

A Design Note on:

IDENTIFYING ISSUES FOR THE DESIGN OF SMALL HOMES

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ABSTRACT

One housing alternative that conforms to the dominant American housing norms and preferences is the small, single-family house. The purpose of this paper is to identify the issues that require research in order to design small homes that are functional and aesthetically pleasing. The issues of defining what is small, exterior/interior space continuity, space division, shape, furniture, lighting, and color are discussed and research suggestions are proposed.

INTRODUCTION

Alternatives to the conventional, single-family detached house have attracted the attention of housing professionals in recent years. Housing alternatives subjected to research include solar, earth sheltered, manufactured, and various forms of multi-family dwellings. Such research efforts generally address the four environmental measurement strategies proposed by Rapoport (1982): 1) how consumers view housing alternatives, 2) how consumers feel about housing alternatives, 3) what consumers like and dislike about housing alternatives, and 4) the attitudes held by consumers toward housing alternatives.

Research on housing alternatives is certainly justified. Tremblay and Dillman (1983) suggest that rising housing costs, resource limitations, the correlation between housing and quality of life, the reduction of government support for housing, and the relationship between stated preferences and actual housing behavior provide a strong rationale for studying housing alternatives. Jones and Day (1987, p. 130) state that "Because of escalating costs of new construction, there is an increased interest in reducing both the initial costs and the life-cycle costs of housing." Additionally, there exists a large building industry that depends on housing construction for its livelihood. From both a consumer and industry perspective, therefore, acceptable housing alternatives need to be developed.

Tremblay and McCray (1987) create a matrix of housing alternatives that contain innovations regarding structure, construction, occupancy, finance, site, ownership, and energy. Regardless of the housing options under study, however, none of the housing alternatives receive the support that consumers direct at the conventional single-family home. Research focusing on norms (Morris and Winter, 1978; Tremblay and Dillman, 1983) and preferences (Hohm, 1983; Priemus, 1986) reveal a strong consumer choice for purchasing a conventional single-family

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dwelling. This choice is further supported by Morris and Cho's (1986) review of housing preferences as well as Hinkle and Combs' (1983) finding that families are willing to make major lifestyle sacrifices in order to purchase a conventional single-family dwelling. The simple fact is that housing alternatives contain perceived problems (such as aesthetics, location, initial cost, and maintenance) that reduce their acceptability to consumers.

The purpose of this paper is to explore the issues involving the design of one housing alternative that has not been studied to a sufficient degree--the small, single-family dwelling. In purchasing a small, single-family dwelling, housing norms and preferences can be satisfied. Thus, problems typically associated with housing alternatives are not relevant to the downsized dwelling. Additionally, "smaller size means lower mortgage payments, easier upkeep and reduced heating costs" (Metz, 1983, p. 1).

Downsizing the single-family dwelling does involve several issues in need of resolution. These issues represent an excellent opportunity for the collaboration of housing professionals and interior designers. Housing professionals can address the socio-economic and psychological aspects of small dwellings, consumer wants and needs, and the methodology to study consumer perceptions toward small houses. Interior designers can develop the design techniques to create downsized dwellings that are functional and aesthetically pleasing. This paper represents the product of such collaboration.

THE ISSUES

In designing small dwellings, it is not necessary to begin anew. The experiences gained by the design of multi-family, manufactured, and dormitory housing provide considerable insight (Faulkner, Nissen, and Faulkner, 1986). Specific design guidelines for smaller spaces have also been developed by housing specialists in Cooperative Extension Service (Wysocki, n.d.). A review of these publications reveals that designing downsized dwellings that are practical, livable, and energy efficient is the overriding goal when dealing with small, single-family houses. Ownership of small, single-family dwellings produces the additional goal of investment and resale value. Thus, design based on the best housing vernacular that meets these goals must be attained.

The issues identified here that require research and design creativity deal with: 1) defining the small, single-family dwelling, 2) interior/exterior continuity, 3) dividing space, 4) spatial perceptions of shapes, 5) furniture and accessories, 6) lighting, and 7) color.

What Is Small?

The first issue to be addressed by those interested in designing small dwellings is to determine what is meant by small. In their matrix of housing alternatives, Tremblay and McCray (1987) do not consider housing size as a variable. The existence of space norms that "prescribe the amount of space a family should have [based] upon family size and composition" (Morris and Winter, 1978, p. 87) may shed some light on what is small. Morris and Winter review several ways to measure the amount of space needed by families, such as square footage, number of bedrooms, and number of bathrooms. Unfortunately, space standards are often vague and sometimes contradictory. Square footage requirements for a family of five, for example, range from 550 to 1,400 square feet depending on the source utilized (Morris and Winter, 1978). The fact that space norms depend on family size and composition makes a determination of what constitutes a small dwelling extremely difficult.

Two design competitions ignored the notion of space norms when outlining criteria for participants. A competition sponsored by *House Beautiful* (Best small houses '87, 1987) required that entries be less than 1,500 square feet. Garden Way Publishing set a maximum of 1,000 square feet, with the additional criteria that entries contain at least two bedrooms, one bathroom, storage space, and living/dining/kitchen facilities (Metz, 1983). At the present time, there exists confusion as to what constitutes a small, single-family dwelling. Research is clearly warranted to set limits for the small, single-family dwelling, perhaps in the form of square footage per individual, total square footage, and/or minimum space types based on family size and composition.

Continuity Between Interior and Exterior Spaces

Is it possible that certain types of landscaping are best for small dwellings? For example, earth sheltering might conceal the true size of a house as well as enhance energy efficiency. Extensive use of trees around the house might produce the same effect. Using a wide roof-overhang might make a home appear larger than it is. A screened porch and deck might be perceived as part of the dwelling's interior, thereby perceptually increasing its size.

A smooth transition between the exterior and interior is necessary to create the illusion of the environment coming inside. This might be achieved by the extensive use of glass such as glass patio doors, a glass wall with southern exposure, skylights, bay windows, and other windows of differing sizes and shapes. Penetration of the enclosure planes might accent spaciousness and add to an open feeling. The use of plants within the dwelling might also be effective. However, what the profession now has are many possibilities without the completed research that indicates whether design intentions have their intended effects. Consumer perception of various design techniques that create interior/exterior continuity may prove to be a promising research strategy.

Division of Space

Shafer (1986) presents 29 projects displaying space-enhancing techniques that shape and redefine the interior. For example, making maximum use of vertical space by carrying shelving and storage units to the ceiling is one space-enhancing technique. The use of such storage units as well as line direction can also divide space without the need of walls. Planning the decor for the entire dwelling as a unit rather than each room separately seems to create a feeling of spaciousness and continuity. Carrying the carpeting throughout the house, staying with the same colors and textures for walls and ceilings, establishing a clear focal point, and creating a sense of harmony might all contribute to this planning strategy. Creation of a "great room" combining kitchen, living and dining areas into one room is often suggested as a way to visually enhance space (Wysocki, n.d.). Essentially, design recommendations tend to limit space division within the downsized dwelling. The design recommendations lean instead toward open floor plans with multiple-purpose rooms.

Morris and Winter's (1978) research showing that types of space are more important to families than the size of spaces is a valuable resource for the development of design techniques to divide interior space. Whether consumers can accept the types of spaces created by open floor plans is a serious question. The privacy of household members is also an important consideration. The provision of acoustical and visual privacy might be accomplished by the use of sound-absorbing materials, different types of furniture arrangements, or the enclosure of certain spaces such as bedrooms and bathrooms (Mehrabian, 1976). Design techniques based on such sociological and psychological considerations for

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the division of space in the small dwelling must become a priority for experimentation as well as consumer acceptance studies.

Spatial Perceptions of Shape

Sadalla and Oxley (1984) look at perceptions of square and rectangular rooms. Their research shows that rectangular rooms seem larger than square rooms because the distance between any two points is greater in a rectangle than in a square, causing one's eye to move greater distances when gazing across the room. Because of differing shapes, people can also space themselves out more in a rectangular room than in a square room. This is the type of research needed to efficiently design the smaller dwelling because the results suggest that, under certain conditions, rectangular rather than square rooms be used. Obviously, long, narrow rectangles are undesirable. The specific purpose of a room may also make squareness desirable.

Other uses of shape need to be identified and researched. For example, do penetrational planes enclosing interior space produce the illusion of greater space depth? What are the perceptual effects of geometric space? Do angular shapes created by the use of cathedral ceilings open up space? Can the angles of walls (for example, a larger base in comparison to the top) be manipulated to enhance perceptions of space? These are all design questions in need of answers.

Selection and Placement of Furniture

The Extension programs on small spaces that have used Wysocki's (n.d.) work (such as those in Ohio and Illinois) and introductory design books such as Faulkner, Nissen, and Faulkner (1986) propose several suggestions for the selection and placement of furniture. Among these suggestions are compartmentalizing closet storage areas to increase storage capacity, using large multiple-purpose storage units that are built-in to conserve floor space, placing large furniture pieces along the room edges, arranging similar items together on walls or on shelves, and eliminating clutter.

A review of available contract furniture that is often multiple-purpose and built specifically for a range of interior environments may provide ideas about furniture for smaller dwellings. Additionally, interviews with contract furniture designers may reveal what is possible for a specific small dwelling. The selection of contemporary furniture that has simple, clean lines, furniture that is versatile (such as a sofa-bed or a combination coffee-dining table) and furniture built of shiny metals and glass might be appropriate in a small dwelling. Accessories can be based on the same theme with the use of metals, glass, mirrors, and photomurals.

Research to examine how consumers react to such furniture and accessories certainly needs to be conducted. The presentation of floor plans, rendered perspectives, and models to consumers may provide information about acceptability. Consumer responses to actual furniture pieces may also prove informative. Consumer reactions may, in turn, influence the design of furniture and accessories that better conform to the space limitations in the small, single-family dwelling.

Lighting Conditions

Lighting is often utilized to define different areas within the home, set various moods, and focus attention. Besides the provision of light to perform activities in the home, the careful application of light can make an average room look

spectacular, hide architectural flaws, and emphasize interior assets. Unfortunately, the effects created by the application of light to enhance small spaces have not been extensively studied. Lam (1977) and Myerson (1986) provide some ideas of what can be accomplished by lighting, but do not directly apply those ideas to small spaces.

Some possible strategies to manipulate lighting in order to visually expand space are to wash walls with an even layer of light, light up the corners of rooms, use accent lighting to focus attention, use downlight wall washers, place indirect lighting around the room in a band near the ceiling, place uplights behind furniture, and use greater amounts of both natural and artificial lighting. In order to provide affordable housing, however, the cost of such lighting techniques must be minimized. The systematic study of lighting options currently available on the market, experimentation with different types of lighting systems, a cost-versus-effect analysis of lighting options, and psychological studies of spatial perceptions created by various lighting techniques are fruitful areas of research in attempting to determine lighting strategies to be used in a small dwelling.

Application of Color

To alter the feeling of spaciousness within an interior space, color can provide designers with an exceptionally powerful tool. Cain (1972), Birren (1987), Wysocki (n.d.), and Faulkner, Nissen, and Faulkner (1986) provide many suggestions for properly using color in small spaces. Suggestions include carrying the same colors throughout the home for visual continuity, using light hues that recede to expand a room and perceptually create more space, using a wide range of subtle and less assertive colors to integrate forms within rooms, and mixing any intense colors with white to create tints.

Some unusual ways in which color may be utilized in the small dwelling are to use dull, low intensity, and nonreflective colors with the idea of trying to diffuse light. Hues of color might be blended to create an atmospheric perspective, thereby increasing the illusion of depth within the interior space. White appears to be especially effective in creating depth perception illusions because the eye is tricked into thinking the walls are further away. Techniques such as dragging, marbling, and stippling may also be effective in enhancing space.

Extensive research needs to be conducted on color because of its potential to visually enhance space. The use of models and rendered perspectives may be valuable aids in such research. Experimental situations where people react to spaces of different color should be created and studied. An examination of physiological research concerning eye response to different colors may also provide information to help designers best apply color within small dwellings.

CONCLUSION

In the future, because of cost and resource limitations, it is likely that an increasing number of individuals in the United States will live in small, single-family dwellings. The small house conforms to dominant housing norms and preferences, has a smaller initial cost, has a lower life-cycle cost, and is not associated with the perceived problems that limit acceptability of other housing alternatives. The small, single-family dwelling has the potential of becoming an acceptable housing choice if families can learn to live comfortably within smaller spaces. The adjustment to smaller spaces can be tempered by the proper design of the dwelling. This paper addresses seven issues that need to be detailed and studied in order to determine proper design for small dwellings.

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The housing and interior design literature provides a great deal of information that can be applied to small dwellings. However, such design recommendations would be clarified and expanded through additional research. Experimental research, evaluation of design drawings and models, evaluation of products, market research, and acceptance surveys are all possible research techniques to determine whether design recommendations actually work and if consumers find such designs acceptable.

While interior designers have the skills to develop and apply design strategies to increase the livability of small spaces, housing professionals have the background to identify what is a small house, provide the rationale for studying small dwellings, develop the research tools for evaluating design techniques, conduct needed research, and collaborate with interior designers in interpreting research results. Downsizing the conventional, single-family dwelling presents an opportunity for interior designers and housing professionals to work jointly on the development of a housing alternative that meets the needs and wants of families.

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