question the extent to which savings are re-invested in shared goods and services.

2 Theory and Reality of Household Consumption

Classifying consumption as manageable or excessive can be done on several levels. In physical terms, resource flows become unsustainable when they disturb “the stability of the internal evolutionary processes of the ecosphere, a dynamic and self-organizing structure” (Spangenberg et al., 1999) The disruption of natural function and balance can be seen in the increasing impacts of desertification, climate change, and ozone depletion (Pimentel et al., 1999).

In economic terms, excessive consumption results when growth in human and manufactured capital is outpaced by depletion of natural capital, thereby withdrawing assets from future accounts. Issues of justice arise when rapid flow of wealth is artificially maintained through undervalued natural and human resources in vulnerable countries (Arrow et al., 2003). Within the United States, the dominance of personal consumption as an economic activity continues to divert resources and attention from other areas. The capitalist propensity to direct investments in response to demand has created a reinforcing loop in which shopping centers grow from the habit they create while competing institutions decline. In the United States, we now have twice as many commercial shopping malls as high schools and visitors to one of the largest malls in the country outnumber entrants to the most-visited National Park (de Graaf et al 2005).

Social aspects of consumption have arisen as shopping has become more than a utilitarian exercise. Research by the New Road Map Foundation found that the average American shops 6 hours per week while dedicating under an hour to exclusively playing with their children. Over 90% of teenage girls rate shopping as their favorite activity. Despite the ostentatious material wealth, Mother Teresa saw the United States as the “the poorest place I’ve ever been in my life.” She was referring not to material assets, but the dearth of spirituality and social investment (de Graaf et al., 2005).

2.1 Why We Buy

Traditional economics has given us a consistent story line of consumption. We begin with the utility-maximizing individual seeking to prioritize his needs and wants for maximum return on his resource investments. The act of prioritizing is never ending, as explained by the non-satiety requirement. Needs always expand in response to increased personal resources (Dake and Thompson, 1999). However, inconsistencies arise when individual preferences are incorporated, resulting in people who sacrifice function for status or individuals who deliberately choose to ‘downshift’ their consumption (Schor, 1998). The view of consumption as driven by ‘needs’ is also being challenged. Utility is

playing less and less of a role in purchases. Recent studies have found that fewer than a quarter of consumers shop with a product in mind and 30% can't remember what they gave their significant other last Christmas (de Graaf et al., 2005).

Theorists have often moved beyond economics and into culture as a driver of consumption. The rapid assimilation of such theories by consumer research institutes is a quick indicator of the robustness of a culture-consumption connection (Coleman, 1983). Social stratification following WWII led W. Lloyd Warner to a highly tactical theory of consumption in which status groups are categorized by key goods, affiliations and activities taken on by members of the group. The purpose of consumption is to identify constituents and exclude unqualified aspirants to status groups; the actual possessions and activities chosen as identifiers are arbitrary (Holt, 1998)

The novel contributions to these established theories describe a drastically unstable and dynamic system driven by insecurities, misplaced investments, and unfulfillable voids. The social networks and community structures once responsible for providing personal identity, status, and security are deteriorating. Consumption is increasingly allowing individuals to define themselves intrapersonally, without having seek contact or validation from a greater community (Ropke, 1999). While such self-definition could be viewed as a potentially satisfying project, hyper-consumption may also be seen as a sign that status and meaning cannot be provided without community. The futility of self-service fulfillment has increasingly become fodder for artists and satirists, as can be seen in an article appearing in the satirical newspaper, The Onion:

The blank oppressive void facing the American consumer populace remains unfilled despite the recent launch of the revolutionary Swiffer dust-elimination system, sources reported Monday. The lightweight, easy-to-use Swiffer is the 275,894,973rd amazing new product to fail to fill the void—a vast, soul-crushing spiritual vacuum Americans of all ages face on daily basis, with nowhere to turn and no way to escape... Despite high hopes, the Swiffer has failed to imbue a sense of meaning and purpose in the lives of its users.

The Onion, Feb 9, 2000

Quoted in (de Graaf et al., 2005)

Beyond culture, biological and physiological drivers are also being described. Anthropological researchers have challenged the notion that environmentally damaging conspicuous consumption is a modern, Western creation. One natural scientist explained, “costly exaggerated displays enable high quality males to honestly advertise their quality to potential mates and rivals because only high quality individuals can bear the costs of the display.” He points out that such displays have accompanied resource depletion for centuries (Penn, 2005). In biological terms, the role of relative wealth over absolute becomes apparent, as the drive to stand out from competitors in the breeding pool fuels increasing extravagance.

Any behavior driven by complex and synergistic biological and cultural drivers has the potential to spin out of control. Psychologists are increasingly recognizing the severity of ‘compulsive buying tendency,’ now referred to in diagnostic terms as oniomania. Compulsive shoppers are prone to impulse purchases of identity-related items such as clothes, jewelry, and makeup. They shop in response to a mood state rather than a perceived need and the typical sufferer spends around half or his or her income on

compulsive purchases. An extensive study by the University of Minnesota found that 1.8% to 6% of participants suffered from debilitating oniomania (Schor, 1998)

While the drivers of consumption are debatable, it is clear that factors interact within individuals to produce personalized behaviors. With this in mind, sustainable consumption formulates differently for each and every practitioner. I cannot describe every permutation, but will attempt to summarize movements focused on appealing to personal adherents.

2.2 Editing Consumption

Institutional definitions of sustainable consumption rarely capture the variety of motivations and methods for reducing the negative impacts of personal consumption. The U.N. promotes “the use of services and products which... bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste” (Fuchs and Lorek, 2004). The implementation of such a goal is dependent on the willingness of the production and market sectors to provide appropriate products, while the consumer is often relegated to nothing more than the ‘user.’

While cleaner manufacturing methods rely primarily on industrial interests, consumers act as the decision-makers responsible for setting the production-use-disposal cycle into motion. As household consumption is driven by individuals, sustainable consumption can take many forms depending on the goals and motivations of different people (Moll et al., 2005). Consumers may take a personalized composite of economic, environmental, ethical, and social approaches to reforming their consumption. Regardless of the individual reasoning, a reduction in household metabolism can be considered a step towards sustainable consumption (Spangenberg et al., 1999).

2.2.1 Money Matters

Author Juliet Schor applauded the media for challenging the fashion industry’s ‘thinner is better’ approach to runway models. However, she asks why the message escaped scrutiny while the display was criticized. In *The Overspent American*, Schor encourages citizens to “make exclusivity uncool.” She asserts that the continual promotion of luxury through advertising and the media results in reprehensible economic and social ills as people sacrifice financial security to purchase status and parents are kept from the home by their relentless need to work more in order to buy more. Her economic approach to sustainable consumption encourages shoppers to re-consider the value of products. She asks, “What if, when we looked at a pair of Air Jordans, we thought, not of a magnificent basketball player, but of the company’s deliberate strategy to hook poor inner-city kids into an expensive fashion cycle?” (Schor, 1998)

Schor suggests economic restraints on consumption, such as voluntary agreements amongst parents of children at a day care center not to spend more than \$50 on their child’s birthday presents. Such actions can be early steps towards a more substantial downshift, or the transition towards working, earning, and spending less in exchange for more time and leisure (1998).

A similar concept grew from a small artists’ movement in Vancouver, Canada to an international phenomena. Buy Nothing Day began in 1992 as a day for consumers to lock up their wallets and invest in non-monetary commodities such as family and community (*Fig.2*). Several years later the theme was adopted by Adbusters, an anti-



consumerism organization and magazine. Buy Nothing Day was established on the Friday after Thanksgiving, the biggest shopping day in the United States (Adbusters.org).

Buy Nothing Day is now celebrated internationally through community parties, organized bartering events, and protests (de Graaf et al., 2005). Minimizing purchases offers a path to sustainability both by reducing material flow and decreasing the economic demands placed on time-strapped individuals.

Figure 2: An Adbusters Flyer

(Source: Adbusters.org)

2.2.2 Green Consumption

When defining changes in consumption as a function of their motivation, ‘green’ consumption becomes a form of environmental action. Individuals engage in green consumption in response to environmental information, such as their perceived ability to personally mitigate environmental damages and contribute positively to a cause or movement (Homburg and Stolberg, 2006). Research has shown that individual action occurs in response to an environmental issue if the opportunity for personal satisfaction is attainable. Satisfaction is achieved both through an internal sense of comfort and well-being and the perception of contributing to greater community welfare (De Young, 1996).

Households can participate in green consumption in many ways. Some of the most significant are:

- Purchases of less environmentally intensive products such as efficient light bulbs, recycled paper products, and organic foods
 - Habits such as minimizing water use in showers and washing, heating homes at lower temperatures, and turning off lights
 - Recycling of wastes, furniture, and clothes
- (Barr and Gilg, 2006)

While the measurable environmental impact of discrete decisions is debatable, green consumption offers another opportunity for individuals to consciously modify their purchases. Collectively, such decisions can impact the industrial and regulatory sectors. An early example is the public response to CFC driven ozone depletion. As a pioneering group of scientists warned that volatile compounds were chewing through our fragile atmospheric barrier, industry and government maintained their skepticism. Millions of Americans, however, re-evaluated their cosmetics and cleaners and retired some of the products responsible for about half of CFC emissions. By 1976, 20% of Americans reported changing to a non-aerosol cosmetic product because of concern for the ozone layer. Over 10 years later, the Montreal Protocol was signed by 37 countries agreeing to limit their CFC use, in a move called ‘the first effort of the international community to deal with an environmental danger before it erupted’ (Brower and Leon, 1999).

While the shift to a more environmentally safe product contributes to sustainable lifestyles, 'reduce' and 're-use' should hold primacy in the quest for greener consumption. The case of cotton versus synthetic cloth illustrates the challenges facing the green consumer searching for a way to buy her way to sustainability. While the production of cotton fabric requires 40% less energy than petroleum-laced synthetic polyesters, nearly 500 grams of fertilizers and pesticides are used for each kilogram of raw cotton produced (Kalliala and Nousiainen, 1999). Chemicals used in clothing production, use, and disposal are responsible for 4.6% of toxic water contaminants released in the United States (Brower and Leon, 1999). While organic alternatives do exist in small niche markets, the most accessible resolution is the decision not to buy.

2.2.3 Social Solutions

Social approaches to sustainable consumption share many characteristics with green consumption. They can be motivated by many of the same ethical considerations. Many solutions also offer economic benefits and can be considered a way of downshifting consumption. However, I choose to differentiate social solutions based on their inherent dependence on a community or network for realization. Practices such as car-pooling, sharing of property and goods, and the use of services can all reduce the burden of consumption.

Consumption of services has long been dismissed as economically unjustified. Early free-market proponent Adam Smith dismissed services as unproductive:

Services generally perish in the very instant of their performance, and seldom leave any trace or value behind them, for which an equal quantity of service could afterwards be procured.

Smith, 1776

Quoted in (Jordan, 2005)

Later neo-liberal thinkers saw public services ranging from community health care to communal land management as a dangerous encroachment of communism on American freedom and initiated a political thrust towards individualism and promotion of private property rights (Jordan, 2005).

Only recently have services re-entered economic dialogue, and households are capturing attention as potential customers. Household services range from maintenance and landscaping to the organization of leisure activities; in general, they have the ability to reduce material demands of consumption while still providing the same rewards as product ownership (Halme et al., 2004). The provider maintains control of the necessary manufactured products, thus resulting in higher intensity of use and a more direct incentive to improve product durability (Mont, 2004).

Sharing networks also provide access to a product without the ownership requirement. Sharing networks can be for-profit businesses or social arrangements. The first scenario has historic roots in communal bath and laundry houses; a more contemporary approach exists under several names including Product Service Systems. PSS offers product utility separate from ownership and has been applied to technology systems, transportation, and household and industrial equipment (Briceno and Stagl, 2006).

From a business perspective, PSS can provide households an opportunity to rent or lease products that are only intermittently needed in homes. Tool rental companies provide customers with access to professional grade tools. Material stocks are reduced as ownership is concentrated and tools are more likely to be professionally maintained and repaired rather than frequently replaced (Mont, 2004).

Formalized car sharing networks have a complex history in the United States. Membership was promoted as patriotic duty by a government concerned with severe rubber shortages during World War II (Fig. 3). Post-war car sharing networks faded into nonexistence as newly prosperous homeowners scattered to the booming suburbs. Car sharing networks have recently begun to rebuild, but they exist primarily as an urban youth counter-culture movement. The environmental and economic benefits are substantial, as thirty percent of American participants reported giving up their car after joining a car-sharing network, while over 60% said the availability of car sharing pre-emptively contributed to their decision not to buy a car (Briceno et al., 2005). With continued investment,

car-sharing networks are often able to replace vehicles routinely with newer, efficient models. The average shared car in the Netherlands is 24% more fuel efficient than its privately owned counterpart (Mont, 2004). The variety of types and sizes of cars available also has the ability to reduce the tendency toward overkill, or the purchase of bigger, more accessorized products in order to be prepared for rare contingencies (Halme et al., 2004).

Less formal sharing networks also exist, from completely social exchange of products amongst friends and family to more organized systems for communal ownership. When organized by neighborhoods, communal sharing has the ability to reduce the transport distance products must travel from provider to user. Communal sharing of tools and household goods is currently a small, niche movement primarily developed by eco-villages and cooperatives (Mont, 2004). More extensive networks are being advanced as Local Exchange Trading Schemes (LETS). The UK boasts 22,000 participants in the on-line network of users willing to barter services and lend goods in exchange for use of other goods and services. The majority of participants offer services involving their own tools and skills (Briceno and Stagl, 2006). This approach also has the potential to reduce material flow through households, as owners barter for maintenance and construction services rather than purchasing necessary tools.

3 Sustainability Analysis of Cohousing

The changes to consumption described above share two relevant characteristics: they have the potential to reduce household metabolism and they are dependent on decisions made at the household level. Structural and cultural changes to households can promote positive change by providing opportunity and encouragement to shift



Figure 3: WWII Government Poster
Source: (National Archives and Records Administration, 1943)

consumption. One development capable of providing a pro-sustainability neighborhood design is the growth of cohousing in the United States.

Cohousing developments are distinct communities identifiable by several primary characteristics. Some linguistic confusion has arisen with the development of cooperative housing, a form of investor-owner management that should not be confused with cohousing. Cohousing in name and function was imported to the United States in the 1980s by Kathryn McCamant and Charles Durrett, a team of architects who toured Danish *bofaelleskabers*, 'living communities' characterized by autonomous private residences and extensive communal resources (McCamant et al., 1988). They returned from a year of Scandinavian immersion to found a company dedicated to promoting what they called 'cohousing' in America. Twenty years later, over 50 communities have been built in the U.S., ranging in size from several units to over 200 (Wann, 2005)

The pioneering architects of cohousing in the United States list several fundamental characteristics of cohousing:

- Participatory Process: Residents organize and participate in the planning and design process for the housing development, and are responsible as a group for all final decisions.
 - Intentional Neighborhood Design: The physical design encourages a strong sense of community.
 - Extensive Common Facilities: An integral part of the community, common areas are designed for daily use, to supplement private living areas.
 - Complete Resident Management: Residents manage the development, making decisions of common concern at community meetings.
 - Non-Hierarchical Structure: While there are leadership roles, the responsibility for the decisions is shared by the community's adults.
 - Separate Income Sources: If the community provides residents with their primary income, this is a significant change to the dynamic between neighbors and defines another level of community beyond the scope of cohousing.
- (McCamant et al., 1988)

All of the above characteristics are vital in the creation and maintenance of a cohousing development. Both physical characteristics and social structure are necessary to achieve the aim of increased strength of community. As explained by one homeowner:

There are condos built in my area that by site design, are like cohousing. They have pedestrian orientation, a common house, pathways, even the picnic tables on the grassy commons which each unit views. These places on paper would be reasonably well designed cohousing developments, in practice they are not cohousing. Why not, what is the difference? The people who live there are strangers to each other, and have little interest in changing that. To me, a key part of cohousing is: The intent is to enhance community among people who are neighbors and to create relationships among themselves that are supportive and mutually satisfying.

Rob Sandelin, Sharingwood Cohousing, Wa. (McCamant et al., 1988)

As cohousing developments are primarily intended to strengthen connections to community, an analysis of their impacts on sustainability should begin with that condition. As seen in Figure 4, I speculate that connection to the community has the ability to positively influence what are typically referred to as ‘the four pillars of sustainability’: Social, Environmental, Economic, and Institutional (UN Department of Economic and Social Affairs, 2001)

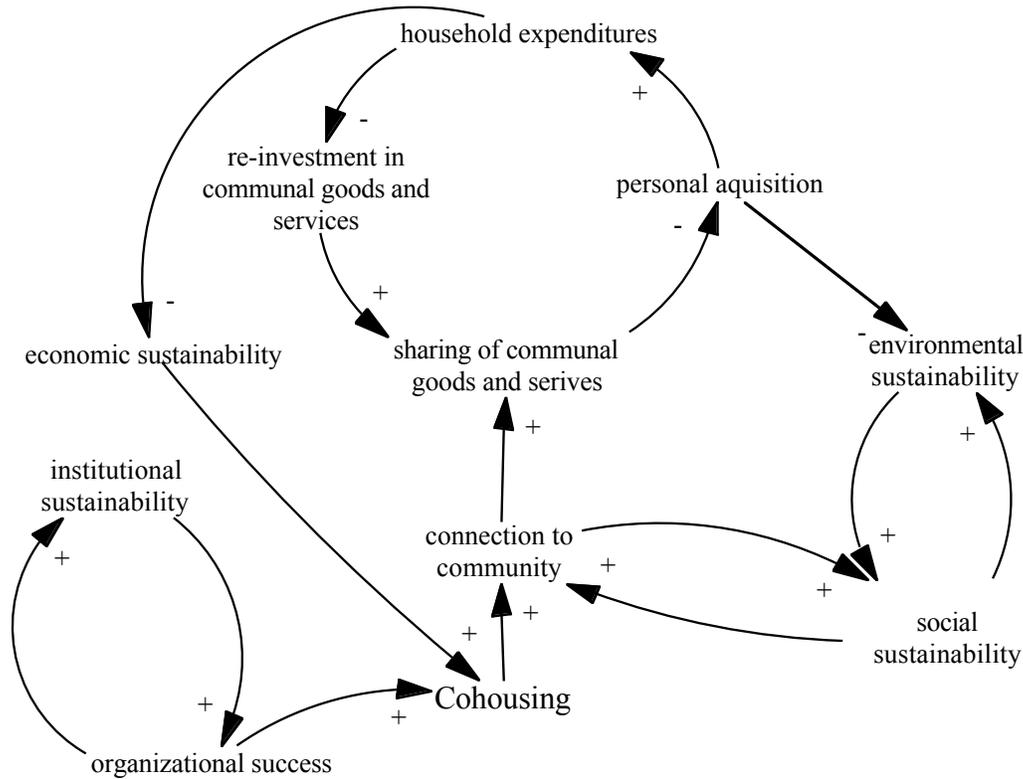


Figure 4: Causal Loop Diagram of Cohousing's Potential Influences on Sustainable Housing

A Note on Causal Loop Diagrams
 A CLD is a tool to show the key causal interdependencies of complex systems. It moves beyond the linear worldview of x creates y to that of a web of interconnected circular relationships made up of a host of driving forces operating at a number of time and space scales. A CLD consists of at least two variables connected by links (arrows); each relationship has a sign, a “+” or a “-” that conveys the relationship between the variables. A “+” signifies a direct relationship: when the first variable changes, the other changes in the same direction. A “-” indicates an inverse relationship: when the first changes, the other variable changes in a reverse direction (Anderson and Johnson, 1997).

Beginning with connection to community, which can be defined as social support, neighborhood interaction, and community participation (Wakefield et al 2005), I speculate that cohousing developments follow numerous paths for impact and feedback from participants (Fig. 4). Briefly, the conceptualization moves as follows:

Connection to community allows for sharing of communal goods and services, typified by the use of a ‘common house’ that is generally accessible and visible to all neighborhood residents. The common

house contains group facilities such as a large cooking and dining area, a play area, and space for reading and craftwork. Private homes generally contain kitchen and living space; their existence in the common house is intended to promote community gatherings. The common house often contains laundry facilities and guest bedrooms to allow for elimination of these resource and space intensive but intermittently used facilities to be eliminated from private homes. Additional communal resources may include tools, cleaning supplies, and equipment for household maintenance as well as outdoor facilities such as gardens, playgrounds, and picnic areas.

With regards to services, cohousing developments encourage communal responsibility for management and improvements of the facilities. If it is necessary to contract for services, the decision is made by homeowner consensus (Wann, 2005)

Access to communal goods and services allows for reduction of personal consumption of such items. This potentially reduces household metabolism of individual homes. The connection of physical throughput and environmental degradation is visible in the life cycle requirements of consumer products (including energy carriers) for material harvesting, assembly, use, and disposal (Spangenberg et al, 1999). Therefore, the potential for shrinking household metabolism through use of communal goods and services has positive implications for environmental sustainability in the context of reducing demands on natural capital.

An increase in environmental sustainability provides for more equitable distribution of goods and services without subtracting from ecological capacity. As such, both individual quality of life and community health are improved, leading to an increase in social sustainability.

Socially sustainable communities provide for protection and enhancement of members' personal enjoyment and social interaction. In the situation of cohousing, it is possible to establish a clear connection between social sustainability and social capital, as defined by the establishment of social norms that promote reciprocity and communal support (Putnam, 2001). Strong social capital is also a consistent indicator of environmental awareness and involvement (Wakefield, 2005).

Increases in social capital fundamentally strengthen community connections, which in the case of cohousing developments supports increased investment and access to communal goods and services and reduced need for individual acquisition. This serves to decrease household expenses without diminishing convenience of access expected by relatively affluent members of industrialized countries. Cohousing communities have the potential to promote economic sustainability as defined by its ability to generate welfare without overexploiting resources (Spangenberg et al, 1999). Decreased housing expenses also offer better conditions for economic diversity.

The economic sustainability of cohousing developments increases their appeal for urban dwellers looking to maximize their income. However, the growth of the cohousing movement is significantly dependent on its organizational success, including both its ability to appeal to broader sectors of society and to function within entrenched institutional and economic systems. This component of institutional sustainability is necessary if cohousing hopes to develop beyond its current existence as a pioneering small-niche movement (Seyfang, 2004)

To follow the same avenue of influence for traditional urban housing developments, Robert Putnam's studies of declining social capital in the United States

prove useful. His research demonstrates declining community connections have negatively impacted social reciprocity, environmental mobilization, and various components of quality of life (2001).

3.1 Methods and Material

3.1.1 Sample Selection

To empirically evaluate the potential of cohousing as a sustainable housing solution, I completed a comparative survey of a conventional neighborhood and cohousing community. Two hundred surveys were distributed door to door within the Martin Elementary School district, a 400-student district with above average attendance rates and standardized test scores. Approximately 20% of students were classified as low-income, which is 10% lower than the district average. Over 70% of students are white, with a fairly even representation of Black, Asian and Hispanic minorities (Green Bay Area Public Schools, 2006). Surveys were distributed to homes in one block areas selected from the north, south, east, and west quadrants of the district, as well as one central block.

Martin Elementary School district was selected for its statistical similarity to Lakewood Elementary School, the 300-student public school district containing Sunward Cohousing, Michigan's first cohousing community. As with Martin Elementary, academic performance was better than the district average and a smaller proportion of students were from low-income families. Lakewood also has a similar racial demographic. Approximately 65% of students are white, with 15% of students in grades 3 to 5 classified as economically disadvantaged (Ann Arbor Public School, 2006).

Sunward Cohousing offers over 40 privately owned town homes situated on 20 acres outside of Ann Arbor, Michigan. Homes range from 500 square feet to over 2,000 and all have access to a large common house containing a kitchen, large dining area, children's play spaces, game room, meeting room, member offices, exercise room, guest rooms, a video theater, laundry room, a large workshop. The original members began planning in 1994 and completed construction in 1998. All community governance is driven by consensus, with monthly meetings determining protocol for grounds maintenance, acquisition of communal goods, and neighborhood policies (Sunward.org and Site Visit, 2007).

3.1.2 Study Design

In developing indicators, I looked for factors easily measurable by surveys and interviews. Surveys were developed for distribution in both a conventional and cohousing neighborhood. Indicators are intended to assess a household's propensity and opportunity for more sustainable consumption as well as the relevant physical and culture characteristics of the household. Interviews were conducted at Sunward Cohousing to assess more complex issues of culture and governance.

Following a description of theory or theories used in development of an indicator, I will list the related survey questions; a full copy of the survey is attached as Appendix I.

3.2 Indicators

3.2.1 *Social*

Author John de Graaf began *Affluenza: the All Consuming Epidemic* with an anecdote. He was in the office he occupied as a successful documentarian with a talent for developing themes into books and campaigns following successful movie releases. His documentary and subsequent book had put a name to what he saw as a disease of over-consumption. His financial achievements one day landed him an invitation to the Millionaire Conference with Reed West, a retreat promising to show him how to slash his tax bill by a third and insure that he could hoard all but a few pennies of the capital gains on his investments.

The restraint that allowed him to toss the offer into the recycling bin could be simplistically dismissed as the sense of duty or obligation felt by a responsible tax-paying citizen. However, it embodies much else. De Graaf explains, “No taxes would mean no schools, parks, public amenities. It would mean even more reckless consumption. And every study I know of shows that getting rich won’t make me happy. Sharing with those in need, building for the common good, living rich in friendships, family, and community—that’s what will” (2005).

What de Graaf has described is the essence of social capital, a sense of community that provides citizens with an awareness of their shared welfare. The term social capital has been tossed around for a century, with definitions ranging from abstractly theoretical to purely economic (Putnam, 2000). Policy expert Robert Putnam solidified a definition of social capital and offered a startling and thorough analysis in *Bowling Alone: the Collapse and Revival of American Community*. He described social capital as a sense of trust and reciprocity developed through connections to family and community. After a decade of research into civic participation, philanthropy, and political involvement, he determined, “to predict whether I am likely to give time, money, blood, or even a minor favor, you need to know, above all, how active I am in community life and how strong my ties to family, friends, and neighbors are” (2000). His analysis also found that political participation, neighborhood socializing, and people’s sense of trust in fellow community members in America has been in decline for at least 30 years. After developing a complex Social Capital Index, his work showed a direct relationship between social capital and student accomplishment, personal health, tolerance, and community safety (Putnam, 1993).

Social capital is therefore strongly associated with social sustainability, as represented by citizen comfort, health, safety, social relations, social justice, and education (Halme et al., 2004). Empirical evidence supports the correlation of social capital and well-being; public opinion also hints at a desire to build connections. Putnam’s 1999 survey found that more than 80% of respondents felt “there should be more emphasis on community, even if that put more demands on individuals” (Putnam, 2000).

SOCIAL CAPITAL

Three survey questions were taken directly from the national Social Capital Community Benchmark Survey, developed at Harvard University’s Saguaro Seminar and administered to over 30,000 Americans in the past 10 years (Saguaro Seminar, 2000).

Survey takers were given a 5 point time scale from ‘less than once per year’ to ‘more than once per week’, with ‘don’t know’ offered as a neutral response:

- About how often do you talk to or visit with your immediate neighbors (closest 10 or 20 households)?
- In the past year, how often have you given time to, or helped out at organizations such as a school, a hospital, a prison, a probation office, or a charity, a voluntary organization, or a community group (eg been a volunteer for one of these organizations)?
- How often do you attend meetings for a community, political, religious, and/or environmental organization?

One question was taken from Robert Putnam’s original work on Social Capital. Survey takers were given a 5-point Likert scale ranging from ‘Strongly Agree’ to ‘Strongly Disagree’:

- Most people can be trusted

Social capital influences household consumption in many ways. As previously discussed, much conspicuous consumption is driven by a need to display relative wealth and portray status. It often takes on a competitive form, with the popularized ‘keeping up with the neighbors’ motivation affecting a substantial percentage of American homeowners (Schor, 1998). Putnam’s research also finds an inverse relationship between social capital and pugnacious, competitive relationships between community members. A higher proportion of citizens in American states with low social capital indicated a tendency for confrontational and competitive relationships with neighbors (Putnam, 2000). Competitive relationships thwart attempts at sharing networks and promote spiraling consumption.

COMPOSITE SOCIAL/ENVIRONMENTAL INDICATORS

Social capital also feeds into drivers for more sustainable consumption. Research is consistently connecting high social capital with better recycling rates, likelihood of carpooling, and preference for organic groceries (Wakefield et al., 2005). Social norms play a substantial role in turning consumers towards ‘green’ products (Nyborg et al., 2006). High social capital also facilitates sharing of goods as well as community participation in sustainable management of neighborhood resources (Halme et al., 2004).

Several survey questions were influenced by the synergistic nature of social capital and pro-environmental behavior. Time-scale questions include:

- How often do you borrow or lend household items (ie tools, gardening supplies) from/to a neighbor?
- How often do you carpool with a friend, co-worker or neighbor to work, school, or errands such as shopping?

3.2.2 *Environmental*

Environmental indicators were selected to denote resource burden placed on the environment by household consumption. My chosen indicators focused on household characteristics strongly correlated with energy and resource demand. Individual households may act differently in similar environments, such as by favoring ecological products and conscientiously reducing energy demands; however, these actions are often

socially motivated (Nyborg et al., 2006) and I believe their greatest contribution to environmental sustainability is through improved social commitment.

Several household characteristics have been shown to consistently and uniformly impact household metabolism:

LIVING SPACE

Residents exercise significant influence in their selection of home size. Living space (measured in square feet in the U.S.) is empirically correlated with raw materials needed for construction, heating demand, electricity use, and consumption of household goods (Lorek and Spangenberg, 2001). Living space has surpassed household form as a primary indicator of energy use in the past 20 years, as improved efficiency has diminished the energy demand differential between multi-family and single family housing (Holden and Norland, 2005).

Greater space also encourages higher acquisition of consumer goods, with demand for increased storage driving growth in home size. The single-car garage has become virtually extinct in the U.S. in the past twenty years, as home builders have offered larger and larger storage for additional vehicles and materially-intensive leisure products such as motorboats and recreational vehicles (Schor, 1998)

The survey addressed square footage both as a physical trait and as a response to consumer demand for living space. Participants were asked:

- The square footage of our home is _____ sq.ft
- Given the number of people and activities in our home, this house feels:
Too Small Just Right Too Big (circle one)
- Check the rooms you have in your home:
Guest Room
Formal Dining Room
Laundry Room
Library/Office
Play Room (for games and toys)
Work Room (for crafts and projects)

TRANSPORTATION

In the United States, personal transport is responsible for 32% of domestic greenhouse gases. Of this, buses and rail lines release less than 5% of emissions, with personal cars and light trucks dominating consumer impact (Brower and Leon, 1999). Direct energy demands of personal vehicles comprise nearly 10% of household energy expenditures in comparable suburban areas (Moll et al., 2005).

Cars also exert life-cycle impacts beyond use. With much of the material intensity of vehicles tied to manufacture and maintenance, car-sharing offers a way to reduce resource investment in vehicle production without necessarily diminishing person-miles (Briceno et al., 2005). However, greenhouse gas emissions are primarily the result of driving, not manufacture, so a heavily driven shared car may offer few emissions-related benefits over a personal vehicle (Brower and Leon, 1999).

Car-pooling offers a way to diminish total mileage driven by decreasing individual passenger mileage. However, car ownership remains the best indicator of car

use, as even ethical concerns have little impact on distance driven once a consumer owns a vehicle (Lorek and Spangenberg, 2001)

As previously listed, participants were asked about the frequency of car-pooling. They were also asked to:

- Check whether they owned a car and/or had convenient access to a car through a business, lending system, friend, etc.

HOUSEHOLD OPERATION

When evaluated for life-cycle impacts, household maintenance and accessories have significant environmental loads. Nearly 15% of consumer driven greenhouse gas emissions are related to the production and use of household appliances such as dishwashers and laundry machines. Household furnishings, cleaning supplies, and painting products contribute 19% of consumer related toxic air pollution in the United States (Brower and Leon, 1999).

Household management also impacts energy usage and water demand. Many

appliances rely both on a direct power source and energy-intensive hot water (Fig. 5). Minimizing appliances and reducing the spatial demands for heating and cooling are significant steps towards reduced energy consumption.

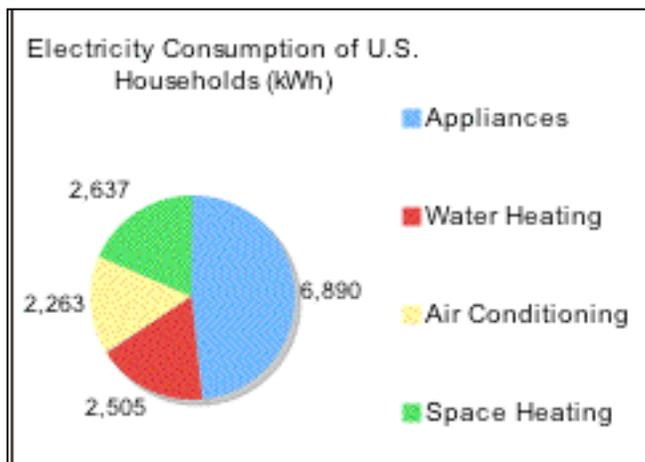


Figure 5: Household Operations and Annual Electricity Demand

Source of Data: (Energy Information Administration, 2001)

To evaluate both ownership and usage of household appliances, participants were asked to:

- Check the items they own and check the items they have convenient access to (through a business, library, friend, etc):
 - Clothes Washer
 - Clothes Dryer
 - Computer
 - Dishwasher
 - High Speed Internet
 - Cable or Satellite TV

Household maintenance can also rely on personal acquisition of resource-intensive goods and environmentally potent products, or tools and materials can be concentrated by companies providing services. To assess both ownership and demand for environmentally significant household maintenance activities, participants were asked to:

→ Check the services they have either hired a company/individual to perform in the past year or have performed themselves in the past year:

- Lawn Mowing
- Lawn Fertilizing/Pest Removal
- Exterior Painting
- Interior Painting
- Major Remodeling
- Weatherproofing
- Household Cleaning

INCOME

Research has shown household income to be a significant determinant of both direct and indirect energy consumption. Increased income correlated with higher energy intensities for food, hygiene, and clothing (Moll et al., 2005). Americans earning in the top decile are more than twice as likely to live in a house constructed in the past four years than people earning the median income and living space increased proportionately with income (U.S. Census Bureau, 2005)

Participants were asked:

→ The combined annual income of our household is \$ _____

3.2.3 Economic

Economic sustainability of households is challenging to define in the context of a hyper-consumptive society. Basic needs, as defined by consumers, vary substantially from standards set forth by global institutions. Over 50% of Americans consider a home computer to be a 'necessity' and over 90% selected cars and clothes washers as 'necessities' rather than 'luxuries' (Taylor et al., 2007). The true un-sustainability of such inflated needs is seen in the increasing economic insecurity of Americans. More Americans file for bankruptcy than divorce every year, and foreclosure rates on homes have tripled in less than twenty years. Parents are disproportionately vulnerable, as they are four times more likely than childless homeowners to lose their homes to bank repossession. Both families and single residents report low savings, with 2/3rds stating they live paycheck to paycheck (Warren, 2003).

AFFORDABLE ACCESS

While a re-examination of such extravagant 'needs' may offer the most direct strike against unsustainable consumption, I don't believe a societal transformation of this scale is an attainable goal in the near future. Classifying cars and high-speed internet connections as 'necessities' may appear overstated, but they are increasingly important educational and economic tools. A more attainable approach to economic sustainability may be to offer affordable and convenient access to such perceived necessities without the ownership requirement. For this reason, survey takers were asked both about their ownership of household goods (as described in *environmental indicators*) and whether or not they had 'convenient access through a business, friend, etc'.

ECONOMIC DIVERSITY

The economic sustainability of the suburban form extends beyond the ability to access goods and services. Several Genuine Progress Indicators provide better values for American suburbs than urban areas. Suburban residents have access to better schools, higher quality housing, and improved safety (Friedman and Rosenbaum, 2007). However, the sustainability of the suburb as a housing form is most substantially challenged for its tendency to reduce community interaction and prevent exposure to cultural, racial, and economic diversity (Henderson, 2007).

Another previously mentioned indicator, annual household income, will also illustrate economic diversity across the survey samples.

3.2.4 Institutional

The institutional sustainability of a neighborhood design is dependent upon adoption of the housing form by consumers, developers, and government. Many urban planners are asserting the need to resurrect the compact urban city in the United States. When the population is densified, it becomes economically viable to deliver reliable water and energy services, safe roads and lighting, and social services to a greater number of people (van Grunsven, 2003). Compact urban form also promotes pedestrianism and bus and bicycle use (Høyer and Holden, 2003).

While these are powerful indicators of economic, social and environmental benefits, the true institutional sustainability of compact urban housing is challenged by widespread flight to the suburbs in America in the past 50 years. While crime, racial tensions, and economic stratification in cities is often held responsible, research also indicates that people were pulled to the suburbs rather than pushed from the cities. The suburbs offered the contact with nature and quiet space that humans are physiologically dependent on for cognitive recovery and relaxation from daily stressors (van den Berg et al., 2007).

It is clear that a neighborhood design must be appealing to homeowners, the housing industry, and regulators in order to persist. In order to understand the potential of cohousing to grow as a neighborhood design, I completed deep interviews with several current residents of a cohousing community.

Interviews were minimally structured. I introduced conversational questions regarding relevant cultural, regulatory, and structural characteristics of the cohousing development and I recorded the responses. The conversations were intended to evaluate organizational success, both as the ability to attract new members and to operate under the economic and regulatory demands of the housing market.

CULTURAL APPEAL

While culture is fluid and diverse composite of many factors, cultural theorists have toiled to find a categorical rubric to study divisions and changes in individuals' cultural inclinations. With this intention, grid-group theory has developed as a way of categorizing individual cultural tendencies, or worldviews. Anthropologists Mary Douglas and Michael Thompson are credited with developing the theory in Britain over the last thirty years; the discipline has spread more recently to the United States with the involvement of prominent political scientist Aaron Wildavsky (Mamadouh, 1999).

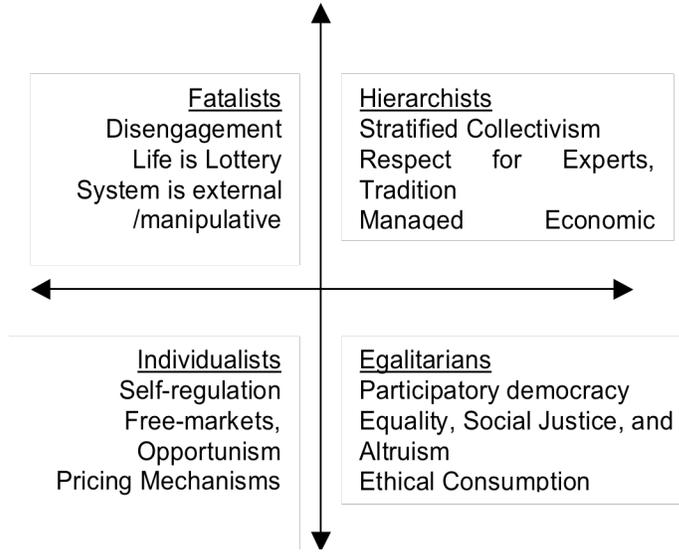


Figure 6: Politics, Ideals, and Consuming Values of Worldviews

Source: Author’s Adaptation from (Dake and Thompson, 1999)

Cultural Theorists divide worldviews into four categories; an individual’s worldview affects everything from political allegiances to daily consumption decisions (*Fig 6*).

Worldviews co-exist in a dynamic equilibrium, and plurality is necessary to maintain societal function. If isolated, hierarchists will follow established procedures, and may place too much trust in experts or authorities. Egalitarians will pursue equality of result (rather than opportunity), but often reach an impasse when trying to resolve all internal negotiations through participatory consensus. Individualists

will pursue individual well-being, but may shun cooperation even when it could be advantageous. Fatalists will dismiss problems as the result of ‘fate’ rather than choosing to plan ahead (Mamadouh, 1999).

Thompson believes that sustainable planning initiatives must involve and engage the three pro-active worldviews, while minimizing the tendency towards fatalism (Thompson, 1997) In structuring interviews, I included questions pertaining to cultural characteristics and social/political allegiances with the intention of determining worldview representation within the cohousing development. A diversity of worldviews would also indicate room for growth, as cultural appeal would extend beyond a small, discrete group.

GOVERNANCE

By design, cohousing neighborhoods are governed by consensus. Building consensus requires substantial dedication to the philosophy; it cannot be compromised for the sake of efficiency or time. The need for consensus challenges all cohousing communities in the United States; one of the first pioneering developments was stalled when 5 of the 25 participating households would not agree to a limited palette of colors for home exteriors. The five households wanted no limits on home color, and they “talked, explained, and convinced until finally everyone came around to their view” (McCamant et al., 1988)

Consensus building is still a largely viewed as a European process (Wann, 2005) and very few Americans have experience in cooperative management of neighborhoods. In directing interviews, I questioned participants about their experiences with consensus based neighborhood management.

EXTERNAL ACCEPTANCE

In order to grow as a movement, cohousing developments must learn to negotiate established financial and regulatory systems. On a national scale, the Federal National Mortgage Association (Fannie Mae) must approve of all new developments seeking loans. Single-family homes are more likely to be approved, as there is a solid re-sale market in the event of repossession. No protocol exists for lending to cohousing developments, and many cohousing communities are forced to seek classification as condominiums, which are considered higher risk lending projects and come with stipulations regarding ownership and management (Wann, 2005).

Opposition from surrounding neighborhoods and planners is also common. One group from Emeryville, California saw their cohousing proposal rejected by city planners following aggressive resistance by potential neighbors who were concerned that the high-density design would create the same traffic and safety issues they had moved to the suburbs to avoid. It took a month of lobbying to city planners to have the proposal re-evaluated and eventually approved (McCamant et al., 1988).

In organizing interviews, I selected several residents who had been involved from early planning stages and were familiar with the financial and regulatory history of the development.

4 Results and Analysis

4.1 Survey

Of the 200 surveys distributed in the conventional neighborhood, 30 were successfully completed and returned in the self-addressed, stamped envelope. The 15% respondency rate was lower than expected, but income and household characteristics indicate a great diversity of participants.

Eighteen usable surveys were returned from Sunward Cohousing, for a 45% respondency rate.

4.1.1 Social

Conventional respondents indicated a level of community interaction well above Robert Putnam's values (2001). Over 46% reported talking or visiting with their neighbors several times per month or more (*Fig. 7, Appendix II*). Only two participants visited with their neighbors less than once per year. While conventional neighbors showed a surprising level of socialization, cohousing respondents interacted significantly more with their neighbors, with nearly 95% talking or visiting more than several times per month.

Volunteering rates were much more representative of Putnam's pessimistic findings. Fewer than 16% of conventional participants volunteered or helped out at a school, charity, or community group several times per month or more, while 40% volunteered less than once per year. Cohousing members were considerably more active, with 45% volunteering several times per month or more, although the respondents reporting at the lower end of the time scale were clustered at the lowest value, with 22% volunteering less than once per year.

Survey takers confirmed Putnam’s (2001) findings that people were increasingly substituting attendance at community meetings for active participation. Thirty percent of conventional neighbors attended meetings several times per month or more, but there was no statistical correlation with people who reported substantial volunteering. However, lack of volunteering and meeting attendance were correlated. Of the 43% who attended less than one meeting per year, 69% volunteered with the same low frequency. Cohousing residents reported both higher attendance rates and a greater tendency to both attend meetings and volunteer. Nearly half of cohousing residents attended meetings more than once per month, and 2/3rds of those also found time to volunteer with the same frequency.

Survey takers in the conventional neighborhood were more trusting than indicated by Putnam’s research. Almost 60% agreed that ‘most people can be trusted.’ Cohousing residents were marginally more trusting, with 85% agreeing with the statement. However, they were much more reluctant to disagree, with the remaining respondents all selecting a ‘neutral’ or ‘don’t know’ response.

Composite indicators for social/pro-environmental behavior also showed greater cohousing support for sharing and service based consumption. Less than 1% of conventional participants borrowed or lent household items to their neighbor several times per month and 50% shared items less than once per year. Half of Sunward Cohousing respondents borrowed or lent items more than once per month, with none sharing household items less than once per year.

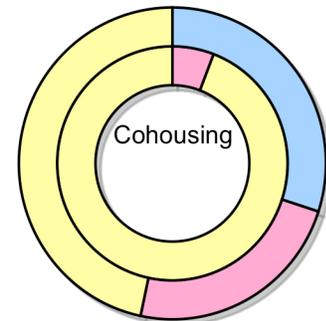
Participants in the conventional neighborhood either carpooled frequently or virtually never, with very few intermediate values. Thirteen percent carpooled several times per month or more, and 70% carpooled less than once per year. Cohousing residents were much more evenly distributed, with 1/3 reporting carpooling several times per month or more and 1out of 5 sharing rides less than once per year.

Conventional homeowners were just as likely to rely on service providers for home maintenance as cohousing residents, with over half of respondents in both cohorts using at least one service provider in the past year. However, cohousing residents used service providers primarily for painting and cleaning. Of the conventional homeowners using services, over 40% only contracted

that people were increasingly

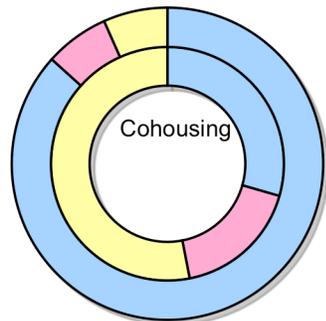


Talking with Neighbors



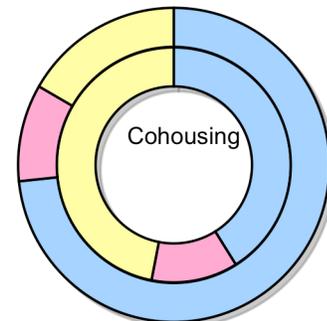
Conventional

Borrowing and Lending Between Neighbors



Conventional

Volunteering



Conventional

Figure 7: Social Capital

for ‘lawn fertilizing/pest removal’ in the past year. Chemically intensive lawn maintenance has the potential to be a sustainable service if consumers seek out environmentally rigorous providers, but a review of the 17 current lawn service providers in the Green Bay area found only one reference to environmentally friendly products (yellowpages.com).

4.1.2 Environmental

Cohousing homes were smaller, with a mean size of 1350 square feet, compared to 1550 square feet in the conventional neighborhood. They were also more likely to feel their house was unnecessarily large, with 27% of cohousing residents reporting that their house felt “too big”, compared to 13% of conventional respondents (*Fig 8*). Cohousing residents were also more likely than conventional respondents to feel that their house was “too small”. The mean house size for conventional and cohousing residents who felt their home was not big enough was nearly identical, at approximately 1200 square feet.

Of residents reporting that their house size was “just right”, cohousing respondents had a mean house size of 1343 square feet, and conventional respondents had a mean house size of 1579 square feet. On average, cohousing residents were satisfied with house sizes approximately 15% smaller than their conventional counterparts. However, the higher proportion of dissatisfied residents in cohousing may also indicate that communal space and goods are not satisfactorily substituting for reduced home size.

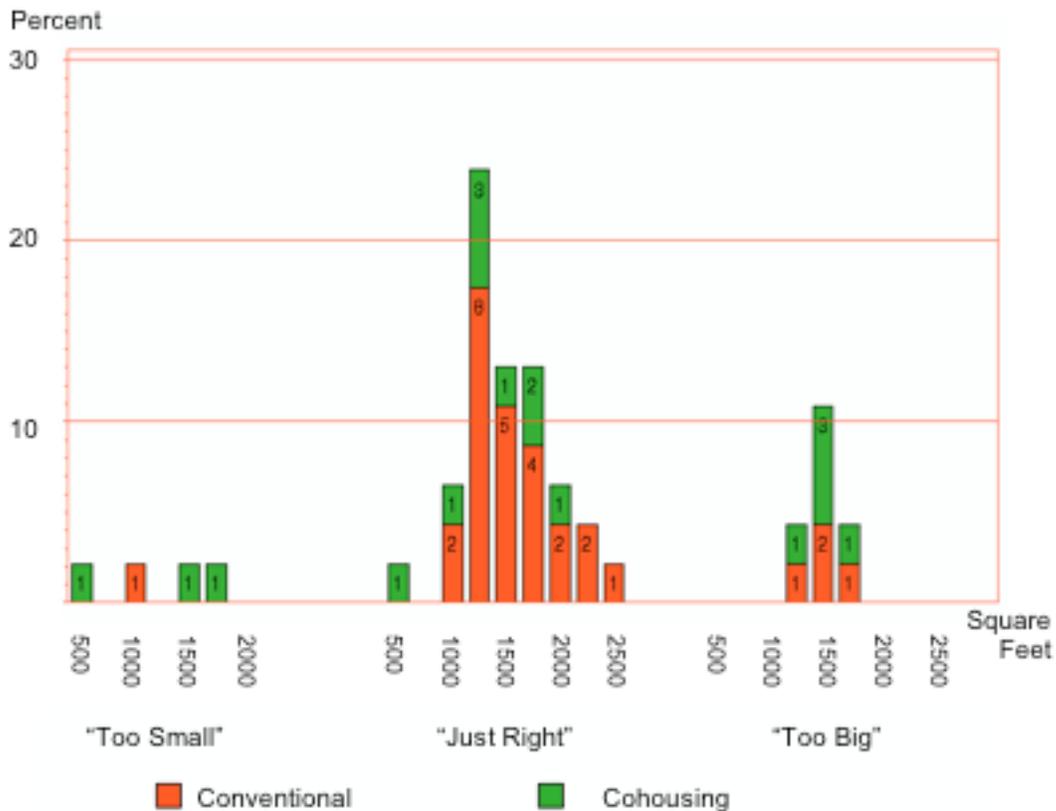


Figure 8: Satisfaction with Size of Home

The average reduced size of cohousing was made possible by the elimination of intermittently used rooms from the home. Cohousing residents are less likely to have guest rooms, formal dining rooms, laundry rooms, play rooms or work rooms (*Fig 9*). All of these rooms were provided in the Common House at Sunward. However, Sunward residents were more likely to have home libraries or offices, although the Common House contained several rooms for this purpose. The greatest reduction by percent from conventional homes to cohousing was the elimination of a formal dining room and a children’s playroom. The Common House at Sunward has a large dining area used for communal dinner several nights a week, and several areas available for children of different age ranges, as well as an outdoor playground.

	Conventional	Cohousing
Guest Room	57	41
Formal Dining Room	17	6
Laundry Room	57	53
Library/Office	37	41
Play Room	37	12
Work Room	37	18

Figure 9: Percentage of Homes with Selected Rooms

As discussed in the Environmental Indicators section, household operations have a substantial environmental burden. Appliances consume large amounts of energy directly and indirectly through increased demand for hot water. Cohousing residents reported lower ownership rates of common household appliances (*Fig 10*). Clothes dryers were the item contained most commonly in conventional homes, but eliminated in cohousing. However, ownership rates were still well above 60% for cohousing residents, despite the multiple washers and dryers in the Common House. Sunward residents were also more likely to have high speed internet in their homes; this is not surprising given the community’s development of a neighborhood network connection.

	Conventional	Cohousing
Car	97	88
Clothes Washer	97	71
Clothes Dryer	97	65
Computer	87	82
Dishwasher	83	65
High Speed Internet	63	65
Cable/Satellite TV	73	59

Figure 10: Ownership of Household Goods by Percent

Figure 10 also shows reduced car ownership by Sunward residents. Combined with higher carpooling rates, cohousing appears to reduce the environmental burden of personal transport.

While previous research has directly correlated income with house size, energy demand of appliances, and increased use of personal vehicles (Moll et al., 2005), differences in income do not explain the different consumption characteristics of

cohousing and conventional respondents. The mean annual household income of conventional survey takers was \$71,200, while cohousing members reported a mean of \$66,000. Also, neither cohort showed a statistical correlation between income and house size ($r < 0.5$).

4.1.3 Economic

While the cohousing movement does not directly seek to limit personal consumption, it does provide an opportunity to reduce individual ownership through shared access. Ownership of common household goods was lower among cohousing residents and the percentage that reported having ‘convenient access to’ goods was higher among all item categories (*Fig 11*). However, over 10% of cohousing residents with convenient access to a clothes washer still reported owning one in their home. Nearly 10% of cohousing residents also stated they had neither ‘ownership’ nor ‘access’ to laundry machines, indicating a lack of convenience of communal laundry equipment.

	Conventional	Cohousing
Car	0	12
Clothes Washer	0	35
Clothes Dryer	0	41
Computer	3	24
Dishwasher	0	6
High Speed Internet	13	24
Cable/Satellite TV	3	24

Figure 11: Percentage Reporting "Convenient Access" to Household Items

Both conventional respondents and cohousing members reported very similar mean incomes and levels of economic diversity. As shown by the box plot, the middle 50% of earners from both neighborhoods occupied a very comparable earning range (*Fig. 12*).

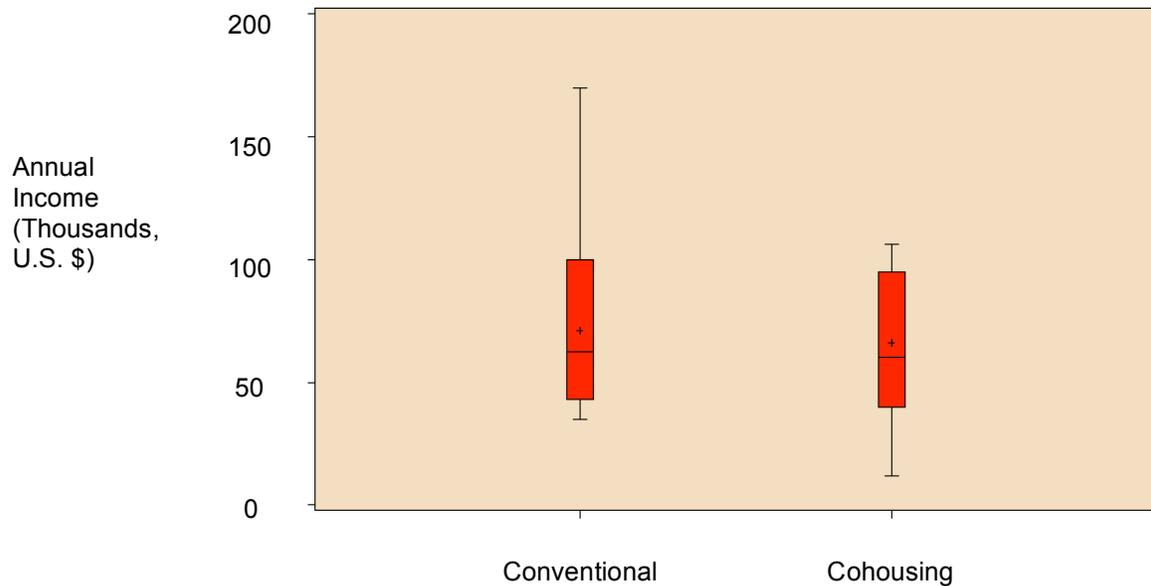


Figure 12: Annual Household Income

Those earning outside the middle quartiles are represented by the whiskers; both samples show a similar range of from minimum to maximum, but conventional homeowners in the end quartiles are generally above-average earners, while their counterparts in the cohousing sample were more likely to earn below-average wages.

This supports one stated intention of cohousing: to extend the opportunity of home ownership in a desirable neighborhood to people of lower incomes (McCamant et al., 1988). However, the lack of high earners in cohousing may indicate a lesser appeal of alternative living to the more affluent. As prosperous homeowners have been shown to be greater consumers, the sustainability of cohousing would be greatly enhanced by extending its appeal to higher economic categories.

4.2 Interview

I spent two days with several members of Sunward Cohousing in Ann Arbor, Michigan. Connie Plice, a retired elementary teacher, was my official tour guide. While exploring the grounds, she explained how she joined the founding group prior to construction of Sunward. Rich Kato met with me as an official representative of the membership committee, a group responsible for education and outreach. Nancy Stryker and George Albercook provided the perspective of relative new comers to the community. Jim Crowfoot offered both a wealth of environmental and structural information, coming from his experience as a natural science professor and a current Board member at Sunward. The membership committee sponsored my place at a community dinner and Connie provided for my stay in the guest room of the Common House. George's daughter did her best to teach me invisible soccer, but I lost every game.

CULTURAL APPEAL

In discussing cultural appeal, several residents acknowledged a narrow demographic niche for cohousing. I spoke with Rich Kato, a member of Sunward's membership committee about his experiences with potential members. When a property at Sunward becomes available for purchase, he assists potential buyers through the admissions process. They must first be familiar with cohousing and attend at least one community social function and one committee meeting. Rich assured me that there "are no grounds for exclusion," rather, the process is meant to help the homebuyer make an informed decision. Currently, a neighboring cohousing community, Touchstone, is slowly filling its predominantly vacant properties. Joining a cohousing neighborhood is a substantial commitment and Rich acknowledged that Touchstone's struggles could be because "the fantasy has worn off."

In speaking with another community member, Connie Plice, she also assured me that everyone was welcome, but she noted that most members were liberal and well educated. When I asked if that was a result of the admissions process, she conceded "we describe it (Sunward) in a way that John Birch (a prominent conservative) wouldn't buy." Connie also noted that a couple early members of the community left because of difficulties with the cohousing structure. One homeowner had admittedly "never belonged to anything before" and was initially excited, only to become frustrated with the demands of communal neighborhood management.

The culture of Sunward certainly tends toward the conditions favored by egalitarians. Thompson describes egalitarians as enjoying “an informal, joining, vegetarian sort of life, in a pleasantly scruffy house filled with furniture that is not new and surrounded by a garden that is far from tidy” (Dake and Thompson, 1999). Sunward regulations heavily limit chemicals that can be sprayed on lawns and gardens, and most homeowners have chosen to cultivate gardens, native grasses, or unmanaged plots. Most of the furniture in the Common House was donated by residents moving from larger conventional homes into smaller units at Sunward. Weekly community dinners bring 15 to 30 neighbors together for dinner in the Common House, with a vegetarian option always offered.

While cohousing does seem to attract a particular cultural demographic, it provides benefits that can be appreciated by all homeowners. Nancy Stryker described falling and breaking her knee in her yard at Sunward. When she returned from her surgery and a long hospital stay, she found her bed had been moved from the second floor to the first, her refrigerator was full of home cooked meals, and her cupboards were fully stocked. With the help of her neighbors, she completed all of her tasks over the next month without driving a car. Nancy credits the healing benefits of strong community bonds, but also tempered her story by saying she had no idea how she, or anyone else, could have dealt with such an injury in her old neighborhood. Regardless of cultural views, a strong community can offer great benefits to vulnerable residents.

GOVERNANCE

Sunward has stayed committed to governing through consensus. Monthly community meetings are held to discuss issues of property management and neighborhood policy; at least 21 households must be represented for voting to occur. Smaller groups such as the Building and Infrastructure Group and the Fun Committee manage maintenance contracts and plan community events.

The boundary between individual choice and community interest is constantly evolving and occasionally contentious. Connie described a shared commitment towards a peaceful and friendly environment; however, one father supplied his son with toy swords and guns for his son and friends to play with in the communal yard. This “weapon house” raised conflicting issues of personal freedom and community priorities. Despite the discomfort raised by the situation, it was not addressed by governing committees because it didn’t fit within organizational boundaries.

Several other issues considered to be personal prerogatives by most Americans did fit within the community planning agenda. Lawn chemicals were heavily restricted and pets were a persistently challenging issue. Nancy Stryker described several factions: dog-people, cat-people, and bird-people (those concerned with cats preying on birds). Each group advocated for better conditions for their pets or wildlife, while often simultaneously pushing for restrictions on other animals. Factionalized groups are a challenge to consensus building, and the issue continues to be brought up as new households enter the community and align with different sides of the debate.

Jim Crowfoot acknowledged the many challenges of finding consensus, but he optimistically argued that it is a learned practice that new households will settle into following initial tribulations. He explained that a move to cohousing requires “cutting

into lifetimes of patterns" and "people try to bring suburbia with them." Given time, he foresees households settling into the system of large group consensus decision-making.

EXTERNAL ACCEPTANCE

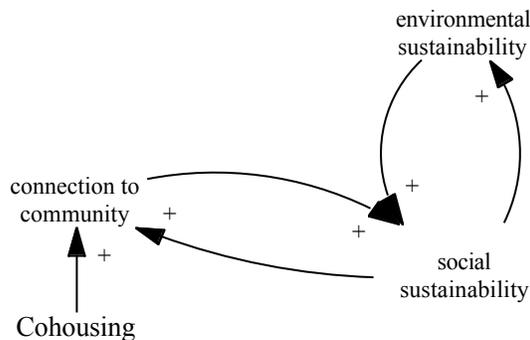
Sunward has confronted many of the challenges faced by a non-traditional association trying to operate in a conventional system. "Visionary founders" began meeting regularly in 1993 and eventually located a suitable site in 1995. However, their initial offer to purchase the property was rejected by the owner. Nancy Stryker explained that he was not willing to sell "to some hippy commune." It took several months, and the formation of a temporary corporation under the business license of one of the initial members, to successfully re-approach the property owner.

Securing loans and mortgages became an additional challenge, and Sunward approached it as many other cohousing communities had in the past. They registered their property as a condominium. Jim Crowfoot explained that this came with a bundle of new requirements under the state of Michigan's Condominium Laws. Sunward had to establish a Board of Directors, with financial obligations and protocols that contrasted with their goal of government by consensus and shared responsibility. A neighboring cohousing community had decided to make everyone in their community a member of the Board, but Sunward took a more conventional approach. They established a Board, but have largely maintained it only for "official and legal interface with external authorities and for making sure legal and financial matters are attended to." (Sunward.org). Despite this limited role, sharing authority between an elected Board and participatory community is continually challenging.

Sunward strives to comply with all condominium regulations, although many do not fit the cohousing model. Jim Crowfoot describes the process of preparing legal notification of upcoming Board meetings and placing the stamped letters to all members in the mailbox for delivery. All households have boxes for inter-community correspondence in the Common House, but state law requires that notice of Board meetings must be sent through a Federal Post Office.

5 Discussion

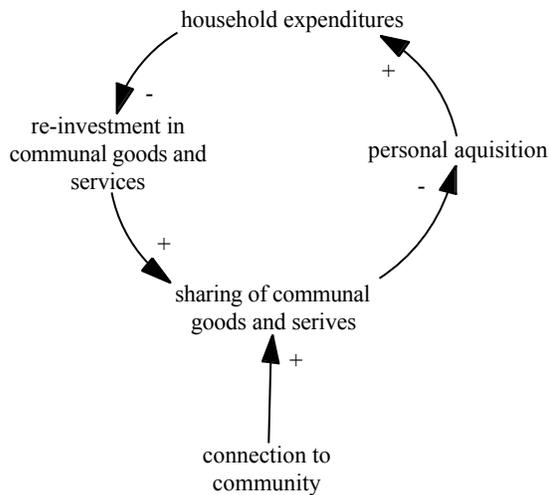
The survey and interviews both confirmed and weakened some of conjectural connections in my causal loop diagram (fig 4). Community connections in Sunward



Cohousing were stronger, as evidenced by greater communication and cooperation. People helped each other and felt a communal obligation towards creating a healthy and secure setting. However, the relationship between social and environmental sustainability was more intermittent. While residents did accept limited use of lawn chemicals, recycling continues to a contentious issue. Rich Kato described the near-

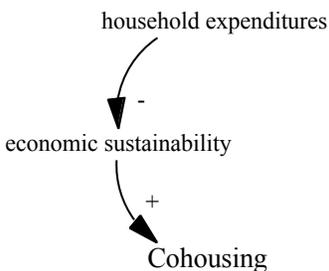
constant battle to raise recycling rates as proof that "we are far from perfect." Although all houses were designed to accommodate solar water heaters, only two have chosen to

install the several-thousand dollar unit. Jim Crowfoot explained, “there is definitely a consciousness, but money has always been an issue.”



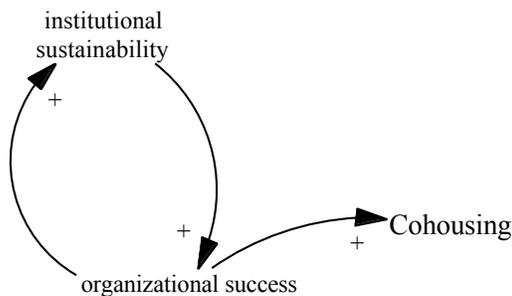
However, lifestyle changes have offered environmental benefits. George Albercook has noticed a substantial decline in his driving now that his two young children are not shuttled around to play-dates with their friends. Instead, the neighborhood kids play together on the community playground. Several of my interview subjects confirmed that they were able to design a smaller home because of the resources in the Common House. The two guest rooms and the meeting/craft room were consistently sited as offering the greatest substitution for personal goods and space. The tool room

was less popular; it was rarely used and George Albercook reported that things were often missing or broken. The community was continually investing in communal goods and services, such as a neighborhood playground and a communally hired home-exterior painter. Connie Plice noted that over half of the donations for the playground came from grandparents who wanted facilities for visiting children but did not want to modify their own homes.



The financial benefits of cohousing appear to support goals of economic sustainability. Homeownership in a desirable community was extended to a lower income bracket than was seen in conventional housing. Communal investment allowed people to reduce the size of their homes and their individual purchases of consumer goods without reducing convenient access.

The weakest aspect of cohousing appears to be institutional sustainability, with organization success being impeded by complex cultural codes and an awkward relationship with financiers and regulators.



The cohousing concept has been inflexibly applied in the United States, rather than modified for efficiency and growth. There is a certain commitment to the ‘purity’ of the cohousing form imported to the United States by Durrett and McCamant. The architectural team has been instrumental in the design of almost every cohousing community in the United States; they met

with Sunward’s founders several times in the formative stages of the community.

Despite the guidance of the movement's founders, the planning stage took nearly five years and encountered time-consuming financial and zoning issues along the way. Jan Gudmand-Hoyer, a Danish cohousing advocate, explained, "for every ten families who want to live in cohousing, there is only one that is prepared to take on the burden of the planning period, and for every ten of those, there are only a few who can take the initiative." (McCamant et al., 1988). Private developers have begun to streamline the process by constructing cohousing communities and selling or leasing properties. Sunward's neighbor, Great Oak Cohousing, was constructed by property developer, and all 37 units were sold on the open market.

Several of the residents I spoke with at Sunward referred to the lack of communal input in the planning of construction of the community as a clear breach of the cohousing philosophy. They all seemed to agree with developer Jim Leach, who feels that, "by eliminating the community involvement in the design and construction process of the homes, (they) will be able to offer significantly lower prices for cohousing homes than we've seen in the recent past. What they will lose is the community building that grows out of the experience of participating with your future neighbors in decisions about the design and construction of your homes" (Wann, 2005). Chuck Durrett has stronger words, equating these business ventures with spaghetti sauce from a jar rather than home-made (*ibid*).

The cultural complexities of cohousing also limit its growth. Cohousing residents are more heavily scrutinized by their neighbors, and personal issues such as choice of children's toys and lawn care products become part of the governing agenda. Privacy is limited, and Sunward has had to develop a system to allow for some solitude in such a collective atmosphere. Residents relaxing on their front porches are considered available for conversation and socialization with passing neighbors. When a resident is on her back porch, she is assumed to be seeking quiet time, and therefore should not be disturbed. These complex codes of behavior are difficult to assimilate with American concepts of privacy and personal choice.

The time-demands of cohousing are also substantial; residents are all expected to contribute to community maintenance and meal preparation, and to attend regular meetings. This poses an additional challenge, as the majority of Americans surveyed by Robert Putnam said they did not have time to attend meetings or volunteer (Putnam, 2000). And despite the hope that cohousing would increase residents' free time through communal work sharing, the inverse is more commonly reported. Several of my interview participants felt they had less free time due to frequent and time-consuming community obligations.

6 Conclusion

The head of UNEP's Division of Technology, Industry, and Economics may have been trying to calm skittish business interests when she assured, "sustainable consumption is not about consuming less, it is about consuming differently, consuming efficiently, and having an improved quality of life" (Fuchs and Lorek, 2004). This weakened definition of sustainable consumption does little to promote true innovation and household engagement. It also implies that lessened consumption would unnecessarily sacrifice well-being. Continued cultural research has challenged the

connection between high consumption and quality of life. Author Andrew Bard Schmookler explains, “the culture of mass consumption develops around a core of unfulfilled longing, in which advertising promises the goods we can buy carry with them the states of consciousness we desire and in which the broken promise of each purchase leads to new yearnings”(Schmookler, 1991)

Spiraling consumption driven by unfulfilled desires for identity and fulfillment will continue to challenge household sustainability in the United States. Cohousing has the potential to offer an alternative, where needs are met through communal investment and neighborhood reciprocity and identities are built through inter-personal communication, rather than displays of status.

Given the advantages of cohousing, it is surprising that it remains a small, inconspicuous movement in housing design. Its cumbersome organizational relationships continue to limit its growth. Reforms to the planning process and structure of cohousing are resisted from inside the movement. As cautioned by Charles Durrett, “Americans are so hell-bent on promoting efficiency that they forget the original intention”(Wann, 2005) Given our need to develop innovative and sustainable housing in America, it may be time to re-evaluate the ‘intention’ of cohousing. The cohousing movement must break from its strict ideological commitment to a pure form and begin to dynamically evolve. Cohousing will never be a perfect creature, but adaptation will allow it to grow and change to fit the needs of people interested in supportive communities and inventive housing solutions.

7 Works Cited

- ANDERSON, V. & JOHNSON, L. (1997) *Systems Thinking Basics: From Concepts to Causal Loops*, Waltham, Pegasus.
- ANN ARBOR PUBLIC SCHOOL (2006) Meap Report: Lakewood Elementary. www.aaps.k12.mi.us.
- ARROW, K., DASGUPTA, P., GOULDER, L., DAILY, G., EHRLICH, P., HEAL, G., LEVIN, S., MALER, K.-G. R., SCHNEIDER, S., STARRETT, D. & WALKER, B. (2003) Are We Consuming Too Much? *Working Paper*.
- BARR, S. & GILG, A. (2006) Sustainable Lifestyles: Framing Environmental Action in and around the Home. *Geoforum*, 37, 906-920.
- BRICENO, T., PETERS, G., SOLLI, C. & HERTWICH, E. (2005) Using Life Cycle Approaches to Evaluate Sustainable Consumption Programs. *Working Paper*, Norwegian University of Science and Technology, 18pp.
- BRICENO, T. & STAGL, S. (2006) The Role of Social Processes for Sustainable Consumption. *Journal of Cleaner Production*, 14, 1541-1552.
- BROWER, M. & LEON, W. (1999) *The Consumer's Guide to Effective Environmental Choices*, New York, Three Rivers Press
- COLEMAN, R. P. (1983) The Continuing Significance of Social Class to Marketing. *Journal of Consumer Research*, 10, 265-280.
- DAKE, K. & THOMPSON, M. (1999) Making Ends Meet, in the Household and on the Planet. *GeoJournal*, 47, 417-424.
- DE GRAAF, J., WANN, D. & NAYLOR, T. H. (2005) *Affluenza: The All-Consuming Epidemic, 2nd Ed.*, San Francisco, Berret-Koehler Publishers, Inc. .

- DE YOUNG, R. (1996) Some Psychological Aspects of Reduced Consumption Behaviour: The Role of Intrinsic Motivation and Competence Motivation. *Environmental Behavior*, 28, 358-409.
- EDGAR HERTWICH & KATZMAYR, M. (2003) Examples of Sustainable Consumption: Review, Classification and Analysis *Final Report to Mitsubishi Research Inc. and the Society for Non-Traditional Technology, Japan*, 63.
- ENERGY INFORMATION ADMINISTRATION (2001) Residential Energy Consumption Survey www.eia.doe.gov/.
- FRIEDMAN, S. & ROSENBAUM, E. (2007) Does Suburban Residence Mean Better Neighborhood Conditions for All Households? Assessing the Influence of Nativity Status and Race/Ethnicity. *Social Science Research*, 36, 1-27.
- FUCHS, D. A. & LOREK, S. (2004) Sustainable Consumption: Political Debate and Actual Impact. *Background paper: Sustainable Europe Research Institute*.
- GREEN BAY AREA PUBLIC SCHOOLS (2006) Title I Reporting Survey www.greenbay.k12.wi.us.
- HALME, M., JASCH, C. & SHARP, M. (2004) Sustainable Homeservices? Toward Household Services That Enhance Ecological, Social and Economic Sustainability. *Ecological Economics*, 51, 125-138.
- HENDERSON, H. (2007) When America Became Suburban. *Planning*, 73, 48-49.
- HOLDEN, E. & NORLAND, I. T. (2005) Three Challenges for the Compact City as a Sustainable Urban Form: Household Consumption of Energy and Transport in Eight Residential Areas in the Greater Oslo Region. *Urban Studies*, 42, 2145-2166.
- HOLT, D. B. (1998) Does Cultural Capital Structure American Consumption? *Journal of Consumer Research*, 25, 1-25.
- HOMBURG, A. & STOLBERG, A. (2006) Explaining Pro-Environmental Behavior with a Cognitive Theory of Stress. *Journal of Environmental Psychology*, 26, 1-14.
- HØYER, K. G. & HOLDEN, E. (2003) Household Consumption and Ecological Footprints in Norway – Does Urban Form Matter? *Journal of Consumer Policy*, 26.
- JORDAN, B. (2005) Public Services and the Service Economy: Individualism and the Choice Agenda *Jnl Soc. Pol.*, 35, 143-162.
- KALLIALA, E. & NOUSIAINEN, P. (1999) Life Cycle Assessment: Environmental Profile of Cotton and Polyester-Cotton Fabrics *Autex Research Journal*, 1, 8-21.
- LOREK, S. & SPANGENBERG, J. H. (2001) Environmentally Sustainable Household Consumption: From Aggregate Environmental Pressures to Indicators for Priority Fields of Action *Wuppertal Papers*, 117, 57pp.
- MAMADOUH, V. (1999) Grid-Group Cultural Theory: An Introduction. *GeoJournal*, 47, 395-409.
- MANIATES, M. (2001) Individualization: Plant a Tree, Buy a Bike, Save the World? *Global Environmental Politics*, 1, 31-52.
- MCCAMANT, K., DURRETT, C. & HERTZMAN, E. (1988) *Cohousing: A Contemporary Approach to Housing Ourselves*, Berkeley, Ten Speed Press.
- MOLL, H. C., NOORMAN, K. J., KOK, R., ENGSTROM, R., THRONE-HOLST & HARALD CLARK, C. (2005) Pursuing More Sustainable Consumption by

- Analyzing Household Metabolism in European Countries and Cities. *Journal of Industrial Ecology*, 9, 259-274.
- MONT, O. (2004) Institutionalisation of Sustainable Consumption Patterns Based on Shared Use. *Ecological Economics*, 50, 135-153.
- NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (1943) www.archives.gov.
- NYBORG, K., HOWARTH RICHARD, B. & BREKKE KJELL, A. (2006) Green Consumers and Public Policy: On Socially Contingent Moral Motivation. *Resource and Energy Economics*, 28, 351-351.
- PENN, D. J. (2005) The Evolutionary Roots of Our Environmental Problems: Toward a Darwinian Ecology *The Quarterly Review of Biology*, 78, 275-301.
- PIMENTEL, D., O. BAILEY, P. KIM, E. MULLANEY, J. CALABRESE, L. WALMAN, F. NELSON & YAO, X. (1999) Will Limits of the Earth's Resources Control Human Numbers? *College of Agriculture and Life Sciences*, Cornell University
- PUTNAM, R. (1993) The Prosperous Community. *The American Prospect*, 4, 1-7.
- PUTNAM, R. (2000) *Bowling Alone: The Collapse and Revival of American Community* New York, Simon & Schuster
- ROPKE, I. (1999) The Dynamics of the Willingness to Consume. *Ecological Economics*, 28, 399-420.
- SAGUARO SEMINAR (2000) The Social Capital Community Benchmark Survey *John F. Kennedy School of Government*. Harvard University
- SCHMOOKLER, A. B. (1991) The Insatiable Society: Materialistic Values and Human Needs. *The Futurist*, 25, 17-20.
- SCHOR, J. (1998) *The Overspent American: Upscaling, Downshifting, and the New Consumer*, New York, Perseus Books, L.L.C. .
- SEYFANG, G. (2004) Consuming Values and Contested Cultures: A Critical Analysis of the Uk Strategy for Sustainable Consumption and Production. *Review of Social Economy*, 62, 323-338.
- SPANGENBERG, J. H., HINTERBERGER, F., MOLL, S. & SCHUTZ, H. (1999) Material Flow Analysis, Tmr and the Mips Concept: A Contribution to the Development of Indicators for Measuring Changes in Consumption and Production Patterns. *International Journal of Sustainable Development*, 2(4), 491-506.
- TAYLOR, P., FUNK, C. & CLARK, A. (2007) Things We Can't Live Without: The List Has Grown in the Past Decade *Pew Research Center*, Social Trends Report 18.
- THOMPSON, M. (1997) Cultural Theory and Integrated Assessment. *Environmental Modeling & Assessment*, 2, 139-150.
- U.S. CENSUS BUREAU (2005) American Housing Survey www.census.gov.
- UN DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS (2001) Csd Theme Indicator Framework. www.un.org/esa.
- UNITED NATIONS (1993) Agenda 21- the United Nations Programme of Action from Rio. *Earth Summit* Rio de Janeiro, New York: United Publishing

- VAN DEN BERG, A., HARTIG, T. & STAATS, H. (2007) Preference for Nature in Urbanized Societies: Stress, Restoration, and the Pursuit of Sustainability. *Journal of Social Issues*, 63, 79-96.
- VAN GRUNSVEN, L. (2003) Compact Cities. Sustainable Urban Forms for Developing Countries, Mike Jenks and Rod Burgess (Eds.). *Journal of Housing and the Built Environment*, 18, 387-391.
- WAKEFIELD, S., ELLIOT, S. & COLE, D. (2005) Taking Environmental Action: The Role of Local Composition, Context, and Collective. *Environmental Management*, 37, 40-53.
- WANN, D. (2005) *Reinventing Community: Stories from the Walkways of Cohousing* Golden, Fulcrum Publishing
- WARREN, E. (2003) The Growing Threat to Middle Class Families. *Brooklyn Law Review*.

Appendix I : Survey



Dear Community member :

As part of an ongoing University Supported Survey, we are trying to assess feelings of safety, community, and participation in your neighborhood. Surveys are completely anonymous and you may skip any questions you find uncomfortable. Please return surveys in the Pre-addressed/Stamped envelope within a week. We appreciate your participation.

There are currently ____ Children (under 18) and ____ Adults living in my household.

The square footage of our home is _____ sq.ft

The combined annual income in our household is \$ _____

Given the number of people and activities in our home, this house feels (circle one):

Too Small Just Right Too Big

	Less than once per year	Several times per year	Once a month	Several times per month	More than once per week	Don't Know
About how often do you talk to or visit with your immediate neighbors (closest 10 or 20 households)?						
How often do you borrow or lend household items (ie tools, gardening supplies) from/to a neighbor?						
How often do you carpool with a friend, co-worker or neighbor to work, school, or errands such as shopping?						
In the past year, how often have you given time to, or helped out at, an organization such as a school, a hospital, a prison, a probation office, a charity, a voluntary organization or a community group (eg being a volunteer for one of these organizations)?						
How often do you attend meetings for community, political, religious and/or environmental organization?						
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know
Most people can be trusted						

CHECK THE SERVICES:		
You have hired a company/individual to perform in the past year	You have performed in the past year	
		Lawn Mowing
		Lawn Fertilizing/Pest Removal
		Exterior painting
		Interior painting
		Major remodeling
		Weatherproofing (insulation upgrade, window installation, etc)
		Household cleaning

CHECK THE ROOMS YOU HAVE IN YOUR HOME:	
	Guest Room
	Formal Dining Room
	Laundry Room
	Library/Office
	Play Room (for games and toys)
	Work Room (for crafts and projects)

CHECK THE ITEMS:		
The items you own	The items you have convenient access to (through a business, library, friend, etc)	
		Car
		Clothes Washer
		Clothes Dryer
		Computer
		Dishwasher
		High Speed Internet
		Cable or Satellite TV

Thank you for your time and participation

Appendix II: Frequency Tables

Talk to Neighbors

(%)	Conventional	Cohousing
<once/year	6.67	0
several/year	23.3	0
once/month	23.33	5.88
several/month	20	11.76
>once per week	26.67	82.35

Borrow/Lend

Conventional	Cohousing
50	0
36.67	29.41
6.67	17.65
6.67	35.29
0	17.65

Carpool

Conventional	Cohousing
70	23.58
16.67	23.53
0	17.65
6.67	29.41
6.67	5.88

Volunteer

(%)	Conventional	Cohousing
<once/year	40	23.53
several/year	33.33	17.65
once/month	10	11.76
several/month	6.67	23.53
>once per week	10	23.53

Meetings

Conventional	Cohousing
43.33	17.65
16.67	17.65
6.67	17.65
23.33	29.41
6.67	17.65

"Most People Can be Trusted"

Conventional	Cohousing	(%)
0	0	strongly disagree
11.1	0	disagree
22.2	15.38	neutral/don't know
55.56	84.61	agree
0.56	0	strongly agree