

AN ABSTRACT OF THE THESIS OF

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Title: Effects of Interior Spatial Features on Use and Perception of Space: An Exploratory Study in Two Assisted Living Facilities in Oregon.

Abstract approved:

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The population in the United States is experiencing a dramatic increase in the number of older adults and this trend will continue with the aging of the baby boomer generation. Many of these older adults want to remain independent in the community, however, when physical or mental health needs do not allow this, purpose-built facilities provide alternative housing/residential care options. The most rapidly growing type of residential care for older adults in the United States is assisted living facilities. It is important for design practitioners and researchers to understand whether current purpose-built housing for older adults, such as assisted living facilities, are addressing their shelter and healthcare needs.

The purpose of this study was to explore if and how specific interior spatial features (light, color, floor covering, and furniture) in the kitchen, dining, and sitting

areas of two assisted living facilities in Oregon influenced space use and perception of space of the facilities' occupants. Based on Weisman, Chaudhury, and Moore's (2000) Environment and Aging Model, the study explored two specific research questions: 1) *Is there a difference in observed behavior of residents in the kitchen/dining/sitting areas of the two facilities?* and 2) *How do residents and staff perceive the interior spatial features in the kitchen/dining/sitting area of each of the two facilities?*

The methods used in this study were photographic analysis, behavioral observations, demographic surveys, and semi-structured participant interviews. Behavioral mapping was used for the observations to examine occupant use of the space. Participant interviews provided resident and staff perception of space data. Information from both observations and interviews was used to create annotated floor plans and photographs indicating positively and negatively perceived interior spatial features.

Results indicate that there is a relationship between interior spatial features and how residents use the space. Layout, circulation, accessibility, and furniture type are aspects of the physical environment that affected space use. Aspects of the social environment affecting space use included social interaction among residents and between residents and staff, along with the dining area being the social hub of the facilities. Autonomy and resident involvement are the aspects of the organizational environment that emerged in this study.

Results indicated a mix of positively and negatively perceived environmental characteristics. Features perceived positively at both sites include the small scale of

the buildings, the dining table arrangement, non-white walls, a connection to nature, social interaction in the space, and resident choice in level of involvement. Features perceived negatively at both sites were noise, carpet flooring in the kitchen work space, the sitting area upholstery, and the aesthetic of lighting fixtures.

Limitations of this study were sample size selection, time, individual differences, and varied location of interviews. Based on the findings from the observations and interviews, practical implications are discussed, as well as suggestions for future research.

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Effects of Interior Spatial Features on Use and Perception of Space:
An Exploratory Study in Two Assisted Living Facilities in Oregon

by
Rochelle R. Neumeyer

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Rochelle R. Neumeyer, Author

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Effects of Interior Spatial Features on Use and Perception of Space:
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CHAPTER 1: INTRODUCTION

1.1 Overview & Problem Statement

Many environmental elements contribute to the way in which we as humans react to a space. Aspects of the natural and built environments combine with social and cultural components, influencing our perceptions. Additionally, people's perception of space may change over the course of their lives due to changing abilities, family structure, and life style choices. Weisman, Chaudhury, and Moore (2000) stated that the experience of "place" for elderly residents is composed of the interaction of the physical setting, the social environment, and the organizational environment. This study will focus on a specific type of purpose-built environment for older adults – the assisted living facility – and the environmental perceptions of older adults living in these types of facilities.

This study is timely because the population is aging in the United States and in most developed countries as well developing countries. The baby boomer generation is approaching retirement age, with the first group of boomers turning 65 in the year 2011 (Quadagno, 2005). It is projected that between the years of 1995 and 2030, the elderly will increase numerically and as a percentage of the total population in all developed countries (IESNA, 2007). The United States Senate Special Committee on Aging (1991) (as cited in IESNA, 2007), projects that the United States will experience a nearly 90 percent increase in the number of people age 65 and over, and

that there will be more people over 65 than under age 17 in the U.S. by the year 2030. Given this expected increase in the older adult population, the importance of understanding the shelter needs of these individuals is amplified.

The shelter needs of humans vary depending on physical ability, as well as other factors. As humans age, many of their physical abilities, especially vision, naturally decline. It is important for interior designers and architects to understand these physical changes and how the built environment can be designed to compensate for them. For example, as part of the vision decline in aging, the lens of the eye thickens and yellows, which often leads to clouded vision, altered color perception, and an inability to focus on near objects (Tofle, Schwarz, & Max-Royale, 2004). Glaucoma, macular degeneration, and cataracts are common among many older people (Calkins, 2003). Thus, aging often brings conditions and diseases leading to changes in color perception and lighting needs. These changes must be considered by designers in planning spaces and selecting finishes and furnishings.

Though a majority of older adults want to “age in place” in their homes and communities (Novelli, 2002 & Greenwald & Associates, 2003), often their home environments cannot accommodate their changing physical abilities and needs. Thus, they need to move to facilities that can support them adequately. Several types of long-term care facilities provide different levels of care for aging individuals. Long-term care can be provided in various settings, including in-home, assisted living facilities, skilled nursing facilities, and rehabilitation facilities (Joseph, 2006a).

The most rapidly growing type of residential care for older adults in the United States is assisted living (Cummings, 2002). People in assisted living facilities are

usually more frail than other community-living older adults. Most people in these facilities need help with some activities of daily living (ADLs), and instrumental activities of daily living (IADLs). ADLs include tasks such as eating and bathing, usually done daily. IADLs are activities like grocery shopping or going to the doctor, which are not typically done every day, but are necessary to remain independent. Assisted living ideally provides this aid to individuals, while allowing them to remain in an environment that promotes choice, dignity, independence, individuality, privacy, and a homelike setting (Cohen & Weisman, 1991; Marsden, 2005).

It is important that designers create assisted living environments that promote these factors. Most previous studies of assisted living facilities have examined the organizational and social support factors, and have focused less on environmental factors (Cummings, 2002; Cummings & Cockerham, 2004; Chou, Boldy, & Lee, 2003). Because recent studies have demonstrated the importance of environmental factors in influencing human behavior, this study focused on exploring what features of the interior environment affected space use, as well as resident and staff perception of space, in two assisted living facilities in Oregon. The kitchens and dining areas of the facilities were selected for the study because these are the primary areas in which people interact with other residents, staff, and visitors.

1.2 Purpose of the Study & Research Questions

The purpose of this study was to analyze and compare user reactions to specific spatial design features of the kitchens and dining areas in two assisted living facilities owned by the same firm. The older of the two facilities, known here as

Valley Run¹, was designed with traditional interior features (*e.g.*, use of neutral colors). In the second, newer facility, Pacific Breeze, which opened a year before the study, attempts were made to utilize interior design elements suggested by some researchers to be more pleasant for residents (*e.g.*, lighting and color).

The following research questions were addressed in this exploratory study:

1. Do the interior spatial features of the kitchen/dining/sitting areas of the facilities appear to modify residents' use of the space?
2. How are residents' and staff members' perceptions of the interior spatial features in the kitchen and dining area of the two facilities similar or different?
3. Is there difference in observed behavior of residents in the kitchen and dining areas of the two facilities?

1.3 Implications

Considering the projections about the aging of the world population, it is increasingly important to build on the existing body of knowledge of how interior spatial features affect the health and behavior of the individuals that inhabit assisted living facilities. Bakker (2000) states that “the blame for some of the functional difficulties elderly people encounter in long-term care really lies in poor design choices rather than the aging process as many – including elders themselves – mistakenly believe” (p. 68).

The aim of this study was to explore reactions to the interior spatial features of two assisted living facilities. It is the hope that by examining which aspects are

¹ Pseudonyms are used for the facility names in order to protect confidentiality of participants.

perceived salient by residents and staff, we may gain a greater understanding of how they affect residents of long-term care facilities. This may, in turn, improve the quality of life of the individuals living in the facilities.

Important terms for this study are defined on the following section. The literature review in the second chapter summarizes previous research in the areas of lighting, color, and furniture (layout, comfort, etc.) in long-term care settings, and how these interior features affect behavior, perception of the space, and the mood of residents.

1.4 Definition of Terms

Activities of Daily Living (ADLs): Include tasks such as eating, bathing, etc. that are done on a daily basis.

Assisted Living: A type of housing, not licensed as a nursing home, that offers supportive and health care services for physically and/or cognitively frail elderly who need help with daily activities (Brummet, 1997; Cummings, 2002).

Cognitively intact: Individuals with few signs of dementia.

Focused interview: A one-on-one discussion between the researcher and participant in which the researcher uses probes (predetermined questions) to find out how participants define a specific situation, what they consider important about it, and how they feel about it (Zeisel, 2006).

Instrumental Activities of Daily Living (IADLs): Include activities such as grocery shopping, going to the doctor, balancing the checkbook, etc. that are not required daily, but are needed to live independently.

Observed behavior: “Systematically watching people use their environments,”

including what they do, how recurring activities relate to one another spatially, and how spatial relations affect participants (Zeisel, 2006, p. 191).

Spatial design features: In this study, spatial design features addressed were lighting (both natural and artificial), color scheme (includes colors and patterns), and furniture (layout/placement, comfort, ease of use).

CHAPTER 2: REVIEW OF LITERATURE AND CONCEPTUAL FRAMEWORK

2.1 Overview

This chapter provides a summary of some of the literature on features of interior light, color, furniture, and flooring that influence behavior and perception of space in long-term care environments. Though the effects of light (both natural and artificial) and color are highly related, they have been broken into separate categories to allow a more detailed summary. While this discussion focuses only on the influence of the physical environment, it is important to remember that social, organizational, and physical environment characteristics also affect occupants' behavior and perception of space.

2.2 Light

The category of light includes both natural and artificial sources. This section reviews literature on the connection of lighting to health and behavior outcomes, including regulation of circadian rhythms, light and melatonin treatments, biological effects of light, and light and cognition. Then, lighting issues relating to long term care, including lighting for older adults and lighting for staff, are discussed.

2.2.1 Connections to Health and Behavior Outcomes

Joseph (2006b) states that light has an impact on human health in at least four ways. It enables performance of visual tasks, helps to control circadian rhythms, affects mood and perception, and facilitates chemical reactions within the body. Some areas of investigation of light relating to health issues include study of the circadian cycle, sleep disorders, seasonal affective disorder (SAD), eyestrain, visual performance, tissue damage to eyes and skin due to ultraviolet radiation, and Vitamin

D deficiency (Donoff, 2008). Sufficient exposure to natural light has been shown to decrease depression among patients (Joseph, 2006b; Noell-Waggoner, 2004), while low levels of exposure have been linked to increased agitation (Joseph, 2006a; 2006b).

Regulation of Circadian Rhythms with Bright Light Therapy

The relation of light to circadian rhythms has been a topic of many studies (Donoff, 2008; Dumont & Beaulieu, 2007; Shochat, Martin, Marler, & Ancoli-Israel, 2000; VanSomeren, Riemersma & Swaab, 2002). Circadian rhythms refer to the natural day-night cycle of the body, approximately 24 hours in length (Donoff, 2008). Adequate exposure to light has been linked to improved circadian rhythms and sleep. Light is the main environmental cue used by the body to set its day-night cycle, and when used properly, it can be used to treat some mood and sleep disorders (Dumont & Beaulieu, 2007).

A recent topic of lighting research is the effect of bright light treatments on occupants. Researchers expose people in a space to artificial bright light while they are indoors, with the intent of simulating the effects of natural light. Van Someren et al. (2002) argue that the time of day of bright light treatment doesn't seem critical (morning, afternoon, and evening have all shown positive effects), and that bright light therapy can improve mood, behavior, alertness, motivation, happiness, concentration, and appetite.

Van Someren et al (2002) have also demonstrated that both complete and partial light deprivation have negative effects on circadian rhythms, with stronger effects occurring with increased age. Age-related circadian rhythm disturbances are hypothesized to contribute to increased memory problems that can occur with aging,

and data suggest that disturbed circadian rhythms may increase occurrence of mortality or occurrence and severity of cardiovascular problems, depression, and cognitive decline in elderly (Van Someren et al., 2002).

Early studies focused only on bright light therapy. Now there is a shift to understanding how the entire profile of light-dark exposure can affect circadian rhythms, and as a result, mood, sleep, and quality of alertness (Dumont & Beaulieu, 2007). Bright electric light exposure treatment is comparable to outdoor light. Results of early studies indicated that bright light was needed for regulation of circadian rhythms in humans (Mishima, Okawa, Hishikawa, Hozumi, Hori & Takahashi, 1994). Now it is also known that the circadian system can respond to low-intensity light, and to variations in light over the course of the day (Dumont & Beaulieu, 2007; Van Someren, Kessler, Mirmiran, Swaab, 1997; VanSomeren et al., 2002).

Shochat et al. (2000) found that an increase in overall light exposure on a daily basis results in overall sleep improvement. Light exposure has been linked to maintenance of good mental health (Dumont & Beaulieu, 2007). Because depression is a common problem among elderly people and is more common in long-term care settings (Cummings & Cockerham, 2004), knowledge of how to treat conditions, such as depression, through environmental design are important.

The goal of an ongoing study by the Lighting Research Center (LRC) in New York is to understand the impact of light on alertness at varying times of day. Researchers are examining whether certain colors of light and types of light are more effective than others in maintaining or restoring circadian rhythms (Donoff, 2008).

Changes in circadian rhythms may contribute to cognitive, mood, behavioral, and sleep disturbances. The circadian system is sensitive to environmental light and melatonin (Dumont & Beaulieu, 2007; Riemersma-van der Lek, Swaab, Twisk, Hol, Hoogendijk, & Van Someren, 2008). Dumont & Beaulieu (2007) state,

“It is now accepted that it is not only bright light that has a physiological effect but that the entire light-dark cycle must be considered. This field of research... shows great potential for the development... of new treatments and prevention strategies for mood and sleep disorders” (p.563).

One important point to consider, however, is that laboratory conditions can be manipulated and more closely controlled than a “real-life” environment. Even if lab studies show that the circadian system responds to low levels of light and that there is a relationship between the intensity of light and its effect on circadian rhythms, it is still largely unknown if this can be generalized to real-life situations, with varying levels of light over multiple days (Dumont & Beaulieu, 2007).

Light and Melatonin Treatments

Reimersma-van der Lek et al. (2008) conducted a study to see if the progression of cognitive/noncognitive symptoms can be improved/restored by treatment with bright light and melatonin (administered in pill form). They hypothesized that long-term treatment would lessen cognitive decline and depression as primary and secondary outcomes, and improve behavior, function, and sleep. Findings of the study indicated that light treatment significantly reduced ratings of irritability, dizziness, headache, constipation, and inability to sleep (Reimersma-van der Lek et al, 2008). In other words, increased light levels contributed to better mood, behavior, function, and sleep.

In the same study, melatonin alone was found to have no effect on depression, and had a negative affect on caregiver rating of withdrawn behavior and mood expressions. However, melatonin had a positive effect in combination with bright light, easing agitated behavior by 9%, and increasing total sleep duration and duration of uninterrupted sleep (Reimersma-van der Lek et al, 2008).

From the study described above, Reimersma-van der Lek et al. (2008) concluded that melatonin treatments improved sleep, but they recommended long-term use by elderly persons only in combination with light in order to suppress negative effects on mood. No adverse effects were found with long-term use of all-day bright light, so it could be considered for use with the elderly who have dementia.

Biological Effects of Light

Biological responses are also linked to exposure to light. For example, light is connected to vitamin D synthesis (Joseph, 2006b; Peck, 1993), which is needed by all humans for maintaining normal blood levels of calcium and phosphorus. Vitamin D aids in calcium absorption, which helps maintain strong bones, and may provide protection from osteoporosis (http://www.mayoclinic.com/health/vitamin-d/NS_patient-vitamind).

Light and Cognition

A study was conducted by Knez (2001), examining the influence of color of light on mood, cognitive performance, and room light estimation. Results indicated no direct effect of light on mood. On measures testing cognitive performance, participants performed best under “warm white lighting” (3000K) for problem solving and short-term recall. Knez (2001) states: “We still do not know if the light affect(s)

cognition via emotion or if emotion and cognition are affected independently by the light” (p.206).

In another study, Hygge & Knez (2001), looked for interaction effects between noise, heat, and lighting levels on attention, memory, and problem solving. Findings indicated that more noise resulted in increased speed but decreased accuracy. Participants showed better long-term recall with a greater amount of light and low amount of noise. in conditions of lower temperature, low noise, and greater amount of light, participants displayed better free recall.

2.2.2 Lighting Issues in Long Term Care Settings

Lighting for Older Adults

Adequate lighting becomes more important with age due to weakened vision caused by natural effects of aging as well as eye diseases such as glaucoma and macular degeneration. When designing spaces used primarily by the elderly, such as long-term care facilities, one must provide more lighting than for younger people while at the same time taking care to avoid glare. Boyce, Hunter, and Howlett (2003) suggest that for performance of visual tasks, natural light is not necessarily better than artificial light. This is because it is more difficult to control natural light. But in relation to sleep regulation and overall health, the benefits of natural have been demonstrated in many studies. This illustrates the importance of both artificial and natural light, and the need to provide means to properly control each.

Cannava (1994) states that as much daylight (for the purposes of this study, the terms “daylight” and “natural light” are used interchangeably) as possible should be used in long-term care facilities – keeping in mind the importance of avoiding glare.

Glare is the sensation produced when the light to which the eyes are adapted is significantly less than the light within the visual field (Noell-Waggoner, 2004). Glare often occurs in transitional areas, in the built environment, such as entryways, making these areas challenging for older eyes. With age, it becomes more difficult to adapt to rapid changes in light and darkness (Calkins, 2003; Taylor, 2005; Tofle et al., 2004). As an older person enters a building on a bright day, it takes up to 90 seconds for the eyes to adjust to the lower light levels indoors (Calkins, 2003).

There is evidence linking glare to agitation generation and discomfort for residents in long-term care settings (Chaudhury, Mahmood, & Valente, 2006; McDaniel, Hunt, Hackes & Pope, 2001; Noell-Waggoner, 2004; Peck, 1993). Along with discomfort, glare may also cause safety hazards, such as falls (Chaudhury et al, 2006; McDaniel, Hackes, Hunt, & Pope, 2001; Noell-Waggoner, 2004; Peck, 1993; Taylor, 2005). Peck (1993) states that glare is painful for cataract sufferers, and can cause the elderly to become less mobile because glare can cause floors to look like ice or water; residents are afraid they will fall on it. DeLepeleire, Bouwen, DeConinck, and Buntinx (2007) studied the levels of light in eight nursing homes and concluded that a higher risk of falls for residents may be related to lack of proper illumination.

Older adults often experience decreased exposure to natural light, due to mobility challenges and institutionalization. Lack of exposure to natural light has been associated with increased sleep disturbances in elderly individuals (Dumont & Beaulieu, 2007). Low levels of artificial light have been linked to increased agitation (Joseph, 2006a; 2006b).

The relationship of light level to number of falls for elderly residents was a recurring theme in the literature reviewed (DeLepeliere et al., 2007; Noell-Waggoner, 2004; Taylor, 2005). Scholars have stated that light levels relate directly to resident safety. Long-term care facilities should provide an environment that encourages residents to be physically active. Appropriate lighting can help residents feel more secure in their movement throughout the built environment. DeLepeliere et al. (2007) concluded from the results of their study that the light level in nursing homes was rarely high enough for older adults. Carson (1998) echoed the view that facilities are underlit, attributing the characteristic to poor lighting system design combined with use of older, lower-output bulb technology. Further, DeLepeliere et al. (2007) found that some of the nursing homes they observed had sufficient lighting installed, but the lights were used infrequently.

Noell-Waggoner (2004) states that a combination of natural and artificial light should be used, especially in nursing homes, due to the age-related changes in vision and the reduced mobility of many residents. Appropriate lighting can aid in fall prevention (DeLepeliere et al., 2007; Noell-Waggoner, 2004; Taylor, 2005), encourage independence, and facilitate wayfinding for elderly residents in long-term care facilities (Joseph, 2006a; Noell-Waggoner, 2004).

Lighting for Staff of Long Term Care Facilities

Natural light is also beneficial for staff in long-term care facilities. Though much research relating to lighting in the work place has been conducted in an office setting, the findings may apply to other work environments, including long term care facilities. Kuller, Ballal, Laike, Mikellides, and Tonello (2006) found that the distance

to the nearest window had an impact on the mood of individuals in an indoor work environment. The further the individual's workspace was from the window, the more negative mood effects were observed.

Exposure to natural light may lead to increased job satisfaction and better performance (Chaudhury et al., 2006; Joseph, 2006b). Natural light has advantages for facility owners and operators because it is considered to provide health benefits with little to no cost (Joseph, 2006b).

Studies of whether artificial lighting has an effect on employees' mood and performance have yielded inconsistent results (Chaudhury et al., 2006). Because of the amount of time spent indoors (approximately eight hours a day for working people), light exposure is determined mostly by light levels in the indoor work environment. Workers with little access to natural light often complain of sleep disorders, lack of concentration, fatigue, and depressed mood (Dumont & Beaulieu, 2007).

"Full-spectrum" electric light, fluorescent lighting that is similar to natural daylight, has been studied as well. Veitch (1997) states that people may report working better and/or feeling better in environments with full-spectrum lighting because they *expect* to, especially if they have been told that the lighting can have that effect. Results of her experiment, in which she controlled for other interior environment features (carpet, wall covering, and furniture), did not support the claim that the spectral composition of fluorescent lamps has any short-term effect on cognitive tasks and mood. Veitch (1997) states:

"It is possible that in settings with more varied finishes, the combination of lamp type and surface colours could lead to a difference

in aesthetic appeal that might result in differences in mood or performance. These would not, however, be direct effects of lamp type on behavior, but mediated effects through cognitive processes (p. 259).”

One study investigated whether indoor lighting and color have systematic impact on the mood of people working indoors (Kuller, Ballal, Laike, Mikellides & Tonello, 2006). The researchers found that differences in indoor lighting seem to affect people in various ways. Workers’ mood was lowest when the lighting was insufficient/too dim, while mood was best when light was “just right”. An interesting finding was that mood declined again when there was too much light, indicating that conditions of inadequate light as well as those of excessive light have a negative affect on mood in an indoor work environment (Kuller et al., 2006).

Color is another environmental component related to light. The following section discusses how color affects behavior and perception of space.

2.3 Color

2.3.1 Personality and Emotional Response to Color

Color and light are interrelated factors, because light generates what we perceive as color (Tofle et al., 2004). It is suggested that color has an impact on mood, satisfaction, motivation, and performance (Chaudhury et al., 2006; Noell-Waggoner, 2004; Peck, 1993). Some researchers suggest that warm colors make people more alert, while cool colors are calming (Chaudhury et al., 2006), but due to a lack of conclusive empirical data on color psychology, “conflicting recommendations are prescribed for the same space and contradictions frequently occur” (Tofle et al., 2004, p. 61). Much of the information on emotional response to color is anecdotal

information; further studies are needed in this area in attempt to gather more empirical evidence.

Dijkstra, Pieterse & Pruyn (2008) propose that the inconsistencies in color research may be explained in part by individual differences in environment/color perception. They conducted a study to examine the effects of color in a healthcare environment, to see if “stimulus screening ability” might explain the contradictory effects of color on emotional states found in previous research. They evaluated, stimulus screening ability, which refers to the natural ability of an individual to “screen out” elements that make the environment more complex, with the hypothesis that a person’s stimulus screening ability serves as a moderator of the effects of environment color on that individual. Results indicated that when participants’ screening ability was taken into account, green wall color had an effect on low-screening participants (that is, those who do not have a natural ability to screen out certain environmental elements). Low screeners also experienced more arousal in an orange room than in a white room, while the two rooms were found to have no difference for high screeners (Dijkstra et al., 2008). Thus, it appears individuals’ stimulus screening ability may have an effect on emotional reaction to color.

Results of a study on the effect of interior color on worker productivity (Kwallek, Soon, & Lewis, 2004) indicated that effects were dependent on stimulus screening ability of the individual and length of time exposed to the interior color. That is, the responses varied based on individual differences, and time was a moderator of effect of color.

In his study on color-emotion associations of adults, Hemphill (1996) found that bright colors (white, pink, red, yellow, blue, purple, and green in his study) elicited mainly positive emotional associations, while dark colors (brown, black, and gray) brought out mainly negative emotional associations. He also found that women responded more positively to bright colors and more negatively to dark colors than men did. “Positive” responses were grouped into four categories: happy, excited, relaxed, and positive. “Negative” responses were grouped into the following categories: anxious, bored, sad, and negative (Hemphill, 1996). Hemphill (1996) reported that 61% of responses to bright colors were positive and 25% were negative. Responses to dark colors were 21% positive and 63% negative. Hemphill (1996) concluded that the results of his study suggest that color-emotion associations become more complex with increasing age. Considering that most individuals have more and varied experiences as they age; they may associate colors with experiential memories. Emotions that correspond to the memories may be linked to colors they associate with the experience. The subjects of Hemphill’s study were undergraduate students, so replicating the study with older adults might produce different results.

Color preference can be affected by factors such as geographical and cultural proximity, age, gender, and background (Manav, 2006). In a study by Manav (2006), examining color-emotion associations and why/how a particular color was selected for a specific interior space, participants chose yellow (from color samples that were shown to them) as the preferred color for dining rooms because they associated the color with simplicity and plainness. Preferences for kitchens and bathrooms were colors close to white, due to their associations with purity and hygiene. The findings

of Manav's (2006) study also suggest that color associations depend on the previous knowledge and experience of an individual. In that same study, responses to bright color samples were perceived as positive by participants, and "lightness and chroma were found to be much more important than that of the hue" (p. 149).

Eysenck (1941) conducted a study examining whether a general order of color preference exists, the relative popularity of saturated and unsaturated colors, and gender differences in color preference. He concluded that the results were in agreement with other studies that had found that to some extent there is agreement between peoples' color preferences, stating that preference is "connected to a general factor of aesthetic appreciation discussed elsewhere (p. 394)." In the same study, Eysenck also found high agreement in color preference between genders.

Similarly, Granger (1955) found that there is a general order of color preference, which he concluded was "dependent in part on the inherent properties of the color stimuli" (p.18). His findings also indicated no significant difference in color preference between male and female participants. From this study, Granger (1955) concluded that an aesthetic factor "of a biological nature" influence color appreciation.

In their study on color preference, Guilford and Smith (1959) had participants rate the degree of pleasantness of a color on a scale from 1-10. Results indicated that when brightness and saturation were held constant, preferences were highest for greens and blues, and lowest for yellow and yellow-green. They concluded that affective value was positively related to brightness and saturation.

The studies by Eysenck (1941), Granger (1955), and Guilford and Smith (1959), investigated adult color preference, however, the participants were young or

middle-aged adults. No studies on color preference of older adults were found. Due to vision changes that occur with age, it is possible that older adults may have different color preferences than those of younger age.

In the cross-cultural study by Kuller et al. (2006) on color's impact on psychological mood, environments were divided into categories of having "no color," "neutral," or "some color." They found that those participants with the most colorful work environment demonstrated better moods throughout the year. However, in some lab studies, very strong colors resulted in undesirable moods (Kuller et al., 2006). Kuller et al. (2006) suggested that good color design may contribute to better mood, because lightness, hue, saturation, combination, and distribution of colors in interior spaces may be important influences on psychological mood of individuals in that space.

2.3.2 Color Studies in Healthcare Settings

Color has been a topic of research in the field of healthcare design for many years. La Torre (2006) states, "Design elements have a significant impact on the individual and awareness of how specific components in the environment can be used to change a client's state of mind is an important part of the therapeutic process" (p. 262). Some think that color may make a significant difference in whether an individual experiences feelings of stress or relaxation (LaTorre, 2006). It has also been found that the physical healthcare environment may affect mood and behavior as well as recovery time (Dijkstra et al., 2008). However, there seem to be contradictory results in regard to the effect of color on recovery time.

Edge (2003) found no significant difference between patients' length of stay based on the color of the wall at the foot of their bed (colors used in the study were beige, purple, green, and orange). There was also no evidence in the results of this study that the color of the wall influenced level of patient anxiety.

When patients were interviewed by Edge (2003), some (mostly males) said they liked the beige rooms, while some female patients found the beige walls "institutional" and said they felt more comfortable in a room with colored walls. This indicates that there may be a difference in color preference based on gender. Also interesting to note was that staff and patients had similar feelings about the colors, preferring colored walls over beige walls a majority of the time (Edge, 2003).

Sensitivity to the given environment can also play a role. Dijkstra et al's (2008) study applied to healthcare facilities, where people typically experience feelings of anxiety and fear. If patients are unable to screen out those feelings, their reaction to a wall color may not be solely a reaction to the color itself, but a reaction that is influenced by other stresses/emotions they are experiencing in the healthcare environment.

While wall color is an environmental stimulus that can be changed easily, making it an important feature of interior design of any facility, there is little empirical evidence regarding the effects of color in the environment in healthcare settings. Greater knowledge of emotional response to color has potential benefits in healthcare and other settings because it is inexpensive to change and may be a tool for producing desired health effects (Dijkstra et al., 2008).

2.3.3 Color Perception and Aging

Most researchers concerned with aging (Calkins, 2003; Noell-Waggoner, 2004; Peck, 1993; Ross & Spitzer, 1993; Tofle et al., 2004) agree that it is important to understand how the natural effects of aging affect the eye and how visual perception of color changes as people age. The lens thickens and yellows, which can cause vision to become blurred and colors to become distorted. Calkins (2003) states that these changes affect the way elderly people perceive the environment. It takes older people longer to adjust to dramatic or sudden changes in light levels. The change in color perception can cause pastel colors to appear gray (Ross & Spitzer, 1993). Tofle et al. (2004) state that evidence regarding age specific color vision loss has been inconclusive, partly because of age difference in sensitivity to luminance. The age at which vision changes begin varies among individuals.

Results of studies on adult color preference are inconclusive in relation to color value (high or low) preference. In their study of children grades 1-12, Child, Hansen, and Hornbeck (1968) found that higher saturation was preferred to lower saturation, supporting earlier findings from studies with adults.

2.3.4 Color Selection in Long Term Care

Many long-term care facilities are designed based on the tastes of owners or donors, without taking into account the color needs of the elderly people that will live in the facilities. This indiscriminate use of color often results in a built environment in which residents have difficulty seeing (Calkins, 2003). When it comes to differentiating surfaces with the use of different colors in the built environment,

researchers agree that value contrast is more important than actual color contrast (Calkins, 2003; Noell-Waggoner, 2004; Peck, 1993).

Pitchford & Mullen (2001) conducted a study with children on the development of color cognition compared to the development of the perceptual attributes of form, size, and motion. They found that the conceptualization of color for children was less relevant than the conceptualization of everyday objects. “Color is an abstract property... it is a perceptual attribute that can be abstracted from an object, and by itself lacks the functional significance that is inherent in objects” (Pitchford & Mullen, 2001, p. 291). This may relate to the importance of contrast (rather than the specific color used) as a tool for older adults to distinguish one object or surface from another. Perhaps form, size, and the activities occurring in the interior environment are a primary concern and color is secondary. As Manav (2006) states: “People experience their surroundings through perception, cognition, and construct meaning through color” (p. 149).

2.3.5 Human Response to the Color Orange

Because this thesis compared a kitchen/dining area with white walls to one with orange walls, the following studies reviewed relate to mood and behavior responses to the color orange that have been found in previous research.

In a color association study, Mahnke (1996) found orange to be associated with the terms “jovial” and “happy”. Bright orange is viewed as exciting and stimulating, while light orange is thought to be cheering. Positive associations with the color orange include the terms “jovial,” “lively,” “energetic,” “extroverted,” and “sociable,” and according to Mahnke (1996), orange has virtually no negative cultural or

emotional associations. In a study on color-emotion associations, Manav (2006) found that in general, participants responded positively toward orange, relating it to terms such as “vivid” or “striking.”

The application of orange in kitchen and/or dining spaces appears to be a good choice, as it is an “appetite-appealing” color. When used on walls, orange gives a warm and luminous effect (Mahnke, 1996). Orange walls were rated as more attractive than white walls, yet were rated lower in professional appearance (Dijkstra et al., 2008).

Interviews with hospital patients revealed that the patients felt that an orange wall at the foot of their bed “brightened up the room and gave a welcome relief to the beige throughout the majority of the hospital”, and staff commented that the orange color was “bright and uplifting” (Edge, 2003, p.51). Similar findings by Dijkstra et al (2008) indicated that when compared to white, orange walls had a significant effect on arousal, suggesting a relationship between the color orange and feelings of arousal.

In their study on the effects of interior colors on clerical tasks and mood in an office setting, Kwallek, Lewis, Lin-Hsiao, and Woodson (1996) found that of the eight interior colors studied (one of which was orange), performance was lowest in the white office interior. Another study (Kwallek, Woodson, Lewis, & Sales, 1997) tested the hypothesis that an office with a bright color covering the largest surface area would create an environment perceived as more confined, unpleasant, and prohibitive of productivity. The researchers predicted that those in a red office would be more adversely affected than those in a blue-green office. While the study found no supporting evidence for that hypothesis, it did provide more support for the role of

stimulus screening ability in color perception. High-screening participants performed better in the red office than did low-screening participants.

Upon completion of his study on color preference, Eysenck (1941) concluded that there was a slight preference for orange among male participants, compared to a slight preference for yellow among female participants.

In summary, the same feature of an interior likely affects people differently depending on individual characteristics. In settings such as healthcare environments, where people's ability to screen out information may be reduced due to medical conditions, color may have a more important influence. The same might be true in long-term care settings, where many residents are dealing with depression, mobility issues, dementia, and other challenges.

Another important component of the interior spatial environment is furniture. The importance of function, comfort, and placement of furniture is discussed in the following section.

2.4 Furniture

Appropriate furniture selection for assisted living environments is important in order to ensure ease of use and resident safety. Furniture should be comfortable and look residential (similar to what a resident might have in his or her own home) (Cohen & Weisman, 1991). Stability is a major consideration – especially for tables and chairs – for senior living environments, as the furniture is often used to support resident movement (Liebrock, 2000; Schwarz & Brent, 1999). Furniture should be easy for older adults to use and should be positioned in a way that does not obstruct

flow of foot-traffic. Necessary clearance for wheelchairs and walkers should be provided (Perkins, Hoglund, King, & Cohen, 2004).

Older adults often have physical limitations, such as arthritis, that make it difficult for them to move into and from seating. They also experience increased discomfort while seated (Koncelik, 1993). Seating becomes even more important for people living with decreased mobility because the seat becomes a place for them to sit and observe and/or interact with the people and the environment around them. Decreased muscle strength in the legs and arms also occurs in older adults, so chairs should have armrests that run the full depth of the chair and can support and assist the elderly in getting up from the chair (Bakker, 2000; Koncelik, 1993, Piotrowski & Rogers, 2007). Dining chairs should provide lumbar support and have castors on the front legs to facilitate movement (Regnier, 2002).

In an interview by Peck (2006), furniture designer Roger Leib stated, “A chair should encourage people to continue moving even while in place, and to feel energized to get up and out of it now and then” (p.72). Bakker (2000) supports this idea of “motion chairs”, which she defines as rocking chairs that are stable and have a stationary platforms that are easy to get out of.

Due to variation in human body size, it is difficult to find a chair designed to accommodate every person. Long term care facilities should aim to provide a variety of seating sizes and options for residents (Koncelik, 1993). Furniture should be residential in appearance while of commercial quality.

Key issues for upholstery in assisted living facilities are maintenance and cleanability (Piotrowski & Rogers, 2007). Materials need to meet code requirements

but avoid an institutional appearance. Regnier (1994) states, “Giving an interior the look of a residential environment is greatly dependent on furniture choices and finish decisions” (p. 11). Items chosen based solely on maintenance concerns tend to look institutional.

Important considerations for dining tables are that they be large enough for their intended use, be wheelchair accessible, and have a matte finish on the top to prevent glare. Pedestal tables should be avoided as they can easily tip over. Tables and other furnishings with drawers should include pulls that are easy for arthritic hands to grasp (Bakker, 2000).

Arrangement of furniture is also important for promoting independence and socialization among residents. There should be enough room to move easily through the space, but it is also important that people with hearing deficiencies be able to hear those around them and participate in conversation without difficulty (Bakker, 2000; Hiatt, 1991). Piotrowski & Rogers (2007) recommend that furniture groupings be placed in such a way that will encourage social interaction. Regnier (2002) provides an example: “In Denmark, an eight-person family-style table used for meals has sociopetal characteristics. The table stimulates conversations between the [caregivers and residents] who take meals there” (p.80).

2.5 Flooring

Brawley (2006) states that providing the best possible quality of life for older persons requires consideration of therapeutic issues associated with finish selections, flooring in particular.

When choosing floor coverings for assisted living facilities, safety and aesthetics should both be considered. Carpeting is the most popular choice for these facilities, and is appropriate for dry areas (Piotrowski & Rogers, 2007). It is frequently used because it helps achieve a more residential appearance (Perkins et al., 2004). Low-pile carpet is often recommended for accessibility reasons, but Dickinson (2009) argues that as long as pile height is below ½ inch it can be considered “low compliancy,” meaning that the floor material shows little compression or give, and may be used for older populations. Perkins et al. (2004) recommend dense loop carpet because it provides a good walking surface for the frail elderly, helps prevent slipping, and allows for use of walkers and wheelchairs. It is important that flooring promote mobility (Brawley, 2004).

Dane (2002) and Dickinson, Shroyer, and Elias (2002) concluded that healthy older adults did not have difficulty maintaining balance on commercial-grade carpet. A study on the effect of residential carpet and pad on balance of healthy older adults was conducted by Dickinson, Shroyer, Elias, Hutton, and Gentry (2001). Results indicated that participants displayed limited difficulty in sustaining balance on the residential carpet used in the study (1/2” cut pile carpet with 7/16” pad).

Carpet tiles can be more effective than broadloom in areas where spillage is an issue; though it can be more expensive initially, it is easier to replace one stained tile than to replace an entire piece of broadloom (Perkins et al., 2004). Carpeting in assisted living facilities should also have a backing system with a moisture-barrier (Regnier, 2002).

Many older adults look at the floor when they walk, so designers should avoid busy flooring patterns as they can cause confusion and depth perception problems (Brawley, 2006; Piotrowski & Rogers, 2007). For example, if the carpet has a floral pattern, residents with dementia may become confused and think the flowers are real and try to pick up the flowers.

Dark colors and contrasting patterns should be avoided because they may be perceived as something the resident needs to step over. Contrast between floor and wall surface colors is important (Brawley, 2006; Perkins et al., 2004), and Piotrowski and Rogers (2007) recommend avoiding borders in flooring as they are sometimes interpreted as a step. Regnier (2002) recommends carpet be a dark enough color for easy maintenance, but light enough to reflect some light.

Carpet can help with glare avoidance and noise reduction, and may provide increased warmth and comfort in the space.

Hard surface flooring should be used for frequently cleaned areas and in areas where water is used, such as kitchens and bathrooms (Perkins et al., 2004). Vinyl sheet flooring with a low-luster finish is often used in assisted living facilities. Non-slip, non-glare ceramic tile can also be used, but the hard surface can be problematic if an individual falls on it, and the grout between tiles can be porous (Piotrowski & Rogers, 2007). In areas where flooring changes occur, providing flush transitions is important for fall prevention. Overall, flooring should be selected to meet both functional and aesthetic needs.

For the reasons noted above, interior spatial features are important considerations in long term care settings. Lighting, color, furniture type and

arrangement, and flooring should be selected with the goal of promoting resident comfort while maximizing their physical abilities and encouraging social interaction.

2.6 Summary of Literature Review

2.6.1 Summary of Lighting Research

Natural light influences behavior, mood, vitamin D synthesis, and sleep regulation. Lack of natural light is related to lack of concentration, fatigue, and depressed mood (Joseph, 2006b; Noell-Waggoner, 2004; Peck, 2003). Reduced mobility often experienced by older adults can result in decreased exposure to natural light. For this reason, the influence of artificial light on human health can be increasingly important with age. Research has demonstrated that artificial light can be used in the form of bright light therapy to help regulate circadian rhythms and improve mood, behavior, alertness, and appetite (Van Someren et al., 2002). Both natural and artificial light also play a role in fall prevention.

The importance of light, both natural and artificial, as it relates to human health is becoming more evident through research, as indicated by the studies mentioned above. Dr. George Brainard of Thomas Jefferson University in Philadelphia (quoted in an article by Donoff, 2003, p.280) comments: “We are in the early days of a revolution. Ten years ago it was an issue of if light impacts health. It's not a question anymore, it's how and when.”

2.6.2 Summary of Color Research

Color and light are linked, so it is not surprising that color has also been shown to have an impact on mood, performance, and satisfaction (Chaudhury et al., 2006; Noell-Waggoner, 2004; Peck, 1993). Studies have demonstrated that light and color

can affect mood, behavior, and perception of space. Natural decline in physical ability and vision that occur with aging create special considerations of which designers need to be aware. Light and color should be treated as two of the many components that make up the totality of a building and contribute to the health of its occupants (Kuller et al., 2006).

Personality may affect emotional reaction to color (Dijkstra et al., 2008). It is important for designers to be aware that color perception is also altered due to vision changes that occur with age (Tofle et al., 2004). One study found that bright colors were associated with more positive emotional associations than were dark colors (Hemphill, 1996). While many color studies have yielded inconclusive results, researchers agree that value contrast is more important than actual color contrast (Calkins, 2003; Noell-Waggoner, 2004; Peck, 1993).

2.6.3 Key Points Regarding Furniture Selection

Furniture selection and arrangement are also important to promote safety and autonomy of residents. Selection and placement should be done carefully, to ensure proper clearances to meet universal design guidelines and facilitate movement throughout the space. Furniture should also be arranged as it would be in a private residence, promoting social interaction. Furniture should be easy to clean and maintain without looking institutional.

2.6.4 Key Points Regarding Flooring Selection

Both safety and aesthetics should be considered when specifying flooring for assisted living environments. Carpet is a popular selection for dry areas, but dark colors and large patterns should be avoided. Vinyl flooring is often used for

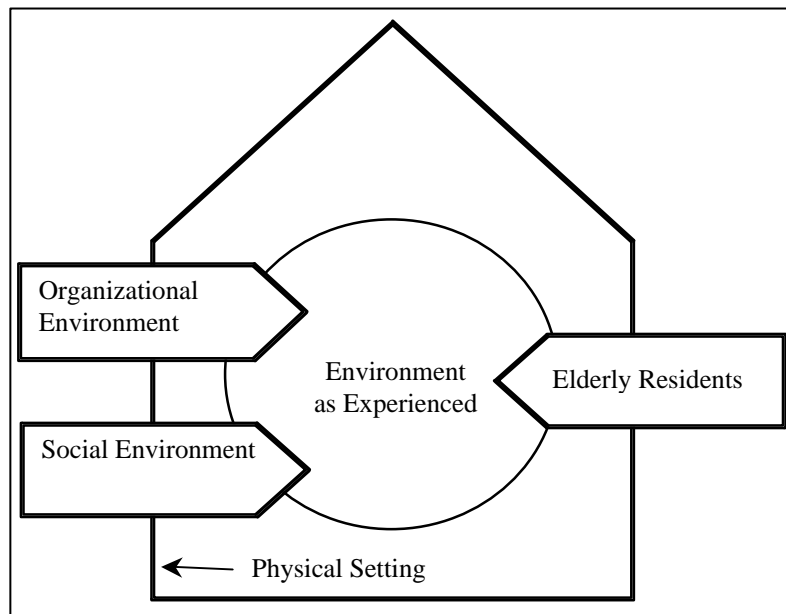
frequently cleaned areas. Transitions between types of flooring should be flush to prevent falls.

This review demonstrates that there are very few studies that explore the effect that interior spatial features have on older adults using the space. Thus, there is a need for more research in this area. Questions of interest in this area include if interior spatial features such as light, color, furniture, and flooring influence behavior of residents in long-term care settings, and whether or not these elements affect staff and/or residents' perception of the space.

2.7 Conceptual Framework

The physical, social, and organizational environments collectively influence the experience of place for elderly residents in long-term care settings (Weisman et al., 2000). The Environment and Aging concept model developed by Weisman et al. (2000), shown in Figure 1.1, illustrates environmental factors that influence the experience of place as it occurs with aging. The organizational, social, individual, and physical environments are interrelated, and all have an impact on an individual's overall environmental experience. These environments combine to form what Weisman et al. (2000) refer to as the "attributes of place" experience. There may be times when one of the attributes has stronger influence than others, but they always interact with one another to produce the overall environment experience.

Figure 1.1. Weisman, Chaudhury, & Moore's Environment and Aging Model



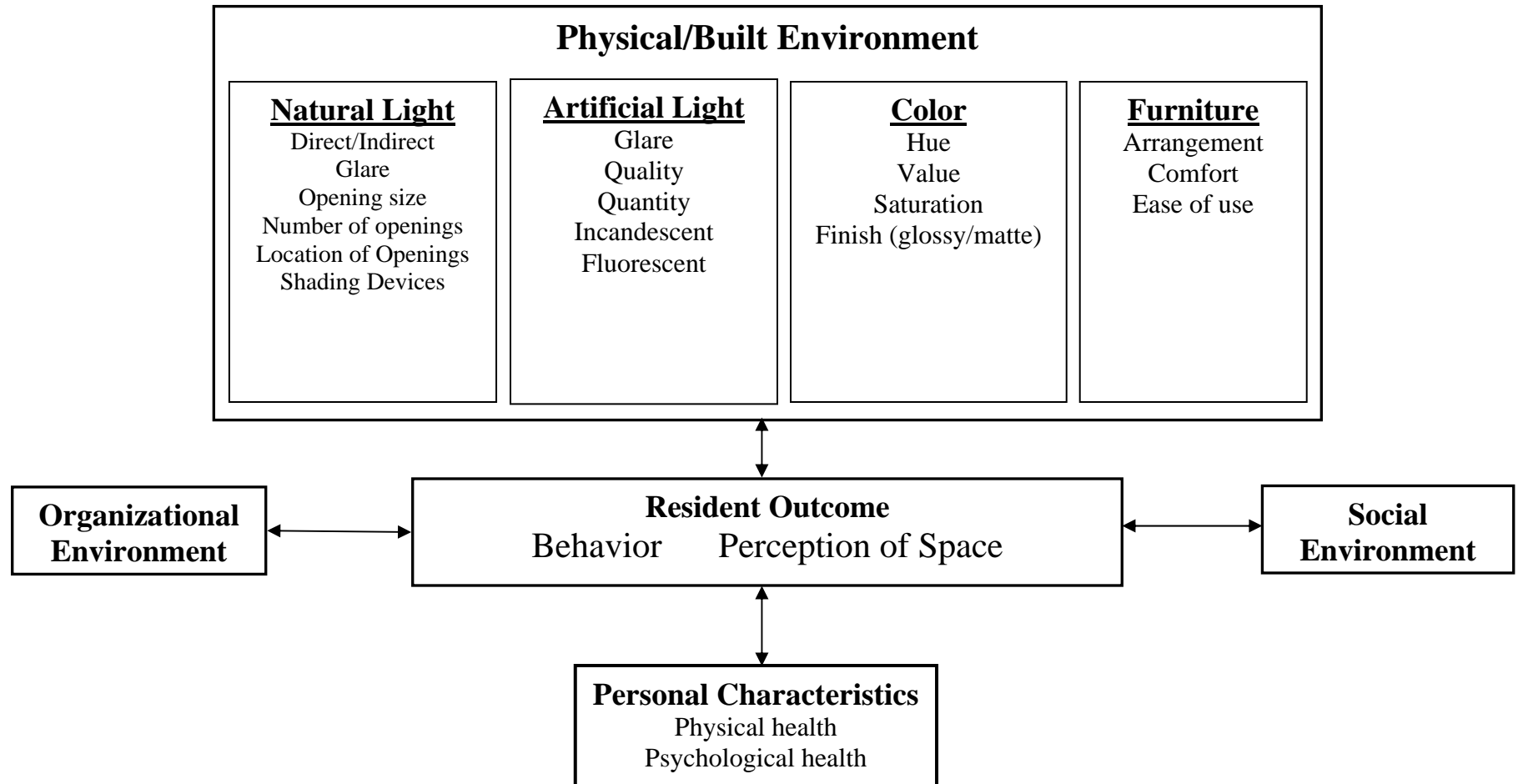
The conceptual framework shown in Figure 1.2 was adapted for this study from Weisman *et al.*'s model. It illustrates the elements that influence the spatial experience of an individual. This study focuses on the spatial elements of the physical environment that may influence resident behavior, and staff and resident perception of space. The items related to physical environment are shown in more detail than the other environmental factors (social, organizational, and personal) in Figure 1.2, however, it is important to be aware that all of these environment types produce a combined effect on resident and staff outcome (behavior and perception of the space), and the findings of the study should be considered with that in mind.

The arrows in Figure 1.2 indicate the presence of a relationship between factors, not cause-effect. Therefore, in this conceptual framework and this specific study, the findings cannot be expressed as cause-effect. It will be possible, however,

to discuss whether the residents perceive the physical environment to be positive or negative, which is useful information for designers.

Spatial features of the physical environment that the study will explore include natural light, artificial (electric) light, color, furniture, and flooring. The issues addressed for each feature are illustrated in Figure 1.2. For example, glare, quality and quality of light, and type of lamp (incandescent or fluorescent) are all issues associated with artificial light. While there are other characteristics of the physical environment, this study will explore only those described in the figure because the owners of the facilities under study have made changes in those specific areas. However, the findings of this study may provide a basis for more detailed studies of other aspects of the physical, social, organizational, and individual environments.

Figure 1.2. Factors Influencing Resident Behavior and Resident/Staff Perception of Space in Long-term Care Settings



CHAPTER 3: METHODS

3.1 Overview

The aim of this study was to examine person-environment interactions as well as occupant perception of the interior environment in two assisted living facilities. A qualitative research approach was used for data collection. This method works well when researching people in places, a focus which is a way to examine both structure and action, without assuming that either has priority over the other (Zussman, 2004). Though the focus of this study was on the built environment and its effect on resident behavior and staff and resident perception of space, it is important to acknowledge that there are many other factors (social, organizational, personal) simultaneously affecting these outcomes. Typically utilizing fewer participants than quantitative research methods, qualitative research has the advantage of close observation of real-life situations (Flyvbjerg, 2006).

This chapter is organized into three sections and deals with the specifics of methodology used for this study: site selection, data collection methods, and data analysis and trustworthiness of this research.

3.2 Site Selection

The study was conducted at two assisted living communities in the Portland, Oregon area. The two residences were chosen for both their similarities and their differences. The similarities provide control variables for the study. They are owned by the same company and share the same operational philosophy, providing a degree of consistency in the social and organizational environments. The goal of the owners is to honor and validate older adults, using design, a relationship-based care model,

and technology to cultivate belonging, influence, and purpose in life for residents. The homes implement barrier-free design, to allow access by individuals of all ability levels. Residents are involved in household decision-making; and interaction among residents, staff, and family of residents enables them to problem-solve to create a satisfactory place to live.

The facilities utilize a monitoring technology system to gather, store, and transmit resident health information. This provides feedback and cues to staff that may help their efforts to prolong resident independence and remain proactive by identifying health problems early.

The facility design is based on a household-type model, which means that they are residential in scale, house a small number of residents, and include an open kitchen with family-style dining. The floor plans for the facilities are similar, affording approximately the same size household at each facility, with comparable layouts of the kitchen and dining spaces used in the study. A profile of the selected facilities was compiled by three techniques: 1) an interview with the owners about the development and organizational philosophy of the two study sites, 2) information gathered from the facilities' websites, and 3) a photographic inventory of the study spaces within each site. Additionally, the researcher drafted computer drawings of the floor plans of each observation setting. The information obtained is presented in the following sections.

3.2.1 Owner Interview

The two facilities, Valley Run and Pacific Breeze, are owned by a husband/wife company. The owner interview was conducted at Pacific Breeze. Both owners were present during the interview session. The purpose of the interview was

to obtain an understanding of the decision-making processes that resulted in the designs at both facilities. The interview information is summarized below under interior spatial feature categories.

Layout

According to the owners, the three main factors that guided their design decisions were community, relationships, and ease of navigation. In developing the initial plans, the owners said the idea for the homes came from their own thoughts of “Where would I want to live, regardless of my condition?”

The overall goal of the facilities is to create a sense of community and a homelike atmosphere. The owners said that in the plan development process, professional advisors, such as architects, recommended they keep the plan on one story, but the owners felt that would result in a plan that was too spread out, with too many hallways. Because they were trying to avoid that type of layout, the owners decided to proceed with their ideas for the 2-story plan.

When Valley Run was built in 2001, the living room area was put on the ground level because, according to the owners, when you walk into a home, you usually walk into the living room area. Because each house had two main social spaces, the other main social space – the kitchen – was put on the upper floor. However, they noticed that the kitchen was the social hub of the house, so when Pacific Breeze was built in 2008, they put the kitchen on the entry level and the common living room space on the upper floor.

Lighting and Color

The lighting design at Pacific Breeze was influenced by studies the owners read about seasonal affective disorder and the effects of melatonin on circadian rhythms. When fully implemented, the goal is for the lighting to create a dawn to dusk simulation. The owners stated that in the morning, the lighting will be similar to full-spectrum lighting, and will gradually decrease in intensity as the day goes on. At night, the light will be somewhat red in tone. The owner compared it to the type of light created by a campfire. However, at the time of the study, the lights had not been programmed. Instead, they were simply on all at once. There was no variation over the course of the day.

The wall colors at Pacific Breeze were selected by one of the facility managers, in consultation with an interior designer hired by the owners. The interior designer did not respond to inquiries.

The ceiling color at Pacific Breeze was selected by the owners after reading a study that was done in Germany. According to the owners, the results of the study indicated that people with Alzheimer's can not see white ceilings well, but green ceilings ground people. The researcher was unable to obtain a translation of the study in English to confirm the owners' statement about the results.

Furniture

The furniture at Valley Run was selected by one of the owners. At Pacific Breeze, it was selected by a manager, with some input from the owners. The dining chair seats and sofas are upholstered with a Crypton fabric for ease of cleaning. One of the owners stated that the "character" of the houses changes over time as residents

bring in their own furniture. The longer the facilities are open, the more they are personalized with resident belongings.

Floor Covering

When selecting the floor covering at both sites, the owners considered durability, comfort, and maintenance. They wanted carpet throughout, even in the kitchen, because staff often stand in that space for long periods of time. A low-pile commercial carpet was selected for ease of movement for wheelchairs and walkers, and carpet tiles were used so that they can be easily replaced in small areas as needed. The owners stated that there is a steam-cleaning system in place as well.

Effects of Design & Future Directions

The owners were asked if they have seen any resident behaviors at either site that they believe can be attributed to the physical design of the space. They said they believe it is not only the design of these buildings that makes a difference, but it is also the way that each house fits into the landscape and the neighborhood. One of the owners noted that though she only has anecdotal evidence, she believes that residents at these facilities get more exercise, are less agitated, and are on less medication than those at “traditional” assisted living facilities.

The owners plan to model future facilities on the Pacific Breeze facility. The only changes they plan to make are to add a study area to the common living area on the upper level. Other changes will be made only in response to changes in code requirements or to address issues related to the features of the site itself.

The following sections describe each site in more detail, and include the photographic inventory of the spaces studied.

3.2.2 Valley Run Assisted Living

Valley Run, opened in 2001, is an assisted living community comprised of six houses on a 6.6-acre campus. Each house has 12 private residence suites, arranged in a cul-de-sac layout to promote a sense of community among residents, staff, and family. This layout encourages residents to act as neighbors, and to look out for and support one another. The homes are built to residential scale, and are intended to be completely accessible to residents. Figure 3.1 shows the floor plan of Valley Run, House A; Figure 3.2 illustrates the same for Valley Run, House B.

Figure 3.1: Floor plan, Valley Run, House A.

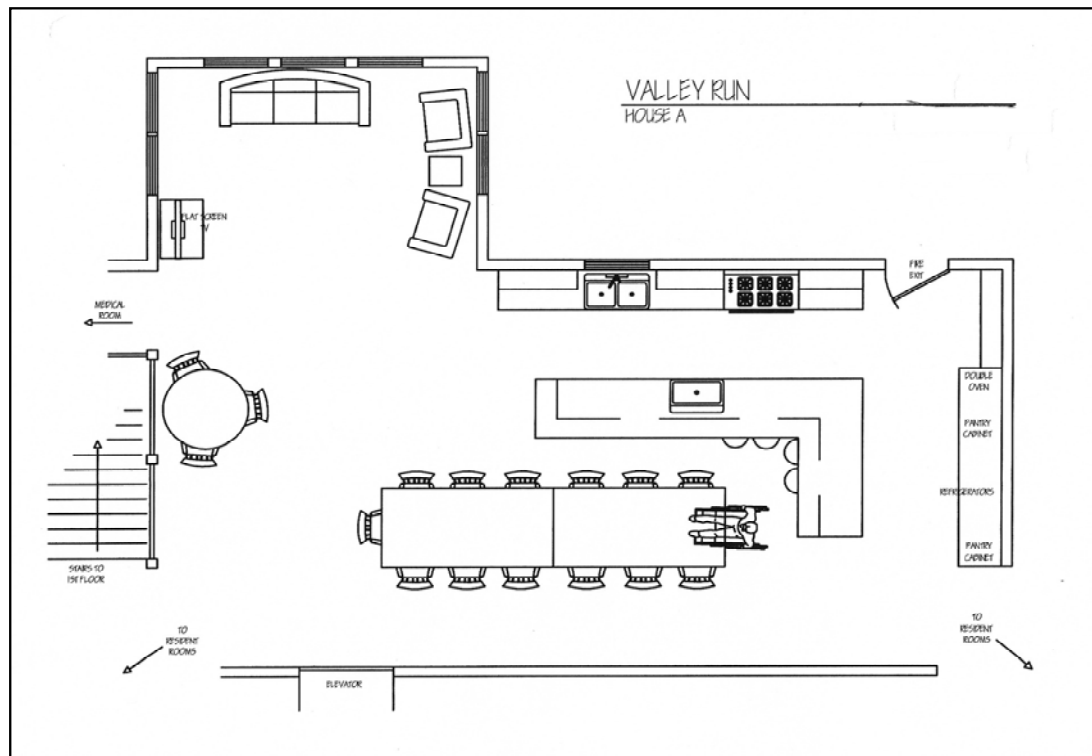
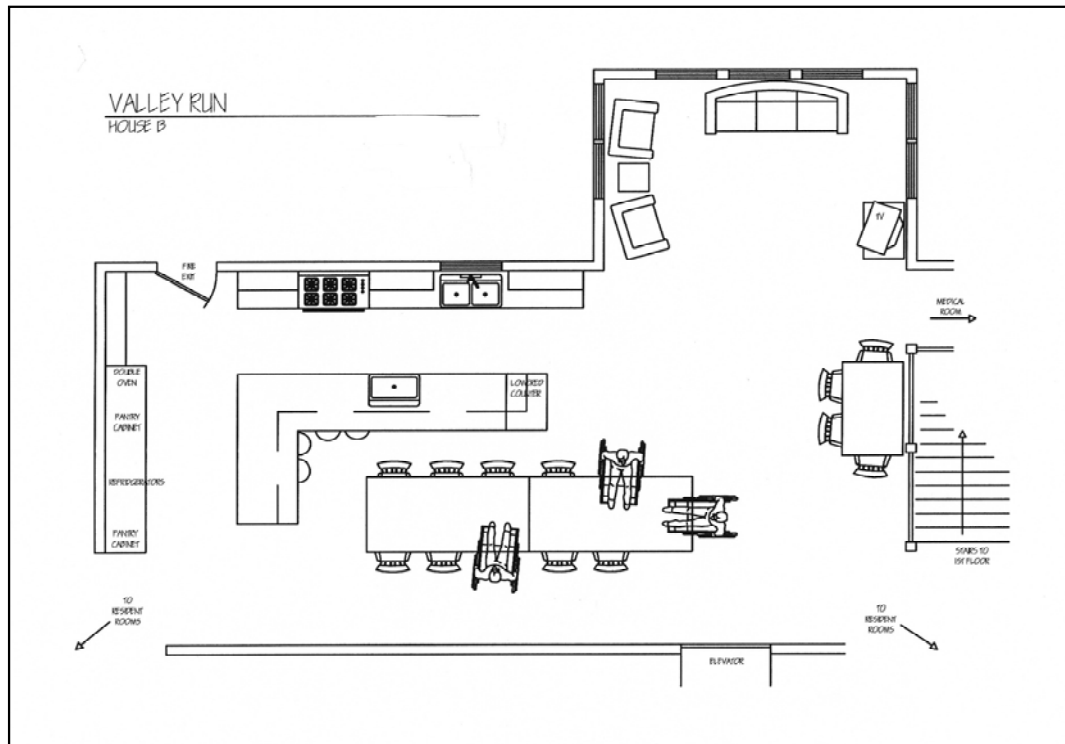


Figure 3.2: Floor plan, Valley Run, House B.



Aims of the building design include encouraging independence and resident interaction, as well as providing a connection with nature. The interior of Valley Run is a traditional assisted living design, but on a smaller scale. The walls are a neutral shade (off-white), and the lighting consists of ceiling mounted compact fluorescent lighting, which is operated with wall switches.

Each house also features an elder friendly kitchen and family style dining area, which are the “social hub” of each household. Figure 3.3 shows the kitchen and dining area and a photograph of the carpet tiles used in that space. The pattern of the carpet tiles in the sitting area of Valley Run, House A is different from that in the

kitchen and dining spaces of that house. A view into this sitting area, as well as the carpet tiles used there, is shown in Figure 3.4.

Figure 3.3: Valley Run, House A. View into the dining & kitchen area (left), and close-up of carpet used in that area.



Figure 3.4: Valley Run, House A. View into the sitting area (left) and close-up of sitting area carpet (right).



Valley Run, House B, is a reversed plan of House A. While the layout is essentially the same, the furnishings and finish materials vary from those used in House A, as illustrated in Figures 3.5 and 3.6.

Figure 3.5: Valley Run, House B. View of dining table and kitchen.



Figure 3.6: Valley Run, House B. View of sitting area (left), and close-up of dining/kitchen/sitting area carpet (right).



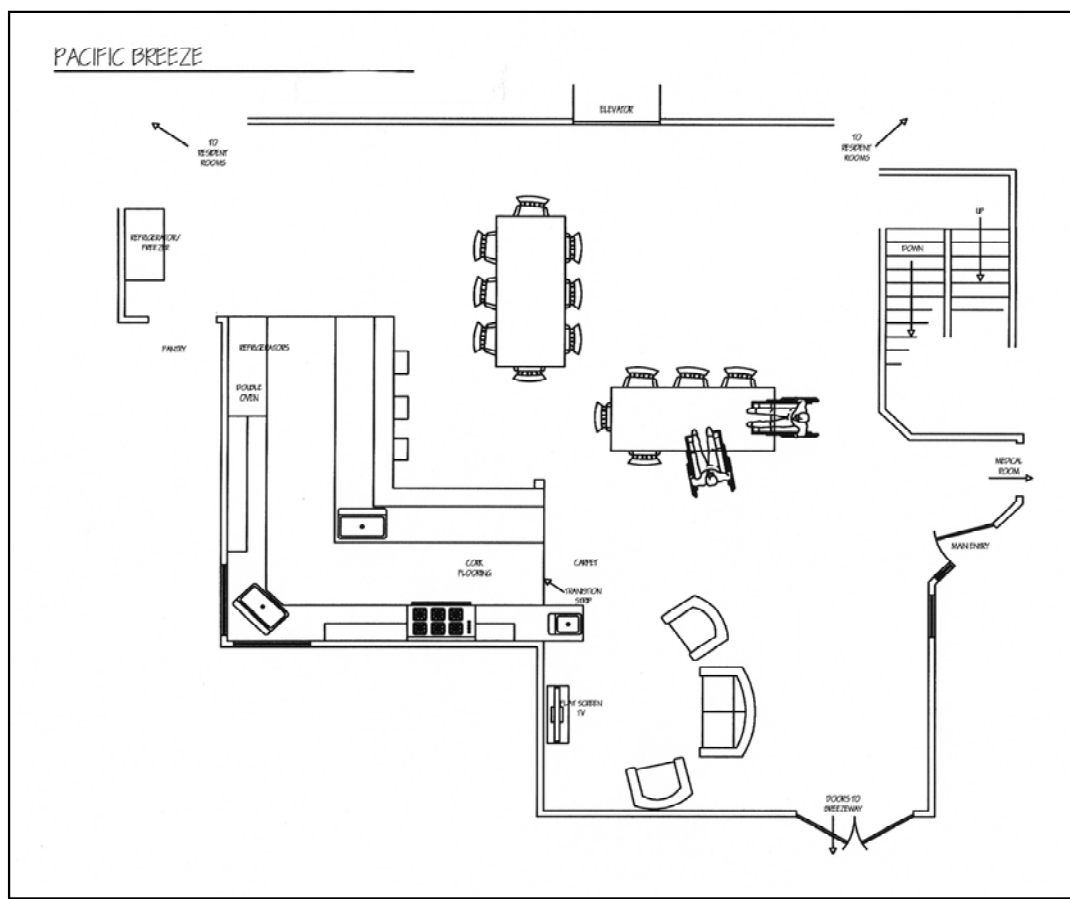
3.2.3 Pacific Breeze Assisted Living

Pacific Breeze opened in 2008. The floor plan of this newer residence was modeled on Valley Run and incorporates many of the same features such as the cul-

de-sac layout, open kitchen, dining, and common areas, as well as being constructed to residential scale. Pacific Breeze’s campus has two houses, each with 12 resident suites. Figure 3.7 illustrates the floor plan of the house studied at Pacific Breeze.

As at Valley Run, the goals of the building design are to facilitate resident independence and a sense of community. Pacific Breeze incorporated several new design concepts that make it different from Valley Run. At Pacific Breeze, some spatial design features – namely the lighting and color schemes – were selected with the intention of influencing the behavior of residents.

Figure 3.7: Floor plan, Pacific Breeze.



The lighting design at Pacific Breeze varies from that in Valley Run.

Alternating warm-toned (2700K) and cool-toned (4100K) fluorescent tubes are used throughout the space.

At Pacific Breeze, the paint colors on the walls are more vibrant. Yellow, blue, and purple are used in bedrooms, yellow is used in the activity room, and orange is used in the kitchen and dining areas. Because this study concerns only the kitchen and dining areas, data were collected only in these spaces. The ceilings at Pacific Breeze are also a non-white color, which, according to the owners, is based on a German study that found that painting the ceiling green helped improve resident orientation and lessen anxiety caused by expansive interior environments. These features, along with flooring materials used in the areas studied at Pacific Breeze, can be seen in Figures 3.8 – 3.10.

Figure 3.8: Pacific Breeze. View into dining/kitchen.



Figure 3.9: Pacific Breeze. View from dining to sitting area.



Figure 3.10: Pacific Breeze. Sitting area (top), cork flooring in kitchen (bottom left), and carpet in dining/sitting areas (bottom right).



Pacific Breeze differs further from Valley Run in that it has been certified LEED Platinum (www.usgbc.com). Energy efficient appliances and fixtures, use of materials such as low-VOC paints, and a rain water collection system, are some of the sustainable features implemented at Pacific Breeze. Table 3.1 provides a comparison of the two facilities.

Table 3.1: Characteristics of the research sites

Characteristic	Site	
	Valley Run	Pacific Breeze
Ownership	Privately owned, for-profit	Privately owned, for-profit
Year Opened	2001	2008
Type of Care Setting	Assisted living residence with fully-integrated dementia care	Assisted living residence with fully-integrated dementia care
Residence Size	Small (10-15 residents)	Small (10-15 residents)
Dining Room Capacity	Small (10-15 residents)	Small (10-15 residents)
Monthly Rental Fee	\$4750	\$5250
Residents	Predominantly Caucasian, mostly female	Predominantly Caucasian, slight majority female
# of Residents Living at Research Site at Time of Study	16	13
General Impression of Building	Homelike	Homelike

3.3 Data Collection Methods

This was an exploratory study that examined two existing interior environments. Because the aim was to observe the interior environment as it existed, no manipulation of the environment was done by the researcher. The study involved four steps of data collection:

1. Drafting and photographic analysis of the spaces included in the study

2. Behavioral observations
3. General information survey completed by participants
4. Semi-structured interviews with participants

The broad, overarching research question addressed by this study is: Do the interior spatial features of the kitchen/dining/sitting area of the facilities appear to play a role in resident use and resident and staff perception of the space? The answer to this question is guided by two more specific research questions:

1. Is there a difference in observed behavior of residents in the kitchen/dining/sitting areas of the two facilities?
2. How do residents and staff perceive the interior spatial features in the kitchen/dining/sitting area of each of the two facilities?

Table 3.2 illustrates the two specific research questions and which method(s) were used to explore each. Following are descriptions of each measure used.

Table 3.2: Data collection methods used to address research questions.

SPECIFIC RESEARCH QUESTIONS	DATA COLLECTION METHOD
1. Is there a difference in observed behavior of residents in the kitchen/dining/sitting areas of the two facilities?	Non-participant observation and staff interviews
2. How do residents and staff perceive the interior spatial features in the kitchen/dining/sitting area of each of the two facilities?	Resident and staff interviews

3.3.1 Photographic Analysis

This component of the study consisted of CAD drawings of the space (floor plans) and photographs (photographs did NOT include staff or residents of the facility). The purpose of this documentation is to illustrate the layout of the kitchen and dining spaces as well as the interior spatial features present. In conjunction with the information gathered via observations and interviews, the floor plans were then annotated to show positive and negative features of the design.

Light measurements were taken with a light meter and recorded in each of the kitchen and dining areas. The measurements were then compared to the Illuminating Engineering Society of North America's (IESNA) recommended levels of lighting for senior living in the dining room environment. The IESNA suggests the provision of 50 footcandles of ambient light in the dining environment for older adults during active dining hours (IESNA, 2007). This information was also considered with data from the participant interviews to see if existing levels were deemed adequate by participants.

3.3.2 Behavioral Observation

This was an objective, systematic observation of behavior in the kitchen and dining spaces of each facility. The observation was conducted for a total of 12 hours at each facility. At Valley Run, six hours of observation were conducted at House A and six at House B. Initially both houses on the Pacific Breeze site were to be included in the study. However, at the time of data collection, only three residents were living in the second house, so the kitchen there was not staffed. The residents of that house went to the other house on site to dine and participate in activities. After

completing a 45 minute observation period in the kitchen/dining/sitting area of the unstaffed home in which no activity occurred, the researcher decided to conduct all observations for Pacific Breeze in the house with full-occupancy. Because the residents living in the unstaffed house ate meals and participated in activities at the other house, they were still included in the observations.

The goal of the observation was to examine “how a physical environment supports or interferes with behaviors taking place within it, especially the side effects the setting has on relationships between individuals or groups” (Zeisel, 2006, p. 191). The observations were recorded in the form of behavioral mapping and observational notes. The researcher used the observational notes to describe her observations of the resident behaviors that occurred in the space and the physical elements of the space that appeared to have an effect on that behavior. The behavior mapping chart and floor plans that were used are included in Appendix A.

Zeisel (2006) states that it is useful to do behavioral observation in addition to interviews because sometimes people will not admit to an activity or will overlook certain aspects of their behavior that are routine to them but may be of interest to the researcher. For this reason, observation was a valuable component to supplement the interviews that were conducted with staff and residents, as there may have been aspects of the physical environment that appeared to affect resident behavior that residents and staff did not point out because they have become accustomed to them. Things that the people living and working in the facility may take for granted are more likely to stand out to a researcher who is seeing the physical space through “new” eyes (Geertz, 1973). Detailed observations were important to gain an understanding of how

the space affects those residents with more severe dementia who were not able to communicate with the researcher in the interviews.

3.3.3 Sample Selection

A combination of purposive and convenience sampling was used to recruit participants. In order to be eligible for the study, staff and residents had to be working or living in one of the houses under observation at either Valley Run or Pacific Breeze. The goal was to obtain a maximum sample size of 20 participants, comprised of approximately 10 residents and 10 staff members at each site. Participation was voluntary, and participants were not compensated.

Resident participants were recruited in consultation with the staff and based on availability. Staff members recommended residents who might be willing and able to fill out the general survey and to participate in a conversational interview with the researcher. The researcher attempted to obtain an approximately equal number of male and female residents at each site, but due to the advanced stage of dementia of most male residents at Pacific Breeze, only female residents participated at that site. Four residents (two male and two female) participated from Valley Run, and three females participated from Pacific Breeze, yielding a total of seven resident participants.

Staff participants were recruited based on availability on the days the researcher was on site, with the goal of interviewing staff members holding a variety of positions at the facility. For the purposes of this study, staff participants included caregivers, cooks, activity coordinators, and managers. Due to the small size of the facilities and the operational philosophy, all of the staff members come into regular

contact with the residents, and because of this were able to inform the researcher not only of their perception of the space, but also of resident behavior. In total, 12 staff members (six from each site) participated in the information survey and interviews.

3.3.4 Sample Characteristics

Residents

The resident interview sample consisted of four residents from Valley Run (two from House A, two from House B) and three residents from Pacific Breeze. All of the resident participants were White/Non-Hispanic. Two of the participants at Valley Run were male, and two were female (one of each from House A and one of each from House B). All three Pacific Breeze resident participants were females. Participating residents were 81 to over 91 years old; seventy-one percent were married. The majority of residents reported their overall health as “good” (86%), that they had little difficulty with vision (57%), and no difficulty with hearing (57%). Seventy-one percent of residents said they had no difficulty getting around the building, and 57% reported that they had not fallen while living at Valley Run or Pacific Breeze. Participating residents from Valley Run had lived there an average of 39.75 months. Those at Pacific Breeze had lived there an average of 5.25 months. It is important to note that at the time of data collection, Pacific Breeze had been open for approximately 11 months. Tables 3.3 and 3.4 summarize the general information survey results for the resident sample population. Table 3.5 provides a profile of each resident participant.

Table 3.3: Resident Sample Characteristics.

		Frequency (N=7)	%*
Facility:	Valley Run	4	57.14
	Pacific Breeze	3	42.86
Gender:	Male	2	28.57
	Female	5	71.43
Age:	81-90	6	85.71
	91+	1	14.29
Marital Status:	Married	5	71.43
	Widowed	2	28.57
Ethnicity:	White, Non-Hispanic	7	100
Education:	High School	2	28.57
	Some College	1	14.29
	Bachelor's Degree	3	42.86
	Graduate Degree	1	14.29
Self-Rated Overall Health:	fair	1	14.29
	good	6	85.71
Vision:	No Difficulty	2	28.57
	Little Difficulty	4	57.14
	Considerable Difficulty	1	14.29
Hearing:	No Difficulty	4	57.14
	Little Difficulty	3	42.86
Difficulty Getting Around Building:	Not Difficult at All	5	71.43
	Somewhat Difficult	2	28.57
Fallen While Living Here:	Yes	2	28.57
	No	4	57.14
	Not Sure	1	14.29

* Due to rounding, values listed may not total exactly 100%

Table 3.4: Residents' Time at Facility (in months)

Facility	Mean (SD)
Valley Run	39.75 (4.35)
Pacific Breeze*	5.25 (6.01)

*At the time of the study, Pacific Breeze had only been in operation for 11 months; one of the residents surveyed did not know how long she had lived there, so there is missing data from Pacific Breeze.

Table 3.5: Resident Profiles

Participant	Age Range	Gender	Facility, length of time lived at facility, interview location, self-reported health information
R1V	81-90	F	Valley Run, 3 yrs, residents' suite, good overall health, little difficulty with vision and hearing, somewhat difficult to get around building
R2V	81-90	M	Valley Run, 3 yrs, residents' suite, good overall health, little difficulty with vision and hearing, somewhat difficult to get around building
R3V	81-90	M	Valley Run, 3 yrs 8 mos, residents' suite, fair overall health, little difficulty with vision, no difficulty with hearing, not difficult to get around building
R4V	81-90	F	Valley Run, 3 yrs 7 mos, residents' suite, good overall health, considerable difficulty with vision, no difficulty with hearing, not difficult to get around building
R1P	81-90	F	Pacific Breeze, 9 or 10 mos, residents' suite, good overall health, no difficulty with vision or hearing, not difficult to get around building
R2P	90+	F	Pacific Breeze, unknown, residents' suite, good overall health, no difficulty with vision, little difficulty with hearing, not difficult to get around building
R3P	81-90	F	Pacific Breeze, 1 month, activity room, good overall health, little difficulty with vision, no difficulty with hearing, not difficult to get around building

Staff

The staff interview sample was composed of six staff members from each site. Four staff participants were male; eight were female. Ninety-two percent were White/Non-hispanic, and 8% were Pacific Islander. Fifty percent of staff surveyed were married, and a majority of them had either taken some college courses or had earned an Associate's degree. Staff at Valley Run had been there an average of 19.2 months; those at Pacific Breeze had

been there an average of 9.5 months. Again, it must be noted that Pacific Breeze was open for only 11 months at the time of data collection. Valley Run staff had an average of 10.47 years of experience in their current profession. The average for Pacific Breeze staff was 10.25 years. Tables 3.6 – 3.8 summarize the general information survey results for the staff sample population. Table 3.9 provides a profile of each staff participant.

Table 3.6: Staff Sample Characteristics

		Frequency (N=12)	%*
Facility:	Valley Run	6	50
	Pacific Breeze	6	50
Gender:	Male	4	33.33
	Female	8	66.67
Age:	18-30	3	25
	31-40	4	33.33
	41-50	2	16.67
	51-60	2	16.67
	61-70	1	8.33
Marital Status:	Married	6	50
	Divorced/Separated	3	25
	Single/Never Married	2	16.67
	Partnered	1	8.33
Ethnicity:	White, Non-Hispanic	11	91.67
	Pacific Islander	1	8.33
Education:	Secondary (up to grade 8)	1	8.33
	High School	1	8.33
	High School plus Technical College	1	8.33
	Some College	4	33.33
	Associate's Degree	4	33.33
	Bachelor's Degree	1	8.33
Vision:	No Difficulty	10	83.33
	Little Difficulty	2	16.67
Time worked at facility:	<1 year	8**	66.67
	1-5 years	4	33.33
Job Designation:	Community Manager	2	16.67
	Residential Service Coordinator	1	8.33
	Staff Nurse	1	8.33
	Personal Assistant	4	33.33
	Activities Coordinator	1	8.33
	Chef	3	25

* Due to rounding, values listed may not total exactly 100%

**One staff member at Pacific Breeze had previously worked at Valley Run. The length of time at facility reflected here includes time at current place of work only.

Table 3.7: Staff Time at Facility (in months)

Facility	Mean (SD)
Valley Run	19.2 (19.43)
Pacific Breeze*	9.5 (2.35)

*At the time of the study, Pacific Breeze had only been in operation for 11 months

Table 3.8: Staff Years of Experience in Profession

Facility	Mean (SD)
Valley Run	10.47 (8.60)
Pacific Breeze	10.25 (10.66)

Table 3.9: Staff Profiles

Participant	Age Range	Gender	Facility, job designation, length of time at facility, interview location, self-reported vision information
S1V	51-60	F	Valley Run, personal assistant, 5 mos, dining room, little difficulty with vision
S2V	31-40	M	Valley Run, community manager, 4 yrs 2 mos, activity room, no difficulty with vision
S3V	61-70	F	Valley Run, chef, unknown, kitchen, no difficulty with vision
S4V	18-30	F	Valley Run, personal assistant, 8 mos, kitchen, little difficulty with vision
S5V	18-30	F	Valley Run, chef, 6 months, kitchen, no difficulty with vision
S6V	31-40	M	Valley Run, personal assistant, 2 yrs 3 mos, activity room, no difficulty with vision
S1P	41-50	F	Pacific Breeze, staff nurse, 11 mos, dining room, no difficulty with vision
S2P	41-50	M	Pacific Breeze, chef, 10 mos, kitchen, no difficulty with vision
S3P	51-60	F	Pacific Breeze, community manager, 11 mos, dining room, no difficulty with vision
S4P	31-40	F	Pacific Breeze, activities coordinator, 5 mos, dining room, no difficulty with vision
S5P	18-30	F	Pacific Breeze, personal assistant, 9 mos, breezeway, no difficulty with vision
S6P	31-40	M	Pacific Breeze, service coordinator, 2 1/2 mos., breezeway, no difficulty with vision

3.3.5 Survey on Demographics

In order to obtain demographic and self-reported health information a short survey was given to all staff and resident participants. After signing the consent form, participants were asked to complete the survey before the interview began.

Demographic information was collected to enable the researcher to report general information about the overall study population (*e.g.* number of female/male participants, participant age range). Self-reported health information was used to help the researcher understand participant responses in the individual interviews (*e.g.* if a participant reports having trouble with vision, it may help explain why he/she answered in a particular way about the lighting in the space). For a copy of the surveys used, see Appendix B.

3.3.6 Participant Interviews

Semi-structured interviews were conducted with each of the participants, addressing their perceptions of the interior features of the space. The location of the interviews within each site varied. While the researcher attempted to conduct the interviews in or as close to the spaces being studied, this was not always possible due to other activities occurring in the study space at the time of the interviews. In order to increase resident comfort during the interviews, the researcher let resident participants choose the interview location. For this reason, all but one of the resident interviews occurred in the individual residents' living room inside his/her suite. One resident interview at Pacific Breeze was conducted in the common living room space in the house that was not fully occupied. Staff interviews took place either in the

kitchen and dining area, in the activity area, or in the breezeway connecting the two houses at Pacific Breeze.

The interview guides that were used for the study can be found in Appendix C. The interviews were audio recorded, and the researcher took notes during the interview sessions. The audio recordings were transcribed after the interviews. Participants were given ID labels to maintain confidentiality.

The researcher then went through the process of open coding with the transcribed interviews. During this step, the transcripts were read, and the researcher looked for terms, key concepts, and themes. Next, through axial coding (Neuman, 2006), the researcher went back through the interviews a second time, focusing on the themes that emerged in the initial coding stage. During axial coding, the researcher looked for categories or concepts that could be clustered together or combined into more general theme categories.

The interviews provided information for understanding resident behavior in more detail, and served as a method of triangulating data by enabling comparison of researcher observation to both staff and resident perception of the space. Combined, the observations and interviews assisted the researcher in forming an understanding of the factors influencing resident behavior and staff and resident perception of the interior environment. These methods helped to capture the individuals' points of view (Denzin & Lincoln, 1998), a characteristic that sets qualitative research apart from quantitative methods. The executed schedule for data collection is shown in Table 3.10.

Table 3.10: Timeline for Data Collection

Task	Month							
	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09
Survey questionnaire development								
Human subjects approval from Oregon State University's Institutional Review Board								
Document facility profile data (floor plans, etc.)								
Participant recruitment and enrollment								
Data collection								
Data management & analysis; write up project results								

3.4 Data Analysis & Trustworthiness

Given the exploratory nature of this study and its small sample size, the researcher is unable to generalize the findings to the entire population. Analysis focused on identifying common themes in the data collected on behavior and self-reported perception of space. Using small facilities for this study allowed the researcher to examine person-environment interactions in more depth. This may improve analysis, as distance from subjects that can come from large samples can cause the researcher to be detached and less able to understand the data (Flyvbjerg, 2006).

3.4.1 Reliability and Validity

Persistent observation over a period of 12 hours per site allowed the researcher to obtain more valid observations than if the behavior observation was a shorter period of time. Lincoln & Guba (1985) state that persistent observation provides depth to a

study by making it possible for the researcher to identify elements (in this study, interior spatial features) most relevant to the issue being studied. The interviews helped increase validity by providing additional data to confirm or negate the behavior observations made by the researcher compared to staff and resident accounts of what occurred in the space and what factors may have contributed to the behaviors.

Trustworthiness of the data was established by the researcher through measures of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Lincoln & Guba (1985) recommend using the practices of prolonged engagement, persistent observation, triangulation of methods, and debriefing to ensure credibility. This study has transferability because the findings have the potential to be used by others, such as architects and designers of assisted living facilities, in similar situations. Dependability and confirmability were addressed through the use of an audit trail (drawings, photos, field notes, etc.) which documents the work and decisions of the researcher. That said, the researcher acknowledges that there are limitations to the study in regard to trustworthiness. Due to time constraints, prolonged engagement was not possible. The researcher attempted to address this limitation to some extent by visiting both sites before the data collection period in order to develop a relationship with the administrators and staff in order to gain access to each facility. The researcher also met with the residents at the sites prior to data collection to build rapport with them.

Well-documented procedural and analysis methods allow the study to be replicated. If the same results are found in future studies using the same methods, reliability will be improved.

CHAPTER 4: RESULTS

4.1 Overview

The purpose of this study was to explore resident and staff perception of dining and adjoining social spaces in two assisted living facilities, and to evaluate the specific interior features for activities within these spaces. The interior features evaluated included lighting, color, furniture, and flooring. Through observations and interviews, the researcher investigated the following: a) whether the interior spatial features appeared to affect residents' behavior, and b) whether these interior spatial features were perceived as supportive or detrimental for resident activities by residents and staff across two study sites – Valley Run and Pacific Breeze. The intent was to find out whether there were differences or similarities in the user perceptions between the two sites, as well as any differences or similarities in perception between the residents and staff. This chapter presents the photographic analysis (Section 4.2, Part I), the results of the resident behavior observations in the studied spaces (Section 4.3, Part II), and findings from the resident and staff interviews on perception of space (Section 4.4, Part III).

4.2 Part I: Photographic Analysis

A photographic analysis was done for each observation setting. The following annotated floor plans and figures reflect both observations made by the researcher as well as perceptions of staff and residents gathered from the interviews. These images serve as further visual representation of the similarities and differences of Valley Run and Pacific Breeze. In this section, annotated floor plans and photographs for Valley

Run House A and House B are shown first, followed by an annotated floor plan and photographs of Pacific Breeze.

4.2.1 Valley Run, House A

The floor plan of Valley Run, House A is shown in Figure 4.1. Figure 4.2a&b and 4.3a&b illustrate the study areas in House A at Valley Run. Figure 4.2a shows characteristics of the dining room. Items noted include lighting, clutter, layout, materials used, and adaptive devices (i.e. wheels on chairs, handrails). Figure 4.2b illustrates the open connection between the observed spaces, as well as lighting and spatial issues. In Figure 4.3a, additional layout features are shown, along with lighting and color. Size of space, lighting, furniture, and materials are highlighted in Figure 4.3b.

Figure 4.1: Annotated floor plan, Valley Run, House A.

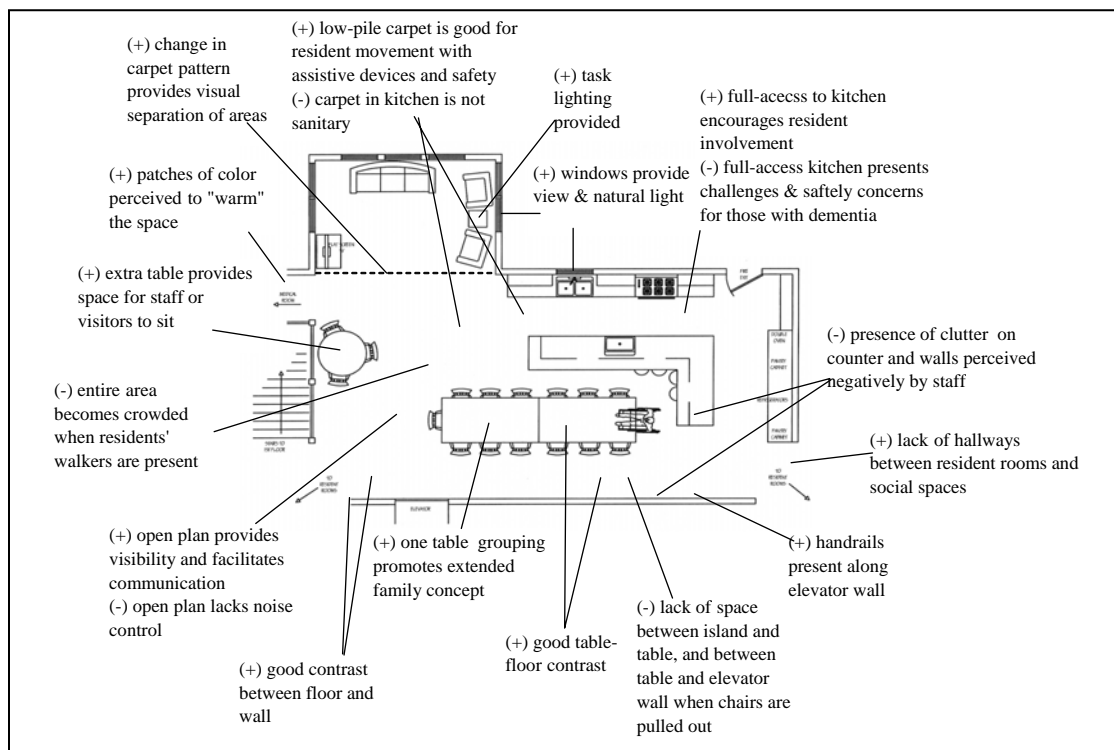


Figure 4.2: Valley Run, House A. Photo Analysis: a&b) kitchen & dining areas.

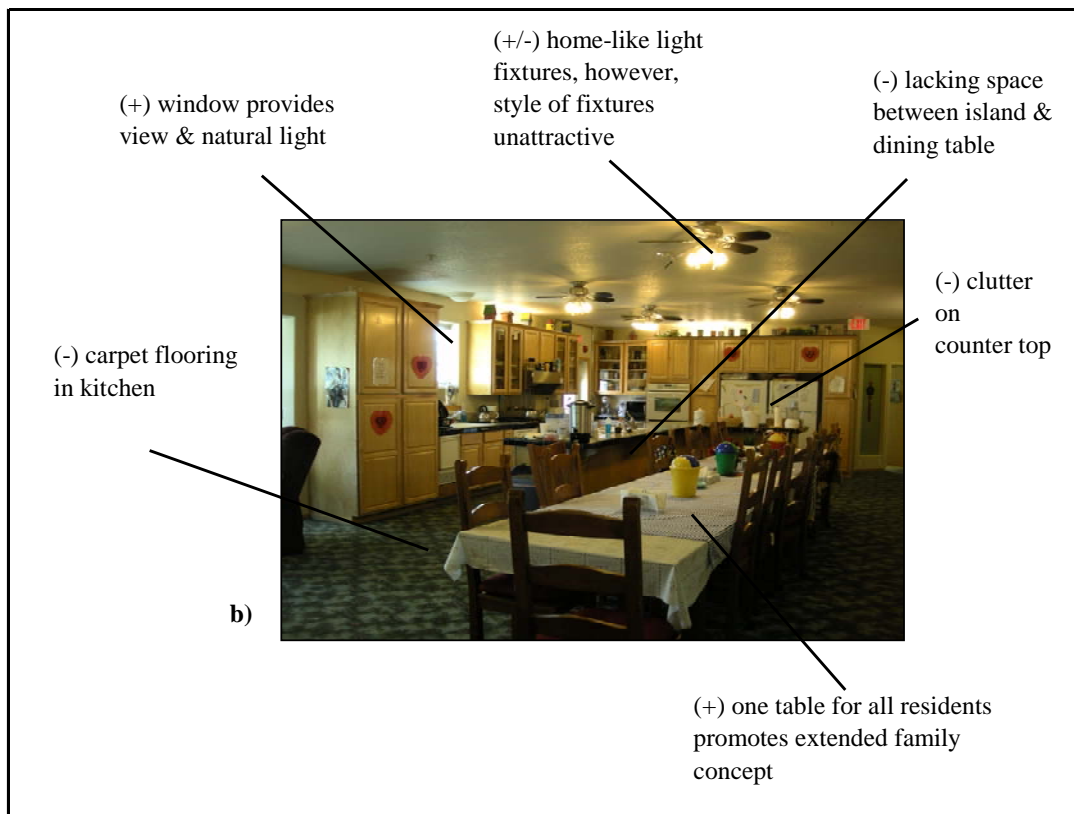
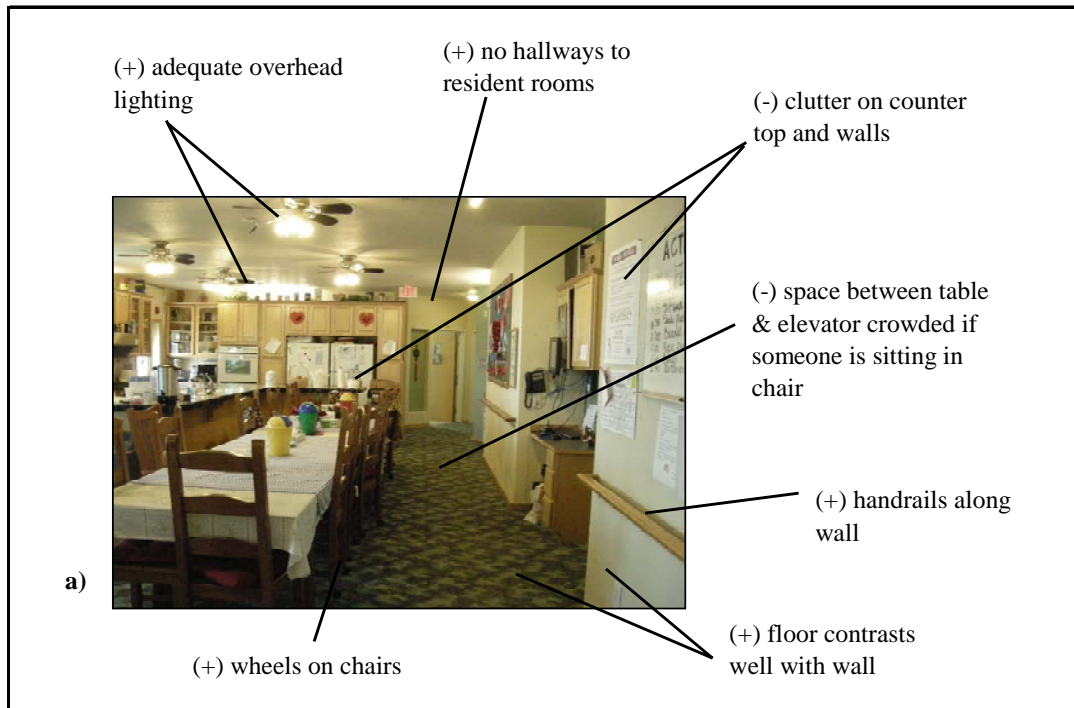
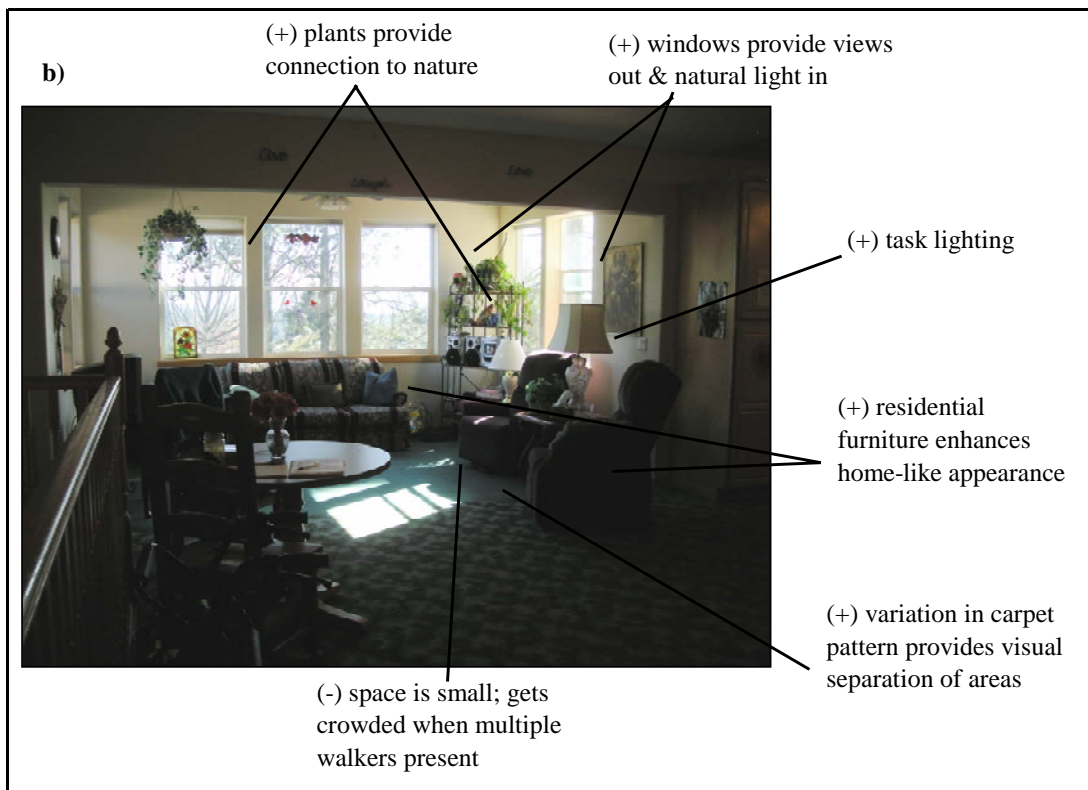
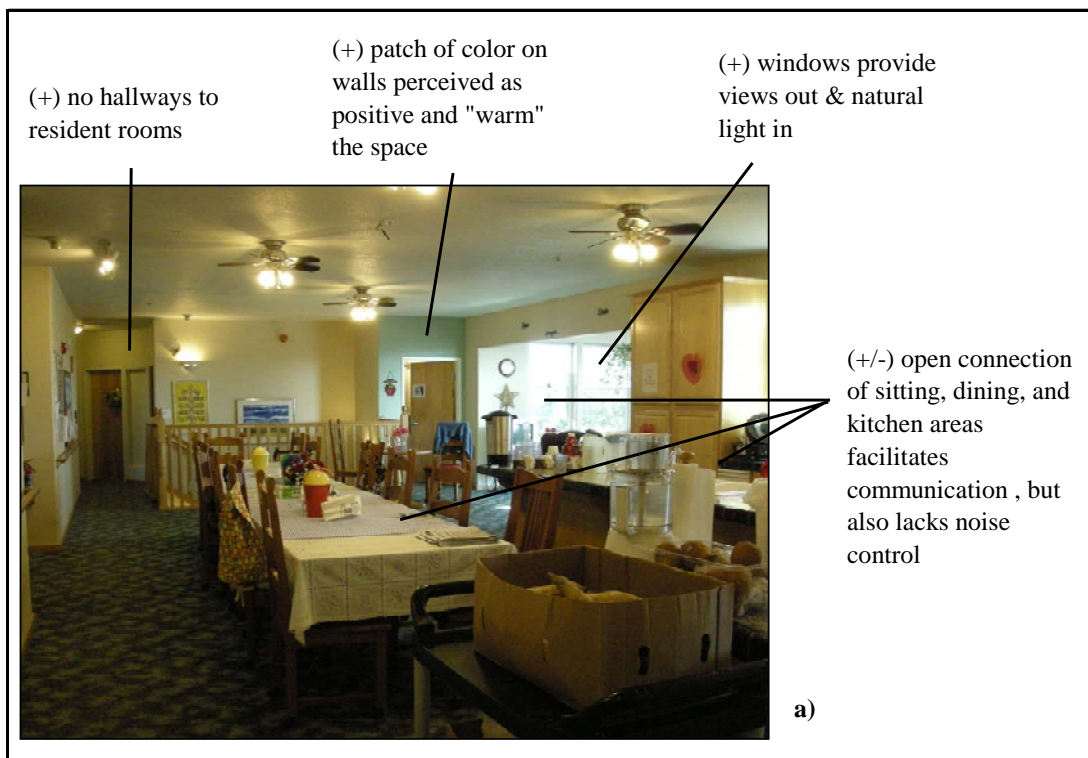


Figure 4.3(a&b): Valley Run, House A. Photo Analysis (cont'd.): a) dining area b) social area.



4.2.2 Valley Run, House B

At Valley Run, House B, aspects relating to layout were very similar to those in House A. These include amount of space, lighting, color, clutter, openness, and assistive devices. The floor plan of the study space at Valley Run, House B is shown in Figure 4.4; Figures 4.5 and 4.6 provide visual representation and annotated description of those aspects.

Figure 4.4: Annotated floor plan, Valley Run, House B.

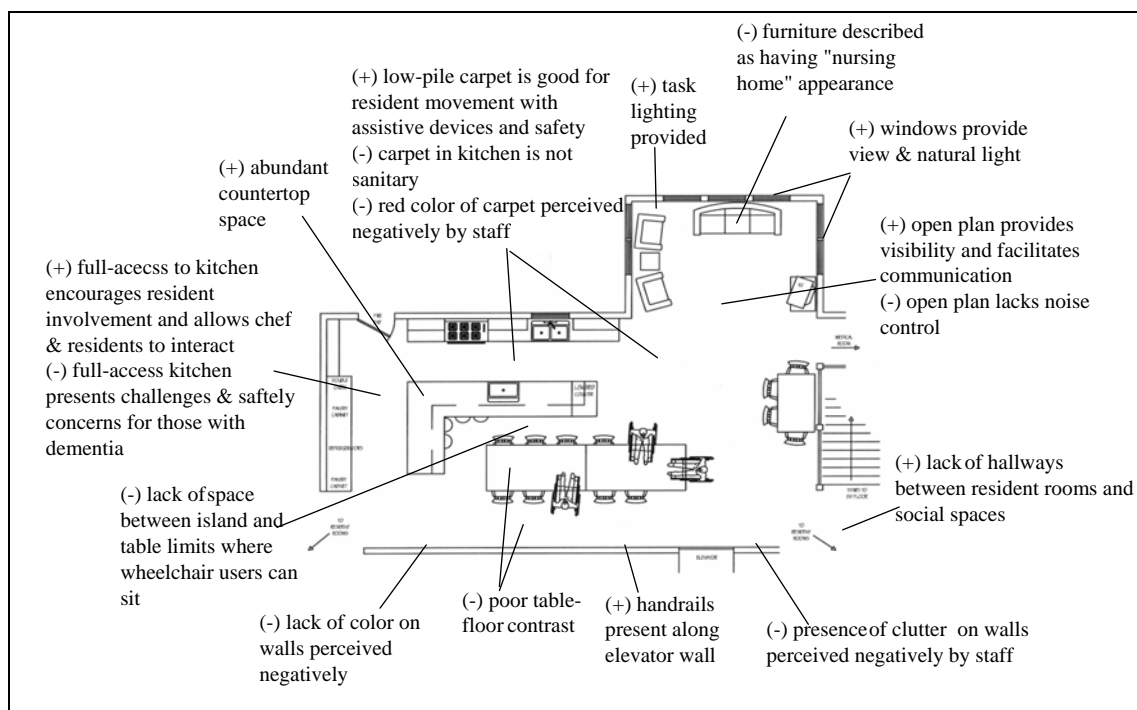


Figure 4.5: Valley Run, House B. Photo Analysis: a&b)kitchen & dining areas.

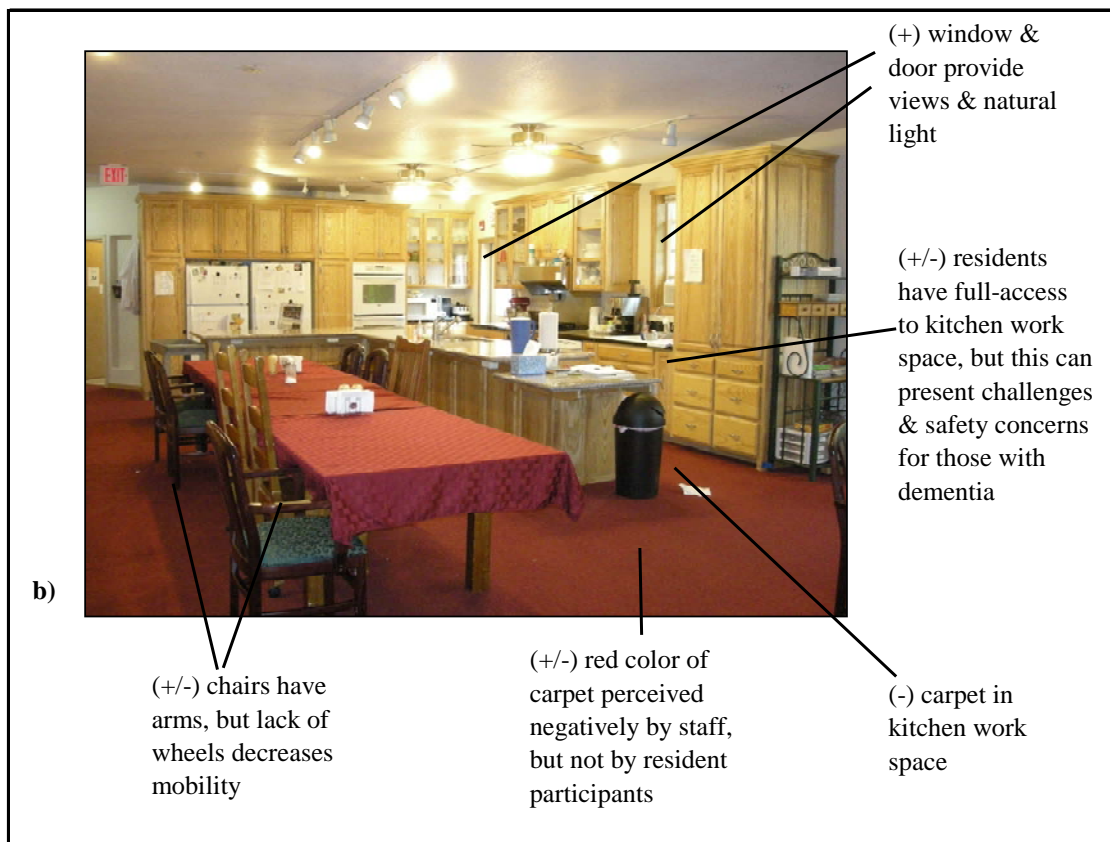
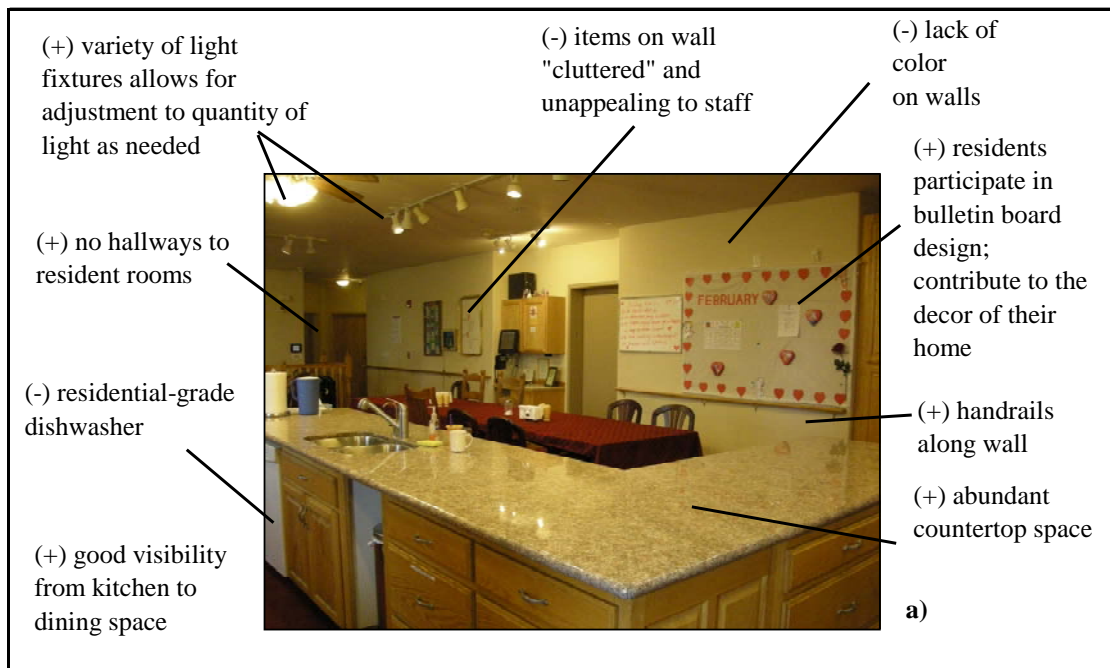
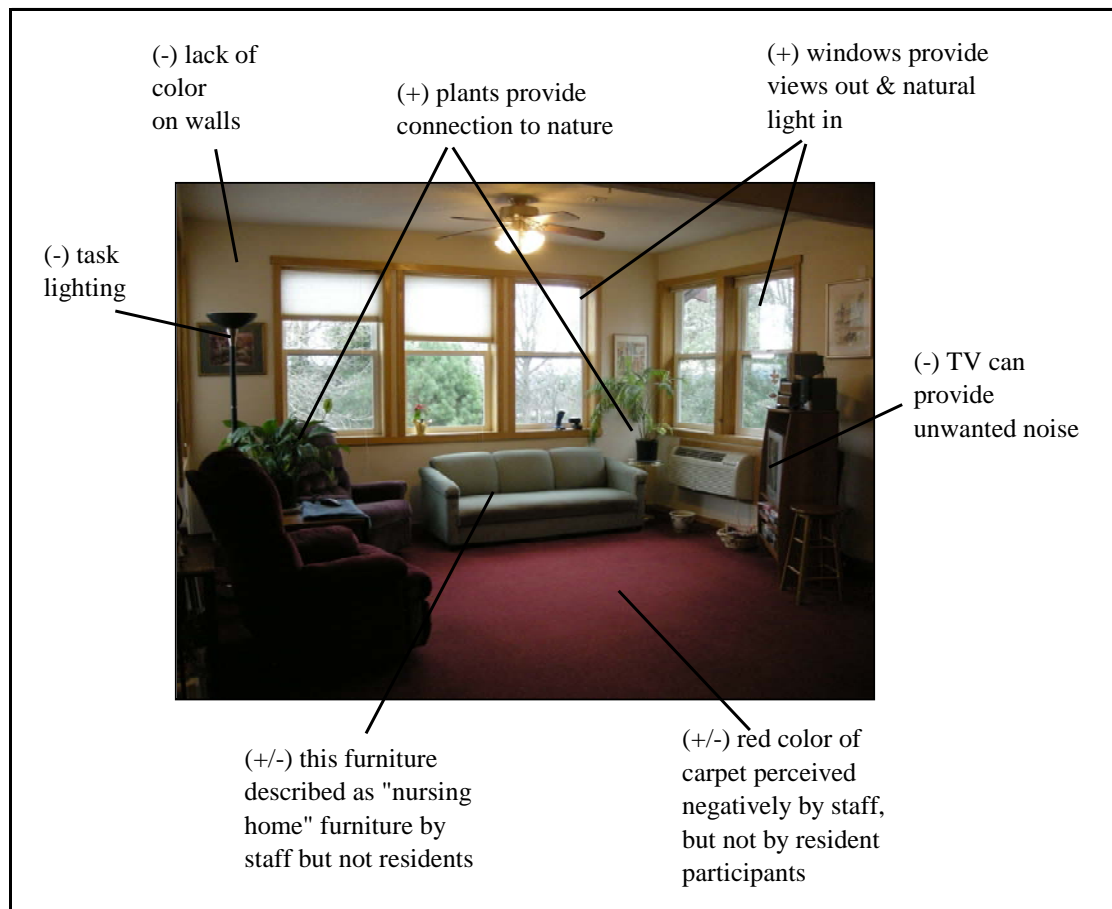


Figure 4.6: Valley Run, House B. Photo Analysis (cont'd.): sitting area.



4.2.3 Pacific Breeze

The photographic analysis of Pacific Breeze is comprised of Figure 4.7, the plan view, and Figures 4.8 – 4.10. Figure 4.8 shows the view from the dining area into the kitchen. Figure 4.9a illustrates the dining and sitting areas, while Figure 4.9b is of the kitchen work space. An additional view of the dining and kitchen spaces is shown in Figure 4.10a, and Figure 4.10b shows the view of the sitting room. As was done with Valley Run, all of the Pacific Breeze photos are annotated, showing positive and negative aspects of the specific spaces, such as lighting, color, and layout.

Figure 4.7: Annotated Floor Plan, Pacific Breeze.

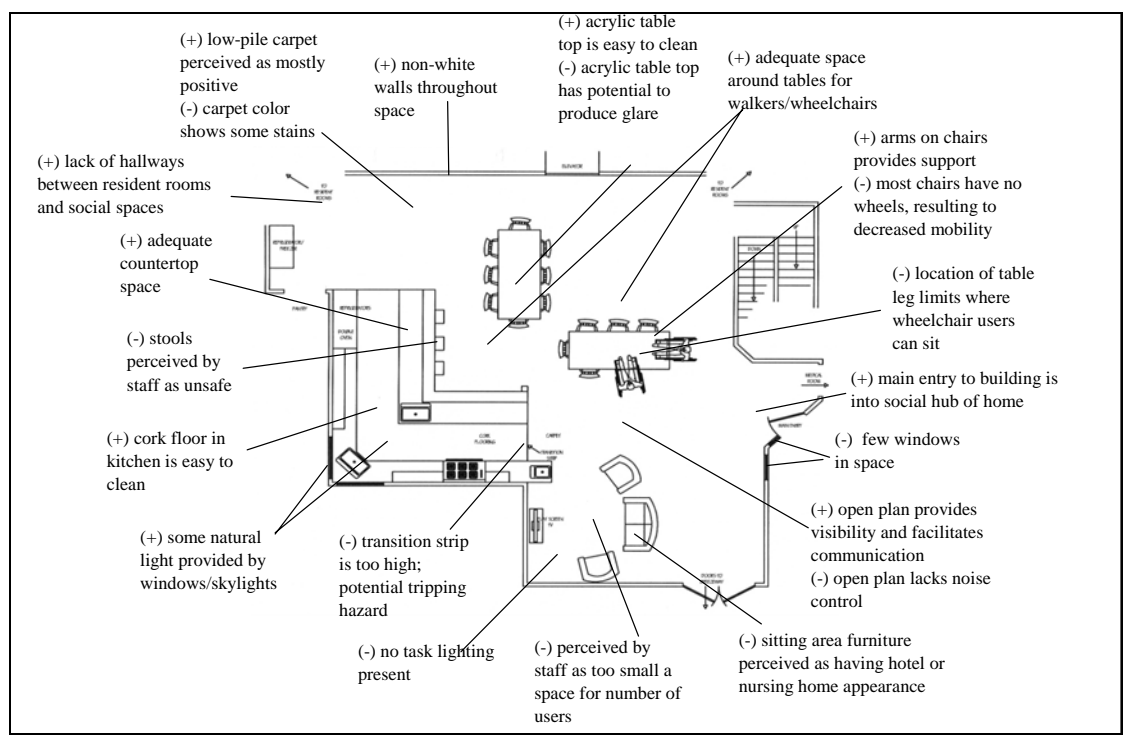
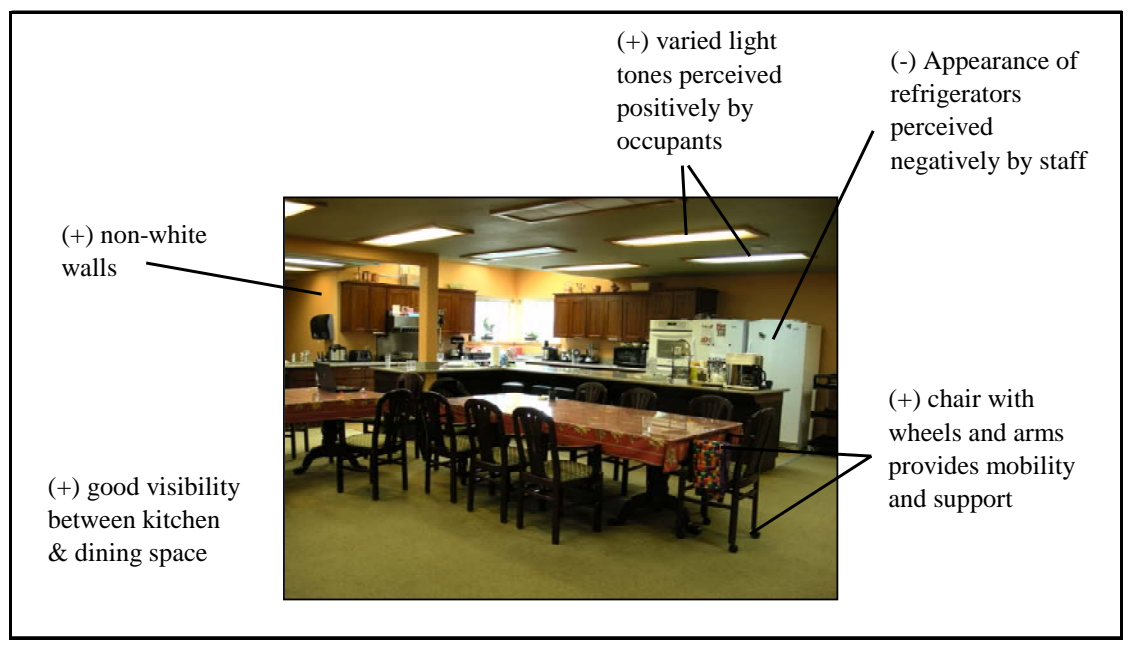


Figure 4.8: Pacific Breeze. Photo Analysis: dining & kitchen areas.



**Figure 4.9: Pacific Breeze. Photo Analysis (cont'd.): a) dining and sitting areas
b) kitchen**

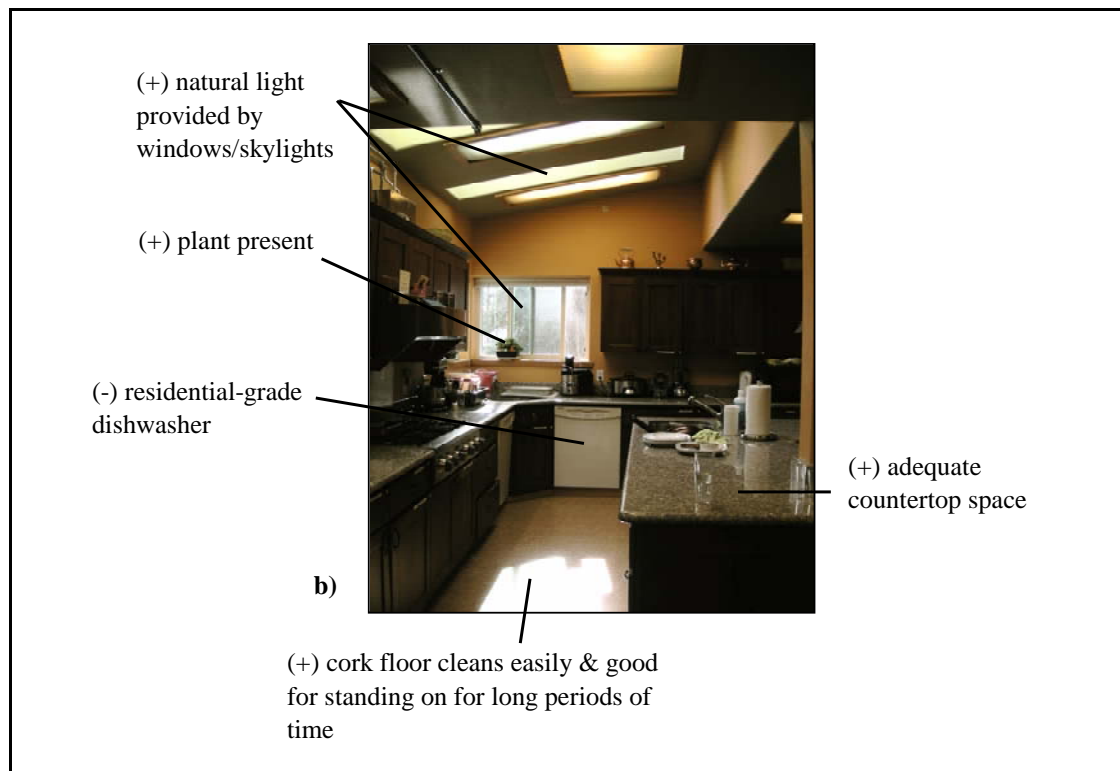
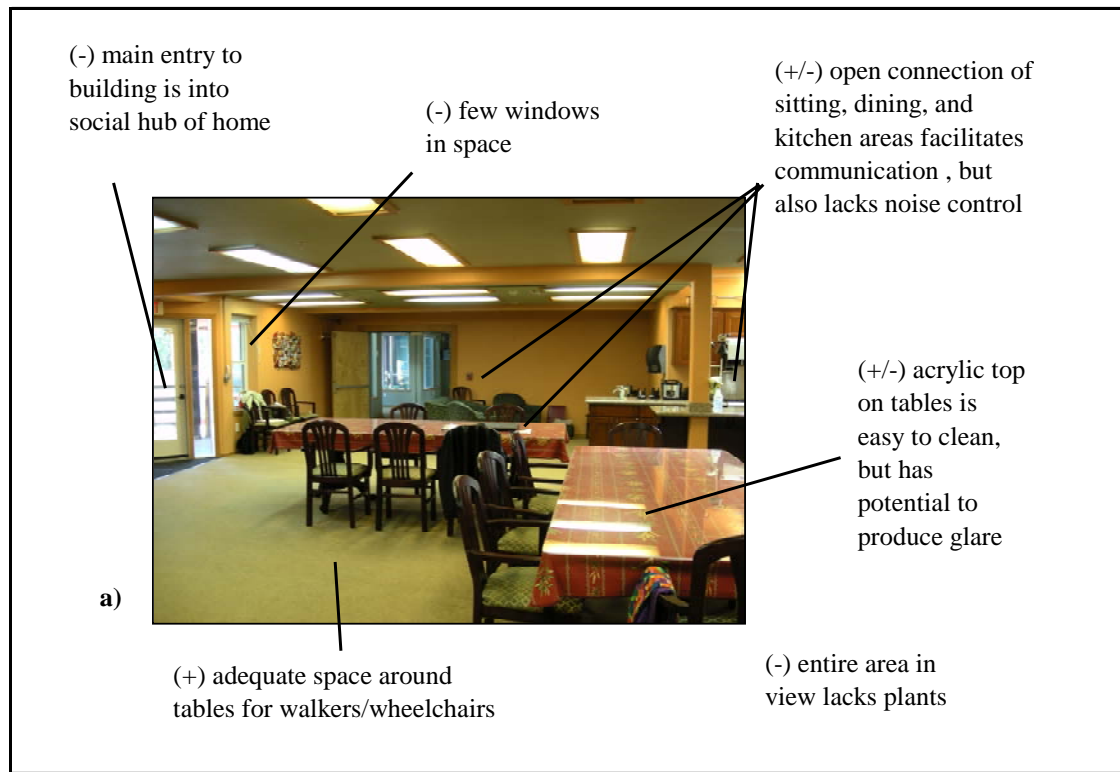
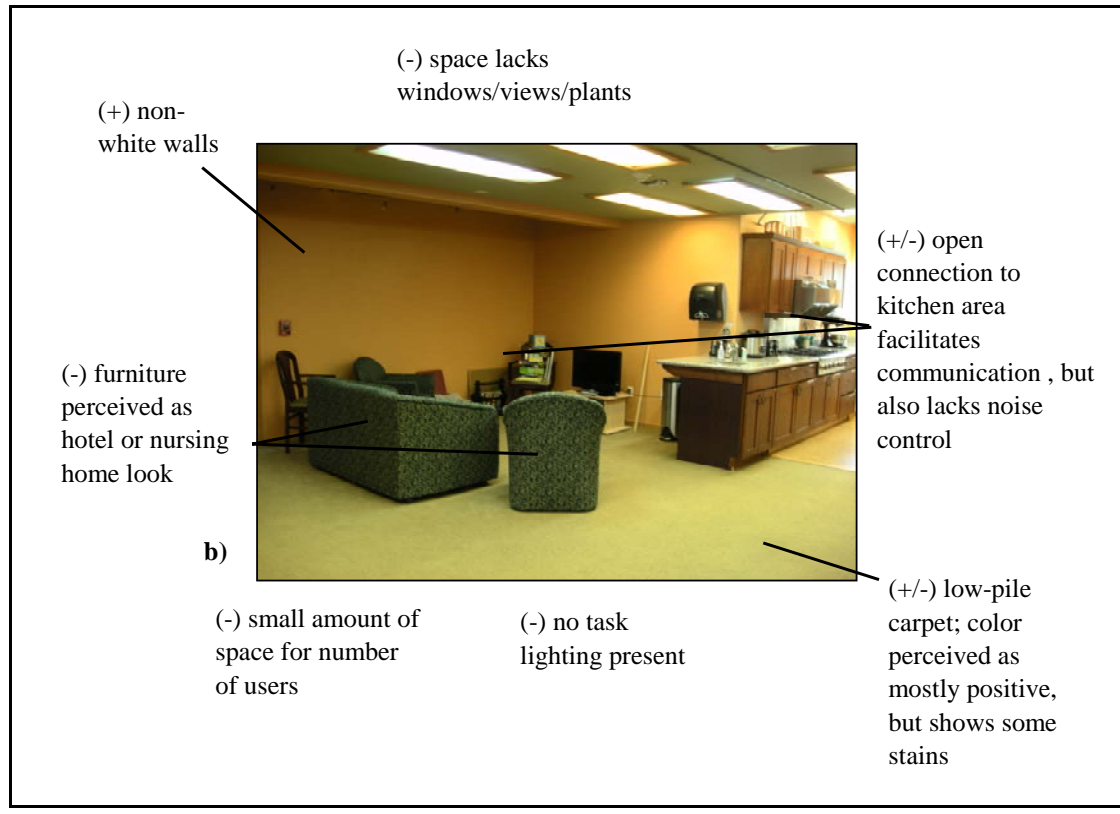
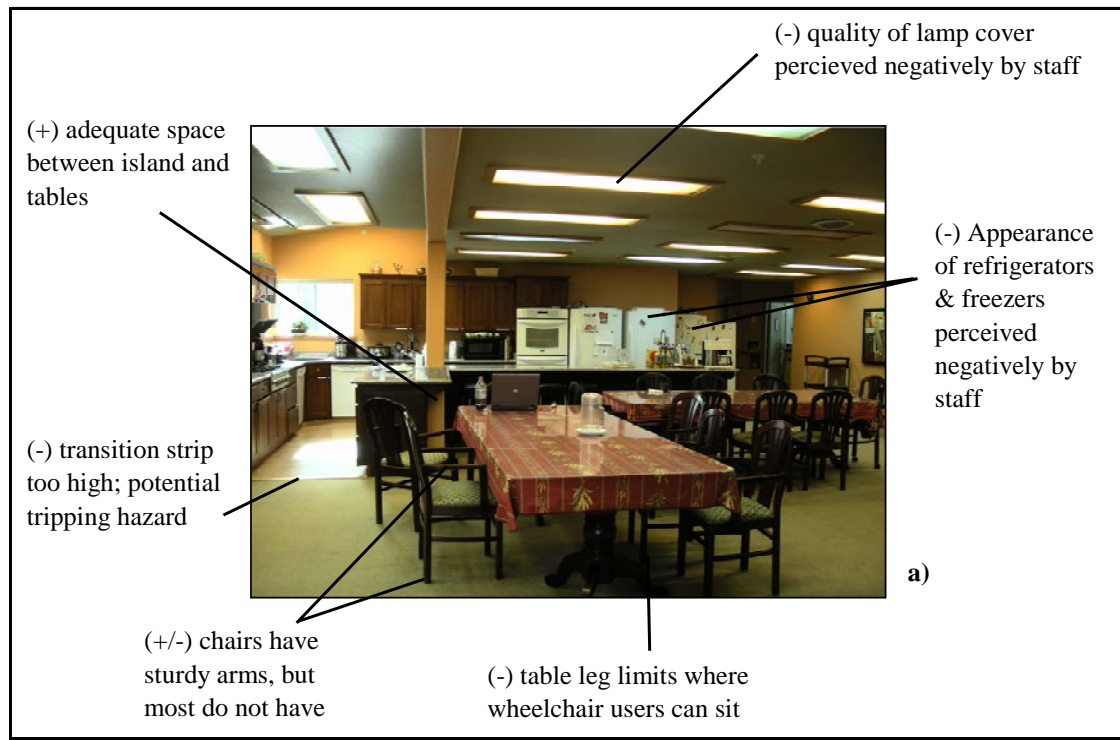


Figure 4.10: Pacific Breeze. Photo Analysis (cont'd.): a) dining and kitchen b) sitting area.



4.2.4 Summary of Floor Plan Inventory and Photographic Analysis

The photographic analysis provides a visual assessment of the physical environments studied. Positive features of the social spaces in the study include adequate and/or adjustable lighting, lack of hallways, and non-white walls. The following features were also perceived as positive: handrails, arms and wheels on dining chairs, skylights and windows, plants, and ample countertop space. Lack of these items at both facilities was viewed negatively. Other features that were negatively perceived include clutter, lack of space (especially around the dining table at the Valley Run houses), residential-grade appliances, and the aesthetics of the light fixtures at both sites. Low-pile carpeting was a positive feature, but not for the kitchen work space; cork was favored in that space. The red carpeting was a negative feature at Valley Run, House B.

Several spatial features elicited both positive and negative responses. The openness of the social spaces was viewed positively, but the noise that sometimes resulted was negatively perceived. There were mixed views on the sitting room furniture. If it was perceived as residential-looking, it was positively viewed; but it was often described negatively as “hotel-ish” or like “nursing home furniture.”

Results of the resident behavioral observations are discussed in the next section.

4.3 Part II: Resident Behavior Observations

The observations by the researcher at each facility were used to investigate the following questions: 1) Are there regular patterns of space use? 2) What behaviors do residents exhibit during meal times? 3) How is the space used

during non-meal times? 4) Where in the areas do residents and staff spend their time?

This section presents answers to those questions, as well as observations of activity levels and agitation. Each answer is organized by facility, then by participant type (resident or staff), and followed by a summary.

4.3.1 Patterns of Space Use

Valley Run Residents

The residents at Valley Run displayed similar patterns of space use in House A and House B. In both houses, the space was used most during meal times. Both houses had fewer than three users in the space in the afternoon (between lunch and dinner). One difference between the two houses was that there was a more constant use of the space in House B was used more constantly by residents in the time between breakfast and lunch than compared to those in House A.

Valley Run Staff

The patterns of space use by staff at Valley Run differed on the days the observation was conducted. The highest level of space use at House A was during lunch time, while at House B it was between 9:45 and 10:30am. This is because House B staff were holding a meeting at that time.

Pacific Breeze Residents

At Pacific Breeze, the patterns of resident use of space were very similar for the two days of observation. On both days, residents used the space for breakfast from 8am-9am, and again at lunch from 12pm-1:15pm. After lunch there was a reduction of number of residents using the space until about 2:30pm, when the number of users increased. This was because at 3:00pm daily, residents and staff gathered at the dining

table for “High Tea,” an activity in which they sat at the table with a tea or coffee and a snack, and talked with one another. Often times a staff member would bring some information on a topic to start the conversation. For example, on one of the observation days, they discussed the history of fast food restaurants.

Pacific Breeze Staff

Pacific Breeze staff showed a pattern of use similar on both days of observation. Staff at this site spent more time walking within the space than did the staff at Valley Run. Pacific Breeze staff spent most of their time in the kitchen, at the dining table, or walking in the dining space. This is most likely due to the area being highly used by residents, requiring staff also spend time there assisting residents. The highest concentration of use occurred just before lunch and during lunch.

Summary of Patterns of Space Use

At both sites, the spaces were used most during meal times. Residents at Valley Run and Pacific Breeze showed similar patterns of space use. Staff at Valley Run did not show similar patterns of space use but the staff at Pacific Breeze did. There also were fewer residents using the space in the afternoon at Valley Run than at Pacific Breeze. This may be due to the lack of a planned activity occurring in the space on the days of observation. Activities did occur on those days, but they were done in areas of the facility not under study.

4.2.3 Resident Meal-time Behaviors

This section presents the results of resident behavior at meal times. Because only residents’ behaviors were observed, there are no results for staff of either facility in this section.

Valley Run Residents

During meals, residents of Valley Run were observed sitting at the dining tables eating. Some of the residents were involved in active conversation at meals, while others did not participate actively in conversation. On the day of observation, House A residents left the dining table as soon as they were finished eating. Only two of the residents at House B left immediately after finishing their lunch. The remaining 10 residents remained at the table together.

Pacific Breeze Residents

At meal times, Pacific Breeze residents sat at the dining tables. Some engaged in active conversation while they ate, while others did not.

Summary of Resident Meal-time Behaviors

During meal times, residents at both sites sat at the dining table to eat together. At both sites, some participated actively in conversation, while others chose not to. Some residents left the table immediately after finishing the meal, while others remained at the table even after finished eating.

4.2.4 Non-Meal-time Use**Valley Run Residents**

At non-meal times, on the days of observation, Valley Run residents were observed to sit at the table, or to leave the space. Some residents helped fold laundry or set the table for the next meal.

Valley Run Staff

Valley Run staff used the space during non-meal times to clean up or prepare the next meal.

Pacific Breeze Residents

Pacific Breeze residents used the space more between meals than did the residents of Valley Run. At Pacific Breeze, residents spent non-meal time at the table, or walking in the dining space. On the second day of observation, several residents used the sitting area between breakfast and lunch time.

Pacific Breeze Staff

At non-meal times, Pacific Breeze staff used the space to clean-up and/or to prepare the next meal.

Summary of Non-Meal-time Use

Residents who remained in the space during non-meal times were observed to sit at the table, walk around in the space, or help with household activities. Staff at both facilities used this time to clean and to prepare the next meal.

4.2.5 Locations Within the Space Where Time is Spent**Valley Run Residents**

Valley Run residents spent most of their time in the observed spaces at the dining table. Some residents also used the sitting area between meals.

Valley Run Staff

Staff spent time in the kitchen, at the dining table, or walking within the space (usually serving meals or clearing plates). Staff at Valley Run were also observed using the medical room (off of the sitting area).

Pacific Breeze Residents

Residents at Pacific Breeze spent their time primarily in the space at the dining table. Between meals, some residents were seen walking around the dining space, and some sat in the sitting area.

Pacific Breeze Staff

Pacific Breeze staff used the kitchen, the dining space (observed walking/standing in the space), and the dining table most frequently when they were in the spaces studied.

Summary of Locations Within the Space Where Time is Spent

Residents and staff at both facilities spent time at the dining table. Residents at both sites also spent some time in the sitting area. Staff at both sites utilized the kitchen spaces frequently. Staff at Pacific Breeze was observed in the space around the dining table as well as sitting at the dining table more frequently than the staff at Valley Run.

4.3.6 Observed Resident Activity Levels

In this study, low activity consisted of sitting or walking while acknowledging what was going on around the individual, and passive participation in a planned activity. A resident was considered to be highly active if he/she was actively engaged in a planned activity and/or in active conversation with another resident, staff member, or a visitor. This section on activity levels compares the number of hours during the observation period in which there was an equal or greater number of residents observed at low level of activity than high level of activity.

As with the meal-time behavior observations, activity levels and agitation levels were observed for residents only in this study. For this reason, there are no results for staff of either facility in this section, or the section on observed resident agitation (4.2.7).

Valley Run Residents

Of the six hours of observation at Valley Run, House A, an equal or greater number of residents were observed to be at a low level of activity than those at a high activity level for a total of 2 hours and 45 minutes. At House B, an equal or greater number residents were at a low level of activity (versus high activity) for 1 hour and 15 minutes. This yielded a total of 3 hours (out of 12) where an equal or greater number of residents were observed as being at a low activity level than those at a high activity level.

Pacific Breeze Residents

At Pacific Breeze, there were 2 hours and 30 minutes during the first day of observation where an equal or greater number of residents were engaging in a low level of activity than in a high level of activity. On the second day of observation, the length of time was 4 hours and 30 minutes. This yielded a total of 7 hours (out of 12) where an equal or greater number of Pacific Breeze residents were observed as being at a low activity level than those at a high activity level.

Summary of Observed Resident Activity Levels

Of the 12 hours resident activity levels were observed at each facility, Valley Run residents showed equal or greater incidence of low activity compared to high activity for a total of 3 hours. At Pacific Breeze, the total was 7 hours.

4.2.7 Observed Occurrence of Resident Agitation

This section presents the number of observation increments in which agitation was observed. The study looked at incidence of both verbal agitation and physical agitation.

Valley Residents

At Valley Run, there were three observed incidences of agitation, two of which were verbal, and one of which was physical. All three incidents occurred at House A.

Pacific Breeze Residents

On the first day of observation at Pacific Breeze, there were four observed incidences of agitation – two verbal and two physical. On the second day of observation at this facility, three incidences of agitation were observed, all of which were verbal.

Summary of Observed Occurrence of Resident Agitation

Incidences of both verbal and physical agitation occurred at both sites. At Valley Run, House B, no incidences of agitation were observed.

4.2.8 Summary of Observation Results

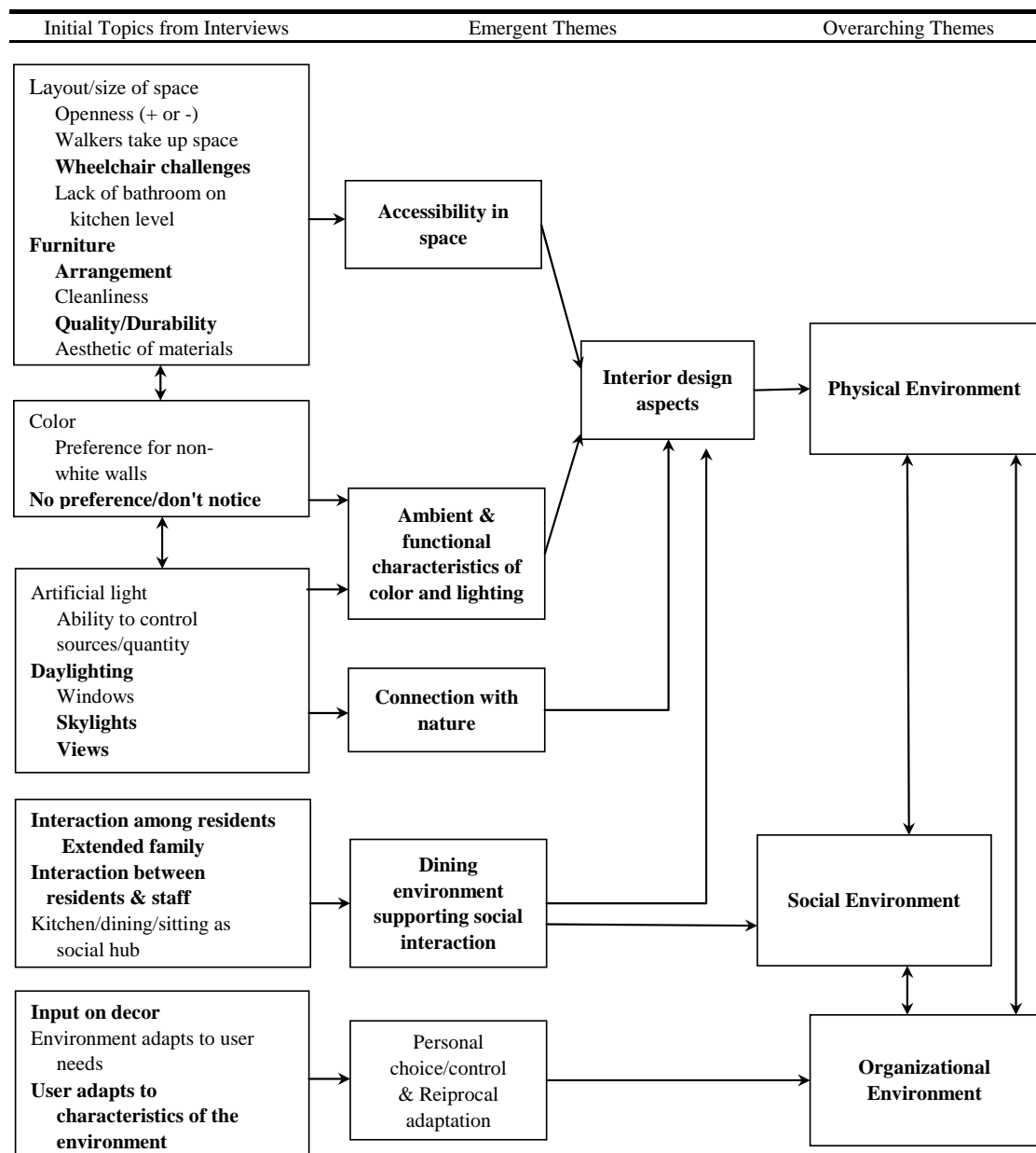
Overall, the results of the observation indicate that the dining table is the most used area of the spaces included in this study. Some residents engaged in active conversation during meals, while others do not. The space was primarily used during non-meal times for clean-up or preparation for the next meal. Staff spent most of their time in the space in the kitchen, at the dining table, or walking in the dining room. Residents were observed in high levels of activity more often than in low levels of activity. Agitation was rarely observed at both sites.

For a detailed illustration of the number of staff or residents in each space at a given time of observation, see Appendix D.

4.4 Part III: Participant Interviews

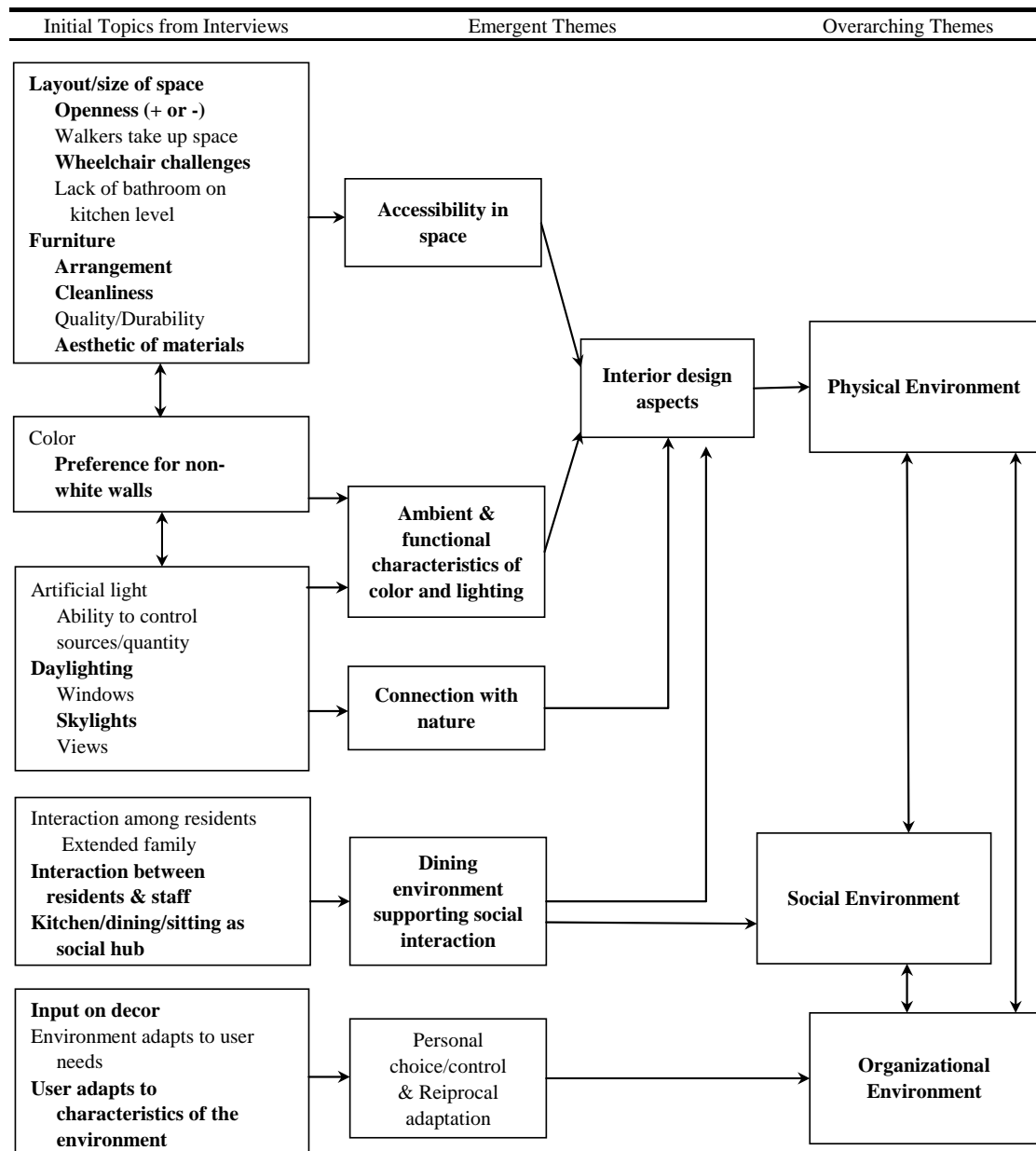
Thematic categories were created from the transcribed interviews. Based on the conceptual framework, comments from the interviews were grouped under three overarching categories: Physical Environment, Social Environment, and Organizational Environment. Figure 4.11 illustrates the process of theme development from the resident interviews; Figure 4.12 illustrates the development process from the staff interview data.

Figure 4.11: A diagrammatic representation of the theme development process from the analysis of resident interviews



Note: **Bold** text = primary issue raised in interviews

Figure 4.12: A diagrammatic representation of the theme development process from the analysis of staff interviews



Note: **Bold** text = primary issue raised in interviews

Each broad category is subdivided in the following manner:

Physical Environment:

- Layout
- Accessibility
- Furniture Arrangement, Type, Material & Finish
- Color
- Lighting

Social Environment:

- Interaction Among Residents
- Interaction Between Residents and Staff
- Dining Space as Social Hub

Organizational Environment

- Autonomy, Choice, & Personalization
- Reciprocal Adaptation

The organization for each subcategory is as follows:

Subcategory Name (*e.g.* Layout)

Site (*e.g.* Valley Run)

Participant type (*e.g.* Resident)

The results of each subcategory are briefly summarized at the end of each section.

4.5 Physical Environment

The emerging themes that comprise the overarching thematic category labeled Physical Environment include layout, accessibility, furniture and flooring, (arrangement/type/material/finish), color, and lighting. All of these are interior design aspects. Accessibility in the space encompasses interview topics such as layout and size of the space, walker and wheelchair issues, bathroom availability, furniture, openness, and homelike attributes of the space. The most talked-about issue in regard to color was a preference for non-white walls. Connection with nature relates to the amount of daylighting, as well as presence of plants in the space. Daylighting, incorporated through windows and/or skylights was a desired feature, not only as a source of light, but also for the outdoor views provided. Function of furniture/materials relates to the cleanliness and quality of the product, as well as the aesthetic properties of the item. Each of the initial interview topics comprising the first overarching theme – Physical Environment – is discussed in more detail in the following sections. Each topic is organized by facility, then by participant type (resident or staff). Each topic is followed by a summary. For example, the first section about facility layout is organized as follows:

Layout

Valley Run Residents

Valley Run Staff

Pacific Breeze Residents

Pacific Breeze Staff

Summary of Layout

4.5.1 Layout

During the interviews, residents and staff were asked to describe their general feelings about the kitchen/dining/sitting space. The topics discussed fit under the category which has been labeled “Layout” in this study. Subcategories of topics that are related to layout that emerged in discussion and are presented here include size of space, openness, clutter, and bathroom availability.

Valley Run Residents

Residents’ responses primarily focused on specific issues rather than the overall impression of the layout. Residents at Valley Run did not mention the size of the social spaces studied. Positive aspects of the openness of the space related primarily to being able to watch and interact with the staff while they worked, especially while meals were being prepared. Negative consequences of the openness related to the residents with dementia having access to the kitchen.

One resident (R3V) remarked:

“The thing about this house is people keep going in through the kitchen and we have a lot of people here who don’t quite remember what they’re supposed to do and not supposed to do, and one of them is they aren’t supposed to touch food that’s out there and you see them touching the food and... when they see ‘em touching the food then they have to throw it away, which is sad. And it’s too bad... cuz sometimes it’s cookies!”

Another negative aspect related to the open plan was noise. This was often a result of the TV in the sitting area; the openness of this space to the kitchen and dining areas allowed the noise to travel throughout. This was sometimes unappealing, as stated by one resident (R1V): “The things they watch on television (in the sitting area) can be annoying at times [when the volume is high].”

Finally, one aspect of the layout that was mentioned by Valley Run residents at both facilities was the lack of access to a bathroom on the kitchen level. As is, the only bathroom accommodations on this floor are those within the resident suites. Residents indicated that this is problematic for residents whose suites are on another level, as well as for staff or visitors. When asked what improvements she would make to the space, one resident (R1V) stated,

“Well, the one big thing for me is that there is no bathroom on this floor other than the bathrooms in our apartments. And when somebody who lives down on the bottom floor needs to go to the bathroom up here, it’s hard to get them down there and they... they have a problem. But that’s even the staff; they use that one downstairs and, uh, it would be nice if there was one people could use [on the kitchen level].”

Residents at Valley Run did not discuss issues of clutter.

Valley Run Staff

At Valley Run, the small scale of the homes and the lack of hallways were viewed as positive aspects of the building layout. One Valley Run staff member (S2V) commented:

“I think the one major component that we have is the lack of hallways. That’s like a big structural improvement that we have here, so that when someone with dementia opens the door, they’re right in the kitchen already where everybody’s hanging out and having tea or whatever. I think that’s just beneficial because it eliminates that time of, ‘Where am I?’ ... If you get lost you’re, you know, 35-40 feet away from either side of the building and so I think that has a difference to it there ... And then with the hallways, you know, there was much more of a greater sense of isolation [at a larger facility] than there is here.”

Staff at Valley Run mentioned the size of the kitchen/dining/sitting areas, stating that they would like the spaces to be larger to accommodate the diverse range of activities that occurred there. One staff member (S5V) told the researcher:

“It’s a little bit crowded, like, it’s a little too...small... because, not only is there eating and relating with them, there are people running back and forth helping people. And then, because it’s close to the office, there’s stuff that goes on in terms of medical needs, and with assistive devices sometimes it just gets to be too much... I think there could be improvements... Like I noted about there being... mainly more space and a little more division of busyness from calm spaces.”

The staff impressions of the location of the kitchen/dining/sitting area in the house were positive. At both sites, staff members mentioned that having this space in a centrally located part of the house was desirable.

As illustrated by the following quote, the chefs enjoyed the interaction that the open plan allowed, but the openness had its drawbacks as well.

S5V: “I definitely like the fact that it’s relational, but I think it could still be relational but maybe blocked off at the ends. Because that way, it’s really—the idea of it being an open kitchen is good in theory, but not in practice in terms of the [risk that] residents can harm themselves by coming in the space.”

Valley Run staff mentioned that noise from kitchen activities as well as the TV in the sitting room was sometimes problematic. On this topic, one staff participant (S2V) said,

“I think that would be one of the things too in terms of the dementia piece and noise, would be like the disposal and the dishwashers and ... that static energy of plates clacking when you’re putting them away and things like that. I mean it’s for short periods of time but... stimulus is really big with dementia, so I think any of that kind of thing, like you can hear plates now... The other thing that’s kind of an interesting thing to observe is the TV... The volume that’s associated with them watching the TV, you know, it can be pretty good at times, and then if it’s just left on, [when no one is watching it]...”

The presence of clutter was mentioned by the staff participants at Valley Run as an aspect of the space that they did not like. They described clutter as items on the

countertops or tables that they felt did not need to be there, and several of them remarked that the arrangement of bulletin boards and papers on the walls in the kitchen/dining area looked unorganized and unattractive. For example, S4V told the researcher,

“I think the clutter on the walls is not good. I mean like we have our board, which, you know, is good and then make one designated area for that and make the rest of it just calm and homey.”

Another staff member at Valley Run mentioned the clutter as a negative feature, but expressed uncertainty on how to eliminate it while maintaining the residents’ contributions to the décor of the space. He (S2V) commented:

“I don’t like clutter very much so the more um, functional space to move around in usually is more comfortable for me as well... There seems to be a general amount of uh, I don’t know if I’d necessarily say clutter but there’s a lot of stuff, but you’ve gotta accommodate for 14 residents or whatever 12 residents.”

The lack of a bathroom on the kitchen/dining level was mentioned by Valley Run staff members. One staff participant (S2V) stated,

“Um, I think ... maybe the addition of the bathroom off the kitchen would be a good thing, even though, you know, half of ‘em live up there and can just go to their room, that would be one area of improvement.”

Pacific Breeze Residents

The resident participants at Pacific Breeze did not discuss the size of the space, openness, clutter, or bathroom availability.

Pacific Breeze Staff

Staff members at Pacific Breeze discussed the overall layout and size of the space as well as specific elements of the space. Staff participants commented about the layout in relation to how it affected their ability to do work, and often compared it to previous experiences of working in more traditional assisted living facilities. This was illustrated by a staff participant from Pacific Breeze (S6P), who said, “I think that everything’s very centralized off of like the main area to where it’s easier to keep an eye on everybody at one time... it works really well for what we do.”

Positive associations mentioned by staff included the increased visibility of the space that the openness provided, and the ability to communicate more easily with residents and other staff members. For example, as S4P stated,

“When you’re working here, the good thing is that you can actually see what’s going on. Like if you’re in the kitchen preparing dinner or whatever you can see everybody where they go, which way they went. So it’s good visually... That’s probably the best thing, I would say, about the space.”

Negative outcomes relating to the openness of the layout discussed by Pacific Breeze staff included the occurrence of too many people in the kitchen work area. One participant (S2P) told the researcher, “The fact that it’s an open kitchen... sometimes I get too many people in the kitchen, and it can really slow me down... and it’s kind of mentally irritating.”

Another staff member (S3P) expressed both positive and negative views of the open plan, mentioning noise as a drawback:

“You see open-style kitchens maybe in an adult foster care setting, but you don’t normally see it in this level... Um, I think that’s a, it’s a great concept. Um, it can be unusually noisy. So that could be a drawback because some of your dementia residents are, don’t do well with a lot

of noise and a lot of activity. And in this area it can get uncontrollable, especially when you have a big group of people.”

Not having a bathroom directly accessible from the kitchen/dining/sitting areas was viewed negatively by Pacific Breeze staff, as indicated by S1P, who stated, “I would have put a bathroom on the second floor. I think that was very poorly designed,” and S4P, who commented, “It’s funny cuz you’re on this floor so much and then [when someone needs a bathroom] you have to say, ‘oh go up or go down’... Yeah, it definitely would be a good thing [to have one].”

Summary of Layout

Size of space, openness (both positive and negative aspects), and lack of bathroom availability were all discussed at both facilities. Issues of clutter were mentioned only at Valley Run. The small scale of the building, and visibility through the social areas were perceived positively at both sites. Noise and the lack of a bathroom near the kitchen/dining/sitting areas were perceived negatively at both sites.

Valley Run residents and staff, as well as Pacific Breeze staff discussed the size of the space as a general topic. Residents mentioned it in relation to wheelchair and walker issues, which will be discussed in the following section. The only group that mentioned clutter was Valley Run staff.

4.5.2 Accessibility Issues

Participants were asked to discuss aspects of the space that facilitated or hindered resident movement in the kitchen/dining/sitting area, and if the space made it possible for residents to do what they need and want to do in the space. Staff and

residents at both sites commented on accessibility challenges, primarily for residents using walkers or wheelchairs.

Valley Run Residents

At Valley Run, the challenges were related to a lack of space around the dining table. One resident (R1V) stated, “We have so many walkers that it is sometimes difficult to move around the table.” Regarding wheelchair users, the same resident said: “... when they come into a group activity it’s hard to find them a place to sit.”

At both facilities, staff and residents mentioned that wheelchair users have difficulty pulling up close to the table, because the arm of the wheelchair often hits the table. During one of the interviews, two Valley Run residents (R3V and R4V) told the researcher,

R3O: “People in wheelchairs have difficulty (pulling up to the table). We have new tables coming that are supposedly higher.”

R4O: “Yeah, Resident X, who has trouble, she almost always runs into the table when she sits down. I mean when she pulls her chair up; she has a wheelchair too.”

R3O: “Resident Y (also in a wheelchair) has to raise her arm up.”

Valley Run Staff

The accessibility issues for wheelchair users were further illustrated by one of the staff members at Valley Run (S2V) who said,

“If there’s a resident that uses an electric scooter or wheelchair to move around, it doesn’t give a lot of leniency on the space for them to get through comfortably... they can’t get through on the back side, and so they can only get through on the wall side... So it limits where those residents can sit based on that... and it seems like, to me, that keeps ‘em a little bit further away [from the dining table] unless they’re good at getting their arms up on the chair, so they can come closer.”

In regard to walkers, Valley Run staff said that the spaces included in the study become crowded when multiple walkers are present.

Pacific Breeze Residents

The resident participants at Pacific Breeze did not discuss wheelchair or walker issues.

Pacific Breeze Staff

Staff at Pacific Breeze told the researcher that there is enough space for wheelchair users to move around the tables, but the table itself presents a problem. S4P explained, “Sometimes the table legs are an issue, with the wheelchairs. We always have to put the people with wheelchairs in the middle so that they don’t bump into the legs.”

Summary of Accessibility Issues

At both Valley Run and Pacific Breeze, it was mentioned that wheelchair users have difficulty pulling up to the table. One difference between the facilities, however, was the reason for that difficulty. At Valley Run, the lack of space around the table limited where wheelchair users could sit; at Pacific Breeze, the placement of the table legs caused the limitation for wheelchair users. At Valley Run, it was stated that when multiple walkers were in the space, it became crowded, while crowding was not an issue mentioned at Pacific Breeze.

Both residents at Valley Run and staff at both sites commented on difficulties experienced by wheelchair users when trying to pull up close to the table. None of the Pacific Breeze resident participants commented on the topic.

4.5.3 Furniture & Flooring (Arrangement/Type/Material/Finish)

Discussion about the furniture related the arrangement, type, material, and finish or furniture at the facilities. Items discussed related primarily to dining room chairs, dining room tables, and furniture in the sitting area. Comments pertained to comfort, mobility, appearance, cleanliness, durability, and quality of furniture and materials present in the kitchen/dining/sitting areas were mentioned in the interviews, and are presented here.

Valley Run Residents

Residents at Valley Run indicated a preference for dining chairs with wheels. At House B, they had just gotten new chairs, which were the same as those used at Pacific Breeze, that had no wheels. They liked the new chairs, but said that they needed to find a way to make them easier for residents to move in and out from the dining table. Two residents discussed this issue, saying,

R3V: “Right now it’s really hard for people to move up in with their chairs. Of course, maybe when we get the sliders it’ll help.”

R4V: “We had wheels before, and you’re (R3) one of the wheel chairs and they were wonderful. You just sit down and you scoot yourself right up. Now, you can’t.”

R3V: “It’s a job trying to... they have to go along pushing people in. But we’re supposed to have slides put on them. I don’t know if that will help or not.”

Characteristics of the facilities that made it more homelike were commonly mentioned in the interviews. The dining table was discussed frequently as an aspect of the interior environment that made the setting homelike, therefore, this section focuses on the perceived role of the dining table as a main attribute of the home.

At Valley Run, residents had positive views of having one main dining table, relating it to home and family. One participant (R3V) said, “[the dining table set-up] makes it feel more like a home thing. When you had everyone sitting at one table.” Another resident (R2V) told the researcher, “We know everybody there at the table; we know everybody there.”

Cleanliness of the dining tables was discussed by the residents at Valley Run.

As R2V explained,

“Well it’s important to have the kind of table cloth ... we ... found out that you can get this white-looking plastic that it looks like it’s regular cloth ... Once a day, at least, somebody spills their junk on there, but then the staff comes around and they wipe the whole darn thing *clean* ... It’s really a carefully worked out plan to have a clean place.”

At House B, residents said that the table there had grooves in it, so if there was not a table cloth over it, food would get stuck in the grooves, which became very dirty. The residents at this site did not talk about durability or quality issues in relation to the furniture or flooring, but one resident did mention that the base molding was damaged from walkers hitting or scraping against it. Another resident (R4V) commented on the quality and aesthetic of the appliances. She said, “I would put in a commercial dishwasher but they don’t want it to look commercial.”

When asked about the sitting area furniture, Valley Run residents said that it was fine.

Valley Run Staff

Staff at Valley Run like the support provided by the chairs with arms, but chairs lacking wheels were perceived negatively. One of the staff participants (S2V) told the researcher,

“What we’re realizing [with the new chairs] is it’s hard to slide, there’s not really sliders on these [new chairs] so we’re either going to be putting wheels or sliders on ‘em. They’re more stable for the residents; they’re solid, sturdier. But some of ‘em have already complained that it’s too hard to get in and out of the table with ‘em, so it requires more staff assistance at this point ... Everything we do we want to encourage independence as much as possible so the fact that it has arms I thought was going to actually help with that, but the fact that the mobility of them right now has decreased is what makes it a little frustrating, I think.”

The dining tables were discussed; Valley Run staff commented that the height of the table was comfortable and appropriate for eating and other activities. Staff participants at Valley Run mentioned both positive and negative consequences of having just one dining table. The main advantage was the sense of family that was created, however, as the comment below indicates, there were some perceived drawbacks, such as the potential that residents may feel overwhelmed.

S5V: “Yeah I don’t think one big table is actually ideal. In one sense it’s kind of nice, the idea again being that it’s one common table and it’s one family and that, but I think that a sense of family could still be had by having two smaller tables. I think the larger table is actually a little bit overwhelming, and not everyone can participate in the conversation because you just have a dominant few because it’s so big.”

Some staff members compared the dining room table arrangement to that of previous work experience in assisted living facilities with larger dining rooms.

Participants expressed unanimous preference for the dining room layout of Valley Run.

Cleanliness was a frequently discussed issue in the staff interviews. Most of them commented on whether or not the flooring was easy to clean. At Valley Run, the use of carpet in the kitchen work space was perceived negatively by staff because it was hard to keep clean. One staff participant (S1V) stated, “My only thought is... who puts carpeting in their kitchen? ... It’s not clean. When there’s food spilled on it every day and back there cooking and... it’s just not clean.” Others mentioned that both the red and green carpeting showed dirt and stains.

Quality and durability of furniture, materials, and appliances was mentioned by staff. Because of the frequency of use, staff expressed that they thought a more industrial-type dishwasher would be an improvement. On this topic, one staff member (S1V) told the researcher,

“I would like to see um, more of an industrial-type dishwasher. Not some big huge ugly monster, but something that tied in better... with the rest of it... Yeah, I think, you know, sticking with a theme of stainless steel, I think that’s nice. Um, better quality dishwashers.”

While most staff members seemed to be satisfied with the quality of the carpet in the dining areas, the cleanliness and durability of the carpet flooring was mentioned by a staff member (S6V) at Valley Run:

“The carpet is several years old so, therefore, it’s very worn. And, stained-up a lot, and it either needs to be replaced or cleaned very well, you know. But I honestly don’t believe that the cleaning would do anything for it. I think that the carpet needs to be replaced. Considering that, you know, yes the house is 3 or 4 years old... And that carpet upstairs has been walked on even more than this carpet downstairs has ever been walked on... And, and you can tell that because it’s got the track marks. It’s got the wear and the tear from

those tread marks. [If] you want your assisted living -- your house -- to look good at all times, you need to replace that carpet.”

The staff members also spoke about the aesthetic of the upholstery fabrics on the sitting area furniture at Valley Run. One participant (S4V) expressed a negative perception of the upholstery, saying, “It just, it... feels like a nursing home furniture.”

Response in regard to the sitting area furniture was mixed. Some staff members commented that they liked its residential appearance, while others indicated the opposite, saying the furniture looked like that found in a nursing home.

Pacific Breeze Residents

Residents at Pacific Breeze thought the dining chairs were comfortable. Two of the three participants interviewed used a dining chair that had been retrofitted with wheels, and they said the chairs were easy to get in and out of. The participants said they felt that the dining tables were at a height that was supportive of eating and other activities. No comments relating to the sitting area furniture were made by the residents at this site.

The residents at Pacific Breeze did not say much in regard to the cleanliness, durability, or quality of the furniture and materials at the facility. One of the residents did say, “I don’t know what they can do because there’s constantly somebody spilling something so they’re always cleaning.”

Pacific Breeze Staff

Participating staff at Pacific Breeze expressed mostly positive opinions about the dining chairs. The chairs were described as supportive and comfortable.

However, staff members did mention a desire for wheels on the dining chairs. One of them (S4P) commented, “It would be nice if we had more with wheels cuz we’ve got two with wheels and those get used a lot for people that we need to help push in to the table.”

Pacific Breeze staff told the researcher that the table height seemed to be appropriate for residents to eat and perform other activities at the table. Pacific Breeze staff discussed the open kitchen and the table arrangement as homelike attributes. One participant (S6P) told the researcher,

“I think our design of our open-kitchen concept, it makes it more like a home. We’re all a family eating together instead of having like an institutional kitchen where you know, no one sees what the chef’s doing kind of thing.”

At this site, the tables are placed in a split L-shape, rather than in together in one long arrangement. The reasons for and benefits of the arrangement are described below by a staff member (S2P):

“Sometimes we have people that don’t get along well, so by breaking up their field of vision it takes their attention off of each other. It keeps the stress level down... It makes the atmosphere a little more enjoyable for the residents’ meal times [as well as providing] accessibility for wheelchairs and things like that. It kind of makes a difference ... If you’ll notice at meal times everyone that sits here, pretty much they either just wander to their chairs and we [seat] our less mobile people are over here cuz it’s easier access to get ‘em in and out of the dining room... I think people sometimes just do better if they’re not ... forced to participate visually in the conversation and everything; they just do better if they’re kind of separated... Even though they’re not really separated but they’re not directly in contact with each other during mealtimes seems to help out.”

Staff participants at Pacific Breeze expressed mostly positive opinions in relation to the table layout. However, some commented that they didn't see any other way to arrange the tables without compromising accessibility in the space.

Staff at Pacific Breeze discussed cleanliness, quality, and durability, in relation to the furniture, tabletops, cabinetry, appliances, and flooring. One staff member (S2P) had the following to say about the furniture in both the dining and sitting areas: "The furniture is built well... It doesn't give. It's not fragile. It's sturdy; it's good quality furniture... I think we did really good with these tables... the acrylic tops [help keep] it more sanitary."

Though the functional quality of the sitting area furniture was perceived as positive, the aesthetic qualities were described negatively by Pacific Breeze staff participants. The pattern was perceived as unattractive, and the comfort of the material was lacking. One participant (S3P), who discussed her perception of the furniture, stated:

"I love the (dining) chairs. I'm not that crazy about that furniture [in the sitting area] ... The color's ok. The material is not very comfortable. I think we could have ... done a little better. I think it reminds me a little bit of nursing home furniture. That if you, if it gets soiled you just wipe it off. So I think we could have done... (pause)... It's missing something to me."

The quality of the kitchen cabinetry was mentioned by one of the participants (S1P), who told the researcher, "I don't like the cupboards... color-wise it's ok. We've had a lot of problems with these cupboards... drawers break. The quality is very poor... I don't think they're going to last very long."

The staff at Pacific Breeze talked about the flooring in the kitchen work space. They were all happy with the recent change from carpet flooring to cork flooring. One staff participant (S1P) felt that the cork flooring worked well in the kitchen, while the carpeting was favorable in the dining and sitting areas. She commented:

“I’m glad they took the carpeting out of the kitchen... It was a mess... You couldn’t keep it clean, especially in the kitchen ... the cork’s really nice... it cleans up well, and it’s not got those stains and... I think it worked out ok. I like this carpet just because it works well for like wheelchairs and walkers and that kind of stuff... it gets a lot of use. Um, it seems to clean pretty well, which would be really important in this area of course.”

In regard to the sitting area furniture, there were mixed opinions on its comfort; but most staff respondents expressed dissatisfaction with the appearance of the furniture in this space, describing it as “hotelish” rather than what you would find in someone’s home.

Summary of Furniture Arrangement/Type/Material/Finish

There was a preference for chairs with wheels and arms at both facilities. This preference, and the perception that the dining chairs were comfortable, was consistent between facilities, as well as between residents and staff alike. All participants at both sites also indicated that the dining table height was appropriate for the activities performed there.

At both sites, participants relayed the feeling that the table arrangement assisted in creating a homelike atmosphere with everyone eating together. Staff at both facilities also commented that there didn’t seem to be any other way to effectively arrange the tables. One difference between the facilities was that at Valley

Run, if the table limited conversation, it was perceived negatively, but at Pacific Breeze, situations of intentionally limiting some interactions was described.

Residents mentioned only positive perceptions relating to the homelike attributes of the setting and table arrangement. Staff participants discussed both positive and negative outcomes of the arrangement.

Neither Valley Run nor Pacific Breeze residents had strong opinions regarding the sitting area furniture. They either responded that it was fine, or it was not discussed at all. Perceived comfort of the sitting area furniture was mixed among staff participants at the two facilities. At both facilities, at least some of the staff members commented that the furniture looked like that found in a nursing home or hotel rather than a residence. Some participants at Valley Run thought the furniture in the sitting area was fine; none of the Pacific Breeze staff members were satisfied with the sitting area furniture.

Participants at both facilities perceived carpet in the kitchen work space negatively because it was too difficult to keep clean. Both residents and staff expressed the importance of using materials that are easy to clean, especially table coverings and flooring. Staff discussed the durability and quality of the furniture, cabinetry, and flooring, but these topics were not mentioned by residents.

4.5.4 Color

Primary topics relating to color pertained to wall, ceiling, and carpet color. Participant reactions to and opinions of the color in their living or work environment are discussed in this section.

Valley Run Residents

Residents at Valley Run said they would prefer to have a non-white color on the walls, instead of what was existing on the walls at the time of the study. House A had a few sections of walls in the study area painted light green, which was perceived positively. One resident of House B, where there was no color on the walls, expressed a desire for color to be added. When asked what she thought of the white walls, she (R4V) said, “Oh... it’s not very interesting. I’d like it to be a color... or even if we just had some parts of the walls painted different.” There was no discussion of the ceiling color at Valley Run, other than it being perceived as “normal.”

The carpet in the study space at House B was red. One of the participants mentioned that staff didn’t like the color, but she and her husband didn’t mind it. In House A, the green carpet was not an issue discussed by the residents.

Valley Run Staff

Staff participants at Valley Run expressed a preference for non-white walls. One participant (S2V) discussed both positive and negative associations with white walls:

“It [white/neutral wall color] definitely creates a sense of space. It doesn’t draw your eye to it, I don’t think, in any way. So ... psychologically I would think it probably brings your focus back to what’s within the space. The greens [in House A] I think warm it up and kind of actually fill it in a little bit, is what my perception of it is ... We’ve been looking at redecorating and, and just trying to warm the space up ... The wall color, it’s just a basic neutral. And I think what it does actually is it makes it more apparent how... just random things are... in my perspective ... whereas when you add the things with color and then things that kind of fit the context of it for some reason.”

Another staff member described it as boring. Sixty-seven percent (4 of 6) staff participants mentioned a preference for earth tones or beiges rather than white in relation to wall color.

Staff working there liked the white ceiling at Valley Run. They associated it with cleanliness and discussed that it helped brighten the space by reflecting the light. One staff participant (S1V) said, “I like ceilings to be white and look clean,” and another (S6V) told the researcher, “Oh, the ceiling’s fine, and it’s nice because of the fact that it brings the light down.”

Valley run staff participants showed strong dislike for the red carpet color in House B. Two participants said they perceived more agitation or “drama” at House B with the red carpet than at House A (green carpet). One of the participants (S2V) commented,

“The red carpet here ... throws me off ... I don’t relax in that space as well as I can relax in the House A space just because of the carpet alone ... And I don’t know to what extent that really has an effect here or not, but I have noticed over time in the four years I’ve been in both of these houses, that for some reason this house tends to have a higher energy of dementia in it. And they don’t segregate on move-in so, whether it’s luck of the draw that we kept getting more in one I’m not sure.”

While the green ceiling at House A was perceived more positively by staff than that in House B with regard to color, the green carpet was compared to something found in a hotel lobby rather than a residence.

Pacific Breeze Residents

Feelings communicated by Pacific Breeze residents on the topic of wall color ranged from neutral to positive. One resident said she didn’t pay attention to it;

another (R3P) said, “It’s a little much, but it’s ok, it’s cheerful... It’s nice. It’s welcoming.”

Two of the three residents interviewed at Pacific Breeze said that they noticed the lights – especially skylights – more than they noticed the green ceiling color. One respondent commented,

“I really hadn’t noticed it, but I... I’ve noticed the lights in the ceiling which are lovely... It seems to be a good color... Well, usually, you see, the lights are on so you really don’t, you don’t. The light is what hits you most. But the green is a very pleasant color... as a background. I really think it is... very nice. I don’t see a thing wrong with it. I mean, I could see some colors that I wouldn’t want to... orange, purple... you know, there are a lot of colors that I wouldn’t want to put up there, but I think the green is very, is very helpful, very welcoming.”

The other two resident participants at the site did not indicate strong positive or negative perception of the ceiling color.

Pacific Breeze Staff

When asked for their views on the wall color in the study space, Pacific Breeze staff expressed positive perceptions based on the fact that the walls were not white.

However, they also indicated that they probably would not have chosen the same orange color. The wall color was perceived as non-institutional, as evidenced by the

following quotes:

S1P: “I like it that it’s not just white ... or cream, or ivory, or any of those shades—because at [Valley Run] it’s like that and to me that’s just more institutional. You know, cuz that’s traditional; that’s what they have so many places. Um, I like it that it’s a, kind of a different color, that it’s actually color, as opposed to just white.”

S2P: “We see in color so I would just assume that—you know, if we’re outside there’s all these colors. There’s blues and greens and browns...you know? And I think if you put yourself in a sterile environment where everything’s just all white it messes with your head

... I just feel more ... at ease working in this environment with these colors ... It's more relaxing... I definitely prefer working in a colored environment as opposed to the white."

There was mixed response about the green ceiling color at Pacific Breeze. The connection was made to the reflective properties of white ceilings. One participant (S1P) told the researcher, "I would have probably had it white; it would have brightened it up more."

Several staff members discussed the purpose behind the colored ceiling, but they had different perceptions of its actual effect. One participant (S2P) described the purpose of the lighting and his perceptions as follows:

"It's supposed to have a calming effect. This type of color and it's supposed to help keep people that are at risk for leaving—that like to leave the property— it's supposed to have more of a calming effect and keep them more subdued. It cuts down on anxiety ... I definitely think that there's a difference between here and Valley Run in that."

But, another staff member disagreed. She (S1P) stated, "I don't think their mood or behavior has anything to do with the ceiling ... I haven't noticed [an effect]. Not that I've been able to correlate to the color of the ceiling."

The carpet color at Pacific Breeze (beige/light tan) was perceived positively, mainly because staff felt it was easy to clean and didn't show many stains or much dirt. One person (S2P) told the researcher, "It's not my favorite color, but I think it's easy to keep clean... It's easy to keep the appearance up." Another staff participant did comment that if something red was spilled and not cleaned up promptly, it would leave a stain.

Summary of Color

Participants at both facilities expressed a preference for non-white walls; earth tones were mentioned by many as a color they would use in their own home. The perception that white ceilings brighten a room was indicated in participant responses at both sites. Staff wanted a carpet color that didn't show stains.

At Pacific Breeze, both residents and staff told the researcher that the wall color was not what they would have selected, but they found it to be warm and welcoming. In regard to carpet color, some residents at Valley Run liked the red carpet, but all of the staff participants at the site disliked the color. Visibility of stains on the carpet flooring was a major issue raised by staff, but none of the residents discussed that issue. Both residents and staff at Valley Run expressed either neutral or positive feelings toward the white ceilings at that site. None of the residents at Pacific Breeze discussed the purpose of the ceiling color at the site; there was mixed response by the staff participants on if the ceiling color was actually having the intended affect.

4.5.5 Lighting & Connection to Nature

Lighting included both artificial and natural sources. Daylighting (natural lighting), which included windows, skylights, and views, was linked to discussions of the connection to nature that they provided. This section presents the results relating to topics relating to both artificial and natural lighting (including connection to nature).

Valley Run Residents

Three of the four resident participants at Valley Run said they felt the artificial light in the studied spaces was adequate. One thought it was too dark, and one

mentioned that she thought it was too dark in the studied spaces at night. When asked about the quantity of natural light in the space, residents said it was fine, considering the Oregon weather. They thought the windows in the sitting area provided a good amount of natural light into the space.

Views were mentioned by participants at Valley Run. Discussion indicated the importance of good views, as evidenced by one resident's (R2V), who said,

“Well I like to look out the back door, and see... I can't see the sunset through [my apartment] windows. So I have to go down out of the house [to] see the sunset. But I can go to the back door in the kitchen area, and raise the blinds and stuff and I can see most of it... Also, ... if we want to see the whole sky [we can't because] we've got two trees—beautiful trees, however, we can't see the planets and stuff; I like to watch planets.”

Two other residents compared the views they had from their previous home to the one they currently had from the window of their suite, which faced a water tower:

R4V: “[Our old house] was big and we had a beautiful view...”

R3V: “We didn't look at water tanks.”

R4V: “Yeah, we didn't look at water tanks [like we do now].”

While R3V and R4V did not discuss the views from the studied spaces, their comment about the view from their suite provides further indication that the type of view residents have from the facility are important.

Valley Run Staff

No Valley Run staff participant stated that there was not enough lighting. Respondents either indicated that it was adequate or too bright. One (S2V) told the researcher, “I think the lighting's on the higher end of what I would prefer, but it serves the purpose for the level of impairment that we have I think and the need to be

able to really see clearly.” Another (S5V) linked the quantity of artificial lighting to resident behavior. She said, “All of the lights, I think, makes for more agitation.”

Overall, a desire for more natural light in the kitchen and dining spaces was expressed by staff when asked what they thought about the quantity of natural light in those spaces. One staff member (S5V) said that there was “not enough natural light, but the lighting is adequate.” Staff participants at Valley Run generally felt the sitting area had enough natural light.

Several staff members related the amount of natural light to the seasons and the climate, as stated by S4V, who told the researcher, “I think during the summer is my favorite time because of the natural light [that] comes in. I don’t think there’s enough natural light.”

When asked about the importance of views from the house, one staff member (S2V) explained, “When it comes time to rent apartments, if there’s one of them that has a view of the garden versus one that has a view of the water towers it definitely has an effect [on which apartment residents want].”

No staff participant at Valley Run discussed the views from the studied social spaces. They did mention positive feelings toward a connection to nature and access to the outdoors. Staff discussed wanting more plants inside the house, including growing plants indoors that could be used in meal preparation. The ability of residents to access the outdoors if they wanted to was discussed by staff, such as S1V, who said,

“The people here just walk outside. [At other places I’ve worked], people with Alzheimer’s, they have a little area they could go out to... that had a big high fence that you couldn’t see out of. There’s an enormous difference in the way that people here thrive compared to the way the people that are locked up.”

Pacific Breeze Residents

All three of the participating residents at the site told the researcher they felt the lighting, both artificial and natural, was adequate. Two of the three residents interviewed at Pacific Breeze said that they liked the skylights at the site.

Pacific Breeze Staff

The artificial lighting at Pacific Breeze was perceived positively by staff participants. Several participants talked about the purpose of the artificial lighting. One staff participant (S2P) told the researcher, “These bulbs are on spectrums to simulate natural sunlight also, and I have my skylights here and the windows, and [the kitchen] is my main work area, so ... it works good.”

Another staff member (S1P) commented,

“It seems just right to me ... What they try to do here is they try to emulate natural light. And that’s why you see the different shades and it’s not all just one big bright light. I think that’s better for – to see period, you don’t have those blinding [lights].

The light fixtures were perceived as unattractive, as indicated by S1P, who remarked, “I don’t like the shades of [the ceiling lights]; I think the shades are ugly. Those are really cheap and ugly. I thought they could have done a lot better than that.”

The lack of a good view was mentioned by one of the staff members (S1P) at Pacific Breeze. She specifically referred to the lack of windows in the sitting area, saying,

“The one thing they did that I didn’t necessarily agree with is this: originally there was a window there, on that wall... It was really hard ... for me, when they closed it up because to me, having that window there you could see through, it was more open. But I guess it was some kind of fire hazard ... I don’t know exactly what the deal was, but I

certainly ... it was weird the difference, you know? You really noticed that you felt more enclosed, as opposed to when the window was there, I liked it a lot better.”

Skylights were also discussed as a desirable feature. Some Pacific Breeze staff participants expressed that they would like it if there were more skylights, but that it was not possible due to the kitchen not being on the top level of the building.

Garden access and use of foods grown on site was perceived positively, as stated by this staff member (S2P): “I like the organic gardening, using natural foods as much as possible... not so much now, but you know, in the spring and summer we’ve got all the plants that we have here.”

Summary of Lighting & Connection to Nature

At both Valley Run and Pacific Breeze, none of the staff participants said that the amount lighting was inadequate. Also mentioned at both sites was a desire for a good view and on-site gardening.

Residents perceived the amount of light as low to adequate, while staff thought it ranged from adequate to bright. Staff put more emphasis on the importance of and desire for natural light than residents did. Both residents and staff valued access to the outdoors, views, and gardening on site.

4.6 Social Environment

The thematic category labeled Social Environment is comprised of the emergent theme of the dining environment supporting social interaction among residents, between residents and staff, and the dining area as a “social hub”. This theme is linked to both the overarching theme of social environment as well as the emergent theme labeled “Interior design aspects.” Because the primary focus of this

study was to examine the physical environment, most of the social aspects that emerged were linked to the physical setting in some way.

Interview topics presented here relate to social interaction among residents, social interaction between residents and staff, and the dining table as the social hub of each facility. Each section on initial interview topics is organized by facility, then by participant type (resident or staff), and followed by a summary.

4.6.1 Social Interaction Among Residents

Participants were asked to describe their general feelings about the kitchen, dining, and sitting areas. As discussed in Section 4.5 of this chapter, the small-scale of Valley Run and Pacific Breeze, was preferred when compared to larger, “traditional” assisted living residences. One resident at Pacific Breeze (S3P) gave this response when asked for her thoughts on the design of the space:

"It's reasonable, it works. I mean, the whole purpose is to get people together there and I think it does that well ... It's a very comfortable place, I don't think there's anything that is bad about it ... It's nice ... I can't think of anything I like particularly about it or I don't like; [it] just seems like a very useful and comfortable place."

This recognition that the space functioned in bringing people together for social interaction was expressed by many of the participants.

It was also mentioned that the physical setting itself was not the primary reason people went to or stayed in a space. The social interaction occurring in the space was very important. One resident (R1V) indicated that even during planned activities, the activity itself was not always his motivation for participating, but rather the socialization that occurred during the activity. He said,

[Putting together seed packets is] a social activity and people interact and we're talking to each other while we're doing it. I'll say now alone you couldn't pay me to do little tiny seeds and put them in a basket and put a little label on it. No, no. But when there's 6 people there who are all talking and having fun ... that's part of the environment here ... And our staff does a very good job of trying to keep people – individuals who have their own private room and they live alone – they keep them out and doing stuff.”

Also discussed at Valley Run and Pacific Breeze was the concept of extended family. They described extended family as the creation of a homelike environment that encourages caring for one another as fictive kin. The dining table was discussed frequently as an aspect of the physical environment relating to the occurrence of social interaction. The remainder of this section presents results of the perceived role of the dining table as a main focal point around which social interaction occurred, as the extended family gathered together.

Valley Run Residents

Resident participants living at Valley Run viewed each other as family, and looked out for one another. This was indicated by the response of one resident (R1V), who compared Valley Run to other retirement housing she had seen:

“It is more like a family [here]. I have seen some of these other retirement homes or old folks homes ... they're very practically run and not very conducive to socialization much ... So for that matter this is a good place ... Most of the old folks homes, you don't really see what the other people are doing. Here you are very conscious if someone doesn't eat or that sort of thing ... Just as you would be for a family member.”

Other residents at the site expressed similar views.

Valley Run Staff

Participating staff members at Valley Run discussed the communication between residents, and that they help one another and look out for one another. For example, one participant (S1V) told the researcher,

“They all communicate with each other. The people ... here who are still cognitive, I think are a lot of help and a good resource to the people who aren’t, because a lot of it’s an age thing. They’re all kind of the same age. I think they are very tolerant of each other, and I just think it makes a huge difference.”

Pacific Breeze Residents

Extended family was not discussed by the residents participating in interviews at Pacific Breeze.

Pacific Breeze Staff

At Pacific Breeze, staff mentioned extended family and residents looking out for one another. Participants here linked a sense of family to the physical environment, as indicated in the quote below:

S1P: “They have a sense of family here... They really look out for each other... They’ve kind of developed their own unique culture at the house in this environment, um, to where they are all helping each other. They look out for each other and make sure everybody’s taken care of... We all get along here. We’re all friendly here. You know, it’s a different, it’s different to watch it play out like that, and it’s because of this type of environment.”

Another participant compared the dining room atmosphere to a previous place of work, with a larger dining room. She described the dining experience at Pacific Breeze, saying, “This is more of a homelike setting, versus where I’ve worked before

which is more like a major dining room... Where here everyone sits sort of together. Like you would do at home.”

Summary of Social Interaction Among Residents

Both facilities were described as environments that were conducive to socialization. At both locations, participants indicated the presence of the extended family concept, with residents looking out for one another and caring for one another as family members do. One difference between sites was that residents at Pacific Breeze did not discuss feelings of being part of an extended family; residents at Valley Run did.

The extended family concept was discussed by both resident and staff participants (excluding Pacific Breeze residents).

4.6.2 Interaction Between Residents and Staff

The open kitchen concept used at Valley Run and Pacific Breeze places the chefs at each house in a more active role than at traditional assisted living facilities where the chefs are behind closed doors and rarely interact with the residents. The responses in the interviews describe resident and staff views of the interactions that result from the open kitchen.

Valley Run Residents

Residents at Valley Run viewed the openness of the area as a positive aspect of the environment because they were not just getting a service from the chef and other staff; they also get social interaction through conversation. This was described by one resident (R1V) who told the researcher, “We like to talk with the staff. That’s one of those things, most places the staff will say, ‘What would you like?’ and then pour

something, and that's about all they say. But here there's a conversation going back and forth, which we like."

In addition to conversation, residents said they liked being able to watch the chef prepare the meals.

Valley Run Staff

Valley Run staff participants discussed the visual interaction, conversation, and personalization of meals that occurred in the kitchen of the facility. A staff member (S2V) commented,

"I think the, the big benefit of it is like watching the chef cook, being able to interact with stories with the chef while she's there doing her thing... I like that it's an open environment towards, you know, asking the residents what meals they want, that kind of thing."

A chef at Valley Run (S5V) remarked that the physical environment was connected to the social interactions, creating a sense of family between the chef and the residents. She stated,

"I really love the seating. People can sit there and talk to me... just that sense of like, "sit down, have a cup of tea, chat to me while I prepare food." And then, so it feels like your grandma's kitchen kind of, in a sense... which is the intention."

Pacific Breeze Residents

Residents living at Pacific Breeze expressed appreciation for the work done by the chefs, and that they try to accommodate individual residents' needs, but the participants at this site did not talk about the direct interaction with the chefs.

Pacific Breeze Staff

Pacific Breeze staff members the occurrence of both visual and verbal communication between the chef and residents, as well as the residents being able to

offer comments, requests, and other input in regard to meal preparation. From one participant's (S2P) perspective: "[I like] that it's open, that it's open communication, direct visual contact with the residents ... direct interaction with the residents. Meal planning with the residents; getting to watch them enjoy the food that I'm cooking for them."

Summary of Resident Interaction with Staff

At both facilities, resident participants expressed appreciation for the work of the chefs. Resident-chef interaction was valued and perceived positively at both sites, as was resident input in meal planning. Residents at Pacific Breeze did not discuss the conversation aspect, but those at Valley Run did.

4.6.3 Kitchen/Dining/Sitting Areas as the "Social Hub"

At Valley Run and Pacific Breeze, the kitchen/dining/sitting areas are not just used for eating. Other activities that occur in the space include puzzles, games, resident baking activities, and TV-watching. The spaces were a preferred place to be both during and between meals.

Valley Run Residents

Participating residents at Valley Run talked about the use of the spaces by residents whose suite was on another floor of the home. R1V commented,

"The upstairs is their living quarters you might say. A great many of them do not go into their room and spend a lot of time in their room. But they can if they want to... Some of them will sit over there between meals and watch television or listen to music."

Valley Run Staff

The frequent use of the kitchen/dining/sitting area, especially by residents with a suite on the lower level of Valley Run, was mentioned by staff members. For example, one participant (S1V) stated, “As you can see there’s a pretty good group of ladies that sit [in the sitting area] ... part of them live downstairs... And they congregate up here because this is where there’s other people to talk to.”

Pacific Breeze Residents

One of the residents (R1P) at Pacific Breeze discussed the social interactions that occurred in the studied spaces, indicating that for her, the value of social interaction might be higher or more noticeable than the aspects of the physical environment. When asked if there was anything in particular she liked about the kitchen/dining/sitting areas, she said, "How everybody’s friendly, I’d say.”

The other resident participants at Pacific Breeze did not discuss the area as a social hub of the home.

Pacific Breeze Staff

The interior spaces included in the study were described by staff participants at Pacific Breeze as the most-used spaces in the facility. The kitchen/dining/sitting areas were perceived as the social center of the home, with something always happening in the space. One staff member (S4P) discussed the frequency of use and social aspects of the area, saying,

“In this whole house, this space gets used the most of everything. We even try to bring them up more to the third floor living area, cuz the TV’s bigger and there’s more couch seating area, but everybody just hangs out here more than anywhere else. Yeah, it just, I guess it’s cuz it’s the kitchen. And there’s always something going on. It draws people...”

Summary

At both facilities, participants said that the spaces was in constant use, and they described it as the social center of the house. One difference between the two facilities was that at Valley Run, participants specifically mentioned that the residents with rooms on the floor below the kitchen tended to spend more time in the common social spaces rather than in their individual suites. Space use by residents at Pacific Breeze who did not have a suite on the kitchen level was not discussed. Both residents and staff discussed the frequent use of the space.

4.7 Organizational Environment

The Organizational Environment is the third overarching theme that emerged in the study. It is comprised of the emergent theme of autonomy, personal choice/control, and reciprocal adaptation. Initial interview topics included in this category are participant input on décor, the environment adapting to user needs, and the user adapting to the characteristics of the environment. This also includes the residents' control over his/her level of involvement in household activities. Each of the initial interview topics comprising this final overarching theme – Organizational Environment – is discussed in more detail in the following sections. Each topic is organized by facility, then by participant type (resident or staff), and followed by a summary.

4.7.1 Autonomy, Personal Choice/Control

As part of the organizational philosophy at Valley Run and Pacific Breeze, residents and staff are permitted and encouraged to participate in the decoration of the

homes. This includes choosing interior finish materials such as paint colors, flooring, draperies, as well as accessories for the space, such as a fish tank in one of the houses.

Valley Run Residents

Having the ability to take part in household decisions was viewed positively by residents at Valley Run. One of the participants described both the positive aspects as well as challenges that emerged when trying to accommodate difference in individual preferences. She (R1V) told the researcher:

“Everyone here has a right to put in their ideas, which is good. [One challenge of that] is that the activities and the staff know what they can spend and they have their **own** way of doing things. Even the chef. If she doesn't like something that's there, she will put it away in the basement and put her own thing out there. So this happens. Other people have their own tastes. And our activities person likes artificial flowers... my taste is not artificial flowers, but you have to allow for other peoples' tastes here.”

Residents at this facility also decorate a bulletin board that hangs on one of the dining room walls.

In addition to having input on the facility décor, residents discussed level of involvement in relation to activities available to them on site. The ability to help in the kitchen with baking or cleaning, or to contribute ideas on how to improve/decorate the space were discussed by the residents. Residents indicated that they were allowed to choose how they would spend their time, and what level of involvement they wanted to have.

Valley Run Staff

The staff at Valley Run discussed the importance of residents contributing personally to the design of the space by creating decorations for the bulletin board in the dining room. One of the staff participants (S2V) said,

“They’ll actually actively participate in redecorating the, the big bulletin board that has the month on it, with a theme and maybe do cut outs on that, so they have a sense of, you know, creating the environment that they live in.”

The participating staff members at Valley Run also discussed that residents could choose what capacity they wished to be involved in household activities. While there were certain activities, such as daily exercise, planned by staff members, residents had the ability to organize or suggest events they wanted to be involved in, such as movie nights, or shopping trips.

Pacific Breeze Residents

Participating residents at Pacific Breeze did not discuss involvement in the decoration of the kitchen/dining/sitting areas at that site. One of the residents (R2P) indicated that the decisions were made by staff or owners, telling the researcher, “if it’s what they want, it’s what they have,” when asked what she thought about the interior finish materials.

Another participant talked about some of the paintings located in the activity room upstairs. The resident (R3P) stated,

“I’m very fond of my mother-in-laws paintings... She was a wonderful painter... Oh over in the corner now... that is a painting by my mother-in-law and that is my needlepoint from it. See I copied it [and] they put the two together which is sort of interesting ... I like them together. They look very nice together.”

Though her comment was about a space not included in the study, it indicates that the resident enjoyed seeing her personal belongings in the shared/common spaces of the house. The same resident (R3P) mentioned that having those personal possessions in the common areas was what made it seem like home. In describing her feelings about the facility, she said,

“It’s a very pleasant place and the unit we have is very nice too... and I don’t know... I mean when you’re not home, but... it’s home. You know, and you live in it and you have things that belong to you. But ... I feel very good about the whole space.”

This related more to her personal suites and the activity area on the top level rather than the kitchen/dining/sitting spaces included in the study.

Pacific Breeze Staff

Resident and staff input on décor was not discussed by staff participants at Pacific Breeze. Staff participants at Pacific Breeze discussed the activities residents could choose to be involved in, such as cooking. One of the participants (S3P) described the involvement opportunities presented by the facility’s open kitchen concept:

“It’s kind of fun and the residents enjoy it. They can smell the food ... they can interact, they can help wipe the tables, they can cook if they want to cook. They can help do the dishes. It allows an engagement process and an interaction with the staff, versus if you had the typical [assisted living kitchen] behind doors, that piece wouldn’t even be there.”

Another staff member mentioned the lack of restrictions placed on residents at Pacific Breeze and her perception of how resident behavior was affected by this. She commented,

“[Residents are] allowed to go outside, they’re allowed to walk around, they’re allowed to participate in the household. They’re allowed to go in the kitchen, you know, there’s not a lot of restrictions for them here and you really see a difference just in how they behave and how they interact with each other. They’ll go in there and help with dishes ... even my most demented residents will go in there and help with dishes or clean the counters, or they’ll have ‘em doing the tables ... It really gives ‘em a sense of purpose, which is really important.”

Summary of Autonomy, Personal Choice/Control

On the topic of input on décor, participants at Valley Run mentioned that both staff and residents are involved in selecting accessories and materials for the kitchen/dining/social spaces. At Pacific Breeze, resident and staff involvement in selections for the spaces studied was not discussed.

The allowance of resident choice in level of involvement was discussed at both sites. At both facilities, the ability for residents to be involved in household activities was discussed. Residents at Valley Run talked about this topic, but it was not mentioned by participating residents at Pacific Breeze.

4.7.2 Reciprocal Adaptation

In this study, the processes of the users adapting to the space and the space being adapted to the users is referred to as reciprocal adaptation. At least one of the two processes was mentioned in the interviews at each site; the results are presented here.

Valley Run Residents

Adaptation of the residents to the environment was indicated at Valley Run. In some cases, residents seemed to instead adapt their space use behaviors without even realizing it, or at least without dwelling on it. This is seen in the following exchange between two resident participants:

R3V: “Well, you can’t get on one side of the table, it’s not room enough.”
R4V: “Oh well I can’t get behind the table but I don’t have to get behind the table.”

Resident participants at Valley Run also expressed a desire to adapt the recently purchased dining chairs so that they all had wheels on them, an example of adapting the environment to the users.

Valley Run Staff

Staff members indicated user adaptation to the space relating to elements of the home that they felt they could not change, such as the limitations of movement around the dining table due to the small size of the space.

The staff participants at Valley Run indicated a preference for dining chairs that had wheels on them. They commented that they wanted to add wheels to the chairs that did not have them, adapting the chairs to increase mobility.

One participant (S6V) at this site commented that the many aspects of the space that he perceived positively, such as the other people there, seemed to make it easier to adapt to any negative features of the space. He told the researcher, “I love this house; I love where I work, the residents, the staff. I guess I’m just so happy here that ... if there was anything negative about the space, I probably wouldn’t even notice it.”

Pacific Breeze Residents

Residents at Pacific Breeze talked about their adaptation that came with transitioning into living at an assisted living facility. One of the participants at this site (R1P) commented, “There’s no place like home! But you know, that’s the way life is and that’s the way it’s going to be so you make the most of it.” Another

resident (R3P) said, “I mean when you’re not home, but ... it’s home,” implying the outlook that one had to do the best one could under the given circumstances.

Pacific Breeze Staff

Pacific Breeze staff participants discussed adaptations they had made to the colors used in the facility. One told the researcher, “There’s so many colors in these houses, which was done intentionally... just for choice and brightness and diversity, and I necessarily wouldn’t have done it that way... I think over time you just get used to it,” and another similar comment was made by S6P in regard to adapting to the wall color. He said,

“I think with the walls being not white, it helps a lot with [making the space feel comfortable]. It has more of a cozy feeling to it than just bright white walls ... Even though I mentioned that it’s nice having not white walls, I’m not a real huge fan of the orange walls ... I think a different color would be better but... it grows on you I guess.”

One of the participants at Pacific Breeze also discussed the ability to adapt the space to meet resident needs, specifically regarding the option of adding handrails to the walls if a resident was in need of the assistive feature.

Summary of Reciprocal Adaptation

Reciprocal adaptation (user to environment and environment to user) was discussed at both Valley Run and Pacific Breeze. The ability to adapt features of the environment, such as furniture, to meet user needs was discussed at Valley Run. Adaptation to the colors used in the facility was discussed only at Pacific Breeze, and only by staff participants. Resident adaptation to the assisted living environment was discussed at both facilities, but only by residents.

4.8 Summary of Results Chapter

The results of this study on the affect of interior spatial features on resident behavior and resident and staff perception of space were grouped into three parts: photographic analysis, observation of resident behavior, and participant interviews.

The photographic analysis presented floor plans and photographs of each space included in the study. These figures were annotated with key issues relating to space use and perception of space that emerged from observations made by the researcher as well as perceptions of staff and residents gathered from the interviews. In addition, the floor plans and photographs serve as further visual representation of the similarities and differences of the social spaces included in the study.

Features presented in the photographic analysis that were perceived as positive aspects included colored walls, presence of natural light and a connection to nature, ample countertop space, and movable dining chairs. Features that were negatively perceived included white walls, clutter, carpet flooring in the kitchen work area, and furniture with an institutional appearance. Issues related to openness and the amount of space in the kitchen/dining/sitting areas had both positively and negatively perceived attributes.

The behavior observations were conducted to gain an understanding of resident and staff space use and to see if any patterns emerged. The results of the observations indicated that the most-used area of the spaces included in this study was the dining table. Some residents engaged in active conversation during meals, while others do not. The space was primarily used for clean-up or preparation for the next meal during non-meal times. The kitchen and dining areas are where staff spent most of

their time in the space. Residents were observed in high levels of activity more often than in low levels of activity, and agitation was observed at both sites, but rarely.

Three overarching themes – Physical Environment, Social Environment, and Organizational Environment – emerged from the interview data. The physical environment was the focus of the study, and included the interior design aspects of accessibility, ambient and functional characteristics of color and lighting, and connection to nature. Topics related to accessibility that were perceived positively were homelike characteristics of the facility, colored walls, and daylighting. Negatively perceived aspects were accessibility issues related to wheelchair/walker use, lack of a bathroom on the kitchen level of the facility, clutter, and white walls. Interview topics that had both positive and negative characteristics as perceived by participants included the size of the space, characteristics of furniture, openness of the layout, artificial light, and the function and aesthetic of furniture and materials used in the kitchen/dining/sitting area.

The second overarching theme was social environment, which was linked to the emerging theme of the dining environment supporting social interaction. The majority of topics discussed in the interviews were perceived positively, and included resident-chef interaction, kitchen/dining/sitting area as the social hub of the house, homelike characteristics, extended family, and privacy.

The Organizational Environment was the third overarching theme resulting from the interviews. Personal choice/control and reciprocal adaptation were the emergent themes in this category. Both positive and negative perceptions related to all three topics under the organizational environment (input on décor, the environment

adapting to the user needs, and users adapting to the characteristics of the environment) were indicated in the participant interviews.

Table 4.1 summarizes resident and staff perceptions of the space. The results presented in this chapter are discussed in the following chapter.

Table 4.1: Summary of Resident & Staff Perception of Space Results

	Valley Run		Pacific Breeze	
	Positively Perceived	Negatively Perceived	Positively Perceived	Negatively Perceived
PHYSICAL ENVIRONMENT				
<i>Layout</i>				
Small scale of building	√		√	
Noise		√		√
Lack of bathroom in area		√		√
Clutter		√ (only staff)		
<i>Accessibility</i>				
Amount of space around dining table		√	√	
<i>Furniture & Flooring</i>				
Dining chairs with casters & arms	√		√	
Table arrangement	√		√	
Carpet in kitchen work space		√		√
Cork flooring in kitchen work space	n/a	n/a	√	
Sitting area upholstery		√		√
<i>Color</i>				
Non-white walls	√		√	
Ceiling (white or green)	√		√	
Carpet	√ (green)	√ (red)	√	
<i>Lighting & Connection to Nature</i>				
Quantity of artificial light	√		√	
Quantity of natural light	√	√ (only staff)	√	√ (some staff)
Skylights	√		√	
Aesthetic of fixtures		√		√
Good views	√		√	
On-site gardening	√		√	
SOCIAL ENVIRONMENT				
<i>Interaction among residents</i>	√		√	
<i>Resident-staff interaction</i>	√		√	
<i>Area as social hub</i>	√		√	
ORGANIZATIONAL ENVIRONMENT				
<i>Autonomy, Choice, Control</i>				
Input on décor	√		n/a	n/a
Resident choice of involvement	√		√ (only staff)	
<i>Reciprocal Adaptation</i>	√	√	√	√

CHAPTER 5: DISCUSSION & CONCLUSION

5.1 Overview

This aim of this study was to investigate the following overarching research question: *Do the interior spatial features of the kitchen/dining/sitting area of the facilities appear to play a role in resident use and resident and staff perception of the space?* The answer to this question is guided by two more specific research questions:

1. Is there a difference in observed behavior of residents in the kitchen/dining/sitting areas of the two facilities?
2. How do residents and staff perceive the interior spatial features in the kitchen/dining/sitting area of each of the two facilities?

This chapter is divided into eight sections. First, the results are discussed by category of environment type (physical, social, organizational) in relation to the two specific research questions. Then, the modified conceptual framework is explained, followed by limitations of the study, implications of the results for practitioners, suggestions for future research, and the conclusion.

5.2 Physical Environment

5.2.1 Comparison of Physical Aspects of Space Use Between Facilities

Overall, the results indicate that there is a relationship between interior spatial features and how residents use the space. Layout, circulation, observed patterns of use, accessibility, and furniture use are discussed here.

Layout /Circulation/Observed Patterns

The open plan and small dining room were major features influencing resident space use. The residents and staff spoke of sitting together at the table, looking out for

one another, and participating in social interaction at the dining table both during and between meals. This behavior is consistent with previous research findings that centrally located social areas increase the time spent in social areas (Devlin & Arneill, 2003), and supports recommendations for the use of small, intimate dining spaces rather than large rooms (Kretschmann, 1995). Regnier (2002) has suggested that dining spaces with 9-11 foot high ceilings facilitate socialization for residents with hearing issues.

Similar patterns of resident space use were observed at both facilities. Breakfast at the facilities was made-to-order at whatever time the residents came to eat, so in the morning hours there tended to be fewer residents at the dining table at once compared to lunch time. Lunch was the time of day when the space was used most. Staff at both sites spent most of their time in the studied spaces in the kitchen preparing food, or cleaning in the kitchen and dining space. At both facilities, staff sat among residents at the dining table during meals, though it was observed that more Pacific Breeze staff members sat at the table than did the staff at Valley Run. Longer observation is needed to understand why this was so.

The residents at Valley Run House A left the table as soon as they finished eating, while those at House B remained at the table for some time after eating. More observation is needed to know if this is a typical pattern or not. On the day of the observation at House A, several of the residents moved to the sitting area after eating, and others left the house for activities that were happening elsewhere at Valley Run.

Accessibility

Residents using wheelchairs at Valley Run did not use the space between the dining table and the island because it was not wide enough. Even residents not using wheelchairs and staff members commented that the space between the dining table and island was impassable to all users if someone was sitting at the dining table. This illustrates the need for accessibility considerations when space planning assisted living facilities. Typically these facilities need more wheelchair room than other types of housing, due to resident needs (Kretschmann, 1995). Though there were more walker-users than those in wheelchairs at Valley Run and Pacific Breeze, providing accessible space for both of these assistive devices is an issue that needs to be considered in space planning. This finding is supportive of what is stated in the literature. Crowding and wheelchair limitations were not mentioned at Pacific Breeze, indicating that the amount of space provided around the tables there is adequate.

Furniture Use

The emphasis on the dining furniture over the sitting area furniture that emerged in the interviews is not surprising when the observation data are considered. From the observations, it can be seen that the dining area is used much more often than the sitting area. Use of the dining chairs that did not have wheels appeared more difficult for residents, and those using such chairs required more staff assistance. This observation was confirmed by residents and staff at Valley Run, House B, who expressed that they found the newly purchased chairs more difficult to use than the old ones that had wheels.

5.2.2 Perception of Physical Aspects Relating to Interior Spatial Features

Perception of the environment by residents and staff can be broadly grouped under physical, social, and organizational components. Due to the focus on physical environment in this study, most of the results and discussion fall under this category. Under the physical environment category, the issues discussed pertain to layout, circulation, accessibility, color, lighting, furniture (arrangement, type, material, and finish), and homelike character of the space.

Layout/Circulation

The open connection between the kitchen and dining areas was important to the participants and for the most part was perceived positively. The participants seemed to value the benefits of social interaction allowed by the openness enough to deal with the few challenges presented by the openness – noise and safety issues – with few complaints. Previous research has linked noise to sleep disorders, increased stress, and confusion (Rashid & Zimring, 2008). One way to provide some noise control while keeping the space open for communication is to build a table height wall between the dining and kitchen spaces (Kretschmann, 1995). This way, residents can interact with the chef without being at risk of hurting themselves in the kitchen. However, resident involvement in household activities was also linked to the openness and being able to communicate easily with staff and other residents.

Many of the residents at both facilities spent much of their time in the kitchen/dining/sitting areas rather than in their individual suites. Staff members attributed this to the lack of hallways present at the facilities, which helps to create a more homelike environment. This supports literature that states that facilities built at

residential scale help provide a nurturing environment with more social interaction among the users of the space (Kretschmann, 1995; Volzer, 2000;), and that social interaction is related to feeling at home (Cutchin et al., 2003).

Compared to previous places of work, staff at both facilities perceived Valley Run or Pacific Breeze as a better design for assisted living. This supports the literature recommending that facilities be smaller in size (Kretschmann, 1995; Volzer, 2000).

Accessibility

Residents and staff discussed accessibility issues within the spaces. Concerns were expressed at Valley Run, primarily about the space between the island and dining table being inadequate. Comments in this category provide support for literature stating that residents perceive the environmental characteristics that are most salient to their needs (Kahana et al., 2003). This may also help explain some of the responses relating to wall and ceiling color, which are discussed later in this section.

Furniture Arrangement, Type, Material, & Finish

The arrangement of furniture was mentioned mostly by staff participants, who expressed that they felt limited in the way furniture could be arranged in the space, particularly the dining tables. This was an issue at both facilities.

In regard to furniture selection, at both sites participants preferred having dining chairs with arms and wheels. This is an important feature to both residents and staff. Having a chair with wheels enables the residents to be more independent, requiring less assistance from staff. The sitting area furniture was not discussed as

much as the dining chairs. When it was, it was typically in relation to the appearance of the furniture.

Discussions of furniture and finishes provides further indication of the importance of commercial grade materials that maintain a residential appearance (Piotrowski, 2007; Trent, 1994). Higher quality dishwashers that did not look commercial were one item mentioned in this study. Other participants stressed the importance of easy to maintain fabrics on furniture, but did not like that it appeared “hotel-like” or like nursing home furniture. Cleanliness and ease of cleaning of kitchen flooring material was a major issue at both facilities, with carpet in the kitchen work space perceived as a negative feature. Literature promotes the use of carpet in assisted living facilities. This finding provides an example that different types of flooring material are appropriate for different areas of assisted living facilities.

Color

If the colors used in the space were deemed less important to an individual than other aspects of the space, the participant may have indicated that he or she did not notice the color or did not care about it. Overall, though, participants preferred non-white walls. Even if the color on the walls, such as the orange at Pacific Breeze, was not what the participant would have chosen, the color was perceived as warm and welcoming. This corresponds to literature stating that warm, bold colors are perceived as more pleasant for social spaces (Trent, 1994).

In regard to the ceiling color, whether or not the green ceiling at Pacific Breeze was perceived as helpful was inconclusive. Some residents and staff indicated that it was, but others did not think it affected the people in the space. It was noted by both

the owners and the staff the green ceiling absorbed the light, so a white ceiling would have reflected more light. Further research on this specific feature is needed.

Lighting (Artificial & Natural)

The responses about perception of lighting support several previous research findings. First, providing several types of lighting, as was seen at Valley Run, allows for variation of “mood” of the space (Kretschmann, 1995). Second, the quality of the lighting in the space is important for older adults, who may be spending most of their time indoors (Devlin & Arneill, 2003). The lighting at both facilities in this study was perceived as adequate by the majority of resident and staff participants. The unique lighting at Pacific Breeze was perceived positively, except for the fixture coverings. Residents did not talk about the simulation of day light at the facility. Most staff members did, however, and they perceived it as helpful.

The indication of a preference for natural lighting in the spaces supports previous research (Rashid & Zimring, 2008). Natural light is related to the number and size of windows and skylights in the space, and previous research has shown that light from windows may have healing and stress-reducing effects (Devlin & Arneill, 2003). This study supports that literature, with staff and residents indicating a desire for more natural light to help create a calming atmosphere. One participant even relayed her feelings of decreased visual comfort when a window at Pacific Breeze had to be removed. In addition to the natural light provided by windows, the connection to nature that they provide was highly valued. The presence of plants and ability to garden were also desirable, supporting evidence that natural settings can provide a

sense of escape and reduced mental fatigue (Hartig et al., 1991). Regnier (2002) states that plants can increase the humane character of the space.

5.3 Social Environment

5.3.1 Comparison of Social Aspects of Space Use Between Facilities

The three main topics relating to the social environment that emerged in the study were interaction among residents, interaction between residents and staff, and the dining area as the social hub of the facilities. This results pertaining to those topics are discussed in this section.

Interaction Among Residents/Between Residents and Staff

At meal times, it was common for residents and staff at both facilities to be engaged in conversation, either actively (talking) or passively (acknowledging and aware but not highly involved verbally). Occasionally some residents, typically with advanced dementia, would fall asleep at the dining table after meals were over, but this was rarely observed during meal times.

Level of participation in conversation was categorized as low (acknowledging by not verbally interacting) or high (verbally interacting). The greater incidence of low activity levels compared to high activity levels that were observed at Pacific Breeze may be due to more residents there having greater cognitive decline than those at Valley Run.

Observed resident agitation at both of the facilities was relatively low. The incidents observed at Valley Run were all displayed by the same resident, who had dementia and whose husband had recently died. At Pacific Breeze, there were four displays of agitation observed on the first day of observation, all of which were

displayed by the same female resident with dementia who expressed confusion about where she was. On the second day at Pacific Breeze, agitation was observed at three observation increments, all verbal. One incidence was of a male resident who became verbally agitated by staff for not letting him go into the room of another resident. The other two were displayed by the same resident that was agitated on the first day.

While it cannot be determined from this study what aspects of the facility environments (physical, social, and/or organizational) may have contributed to the small number of residents displaying agitated behaviors, it may be worth further investigation as agitation is common in residents with dementia, and something most facilities seek to lessen.

Dining Space as the Social Hub

As mentioned in the physical environment discussion, the dining spaces at Valley Run and Pacific Breeze were viewed by participants as the social hub of the facilities. This space was often mentioned by staff as the most-used area in the facility. Residents and staff were observed using the space often, both during and between meals.

One of the differences in space use between the two facilities was that few individuals at Valley Run used the space from 1pm-3pm. At Pacific Breeze, the space was highly used by staff and residents from 2:15-3pm. This is likely because at Pacific Breeze, occupants participated in “high tea” (an activity where they gathered at the table for tea and a snack and talked) at 3pm.

5.3.2 Perception of Social Aspects Relating to Interior Spatial Features

Interaction Among Residents/Between Residents and Staff

The social aspects that related to the interior spatial features were perceived positively by participants. Highly connected to the physical layout of the space, the participants described their interaction with other residents as that of an extended family, where they all know one another and they look out for one another. Residents and staff perceived the social interaction between one another – especially the resident-to-chef interaction – as positive. Again, the perception of an extended family relationship was discussed. Both of these types of interaction can be linked to the literature that promotes smaller assisted living facilities as better for increased social interactions among occupants.

5.4 Organizational Environment

5.4.1 Comparison of Organizational Aspects of Space Use Between Facilities

Autonomy/Resident Involvement

Residents at both sites who remained in the space during non-meal times were observed to sit at the table, walk around in the space, or help with household activities. These actions correlate with a topic that arose in the interviews – that residents are encouraged to be involved members of the household. More residents at Pacific Breeze were observed walking or standing in the space around the dining table compared to those at Valley Run. This may be due to the higher levels of dementia in residents at Pacific Breeze than at Valley Run.

5.4.2 Perception of Organizational Aspects Relating to Interior Spatial Features

Choice & Opportunity for Personalization

Many studies have found that lack of control affects wellness (for example, see Kahana et al., 2003). In this study, those participants who expressed feelings of having input/choice/control in relation to their home environment and what they do there seemed to perceive the facility more positively overall.

Some of the resident participants mentioned that they enjoyed having their personal possessions at the facility with them. Some resident furniture and décor were found in the common spaces at Valley Run, but not at Pacific Breeze. Personal possessions have been related to place attachment (Boschetti, 1995), so it is possible that the lower sense of being at home that was found in the resident interviews at Pacific Breeze may be related to the lack of resident-owned items featured in the studied spaces. It may also be due to the fact that all Pacific Breeze residents had lived at the site less than 11 months, so they may have still been going through a transition period.

Reciprocal Adaptation

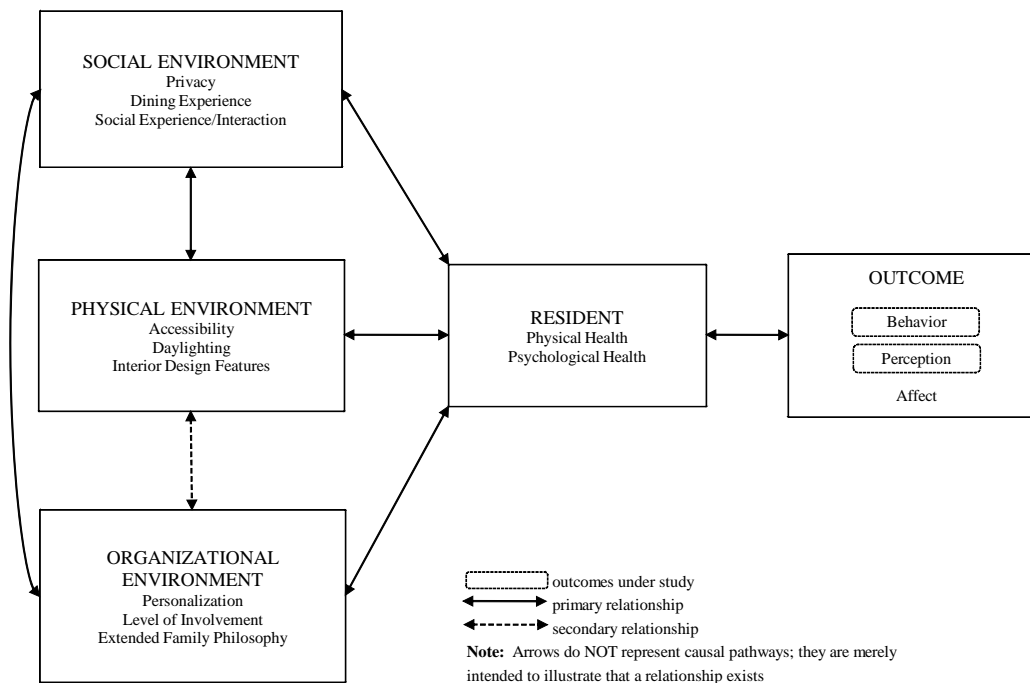
Adaptation occurred in relation to the issue of utilization of the space between the island and dining table at Valley Run, as one resident there indicated when she said she did not *need* to access that space. This may be an instance of the individual adapting to the environment based on what she perceives most salient to her. In this particular case, she did not feel that she needed access through the space between the island and the table because she could get around the table another way.

5.5 Revised Conceptual Framework

The factors influencing resident behavior and perception of space, and staff perception of space can be grouped into the categories proposed: Physical Environment, Social Environment, Organizational Environment, and Personal Characteristics. Based on the specific findings discussed in the previous chapter, the original model is expanded to include the thematic categories and subcategories that highlight the specific issues that were most salient to the participants in this study. Two separate models were created because there was some variation in resident/staff perception. Additionally, resident data include information on both behavior and perception, whereas staff data only include information on perception. The affect component is kept in the model to highlight that it plays an important role, though data related to affect were not included in this study.

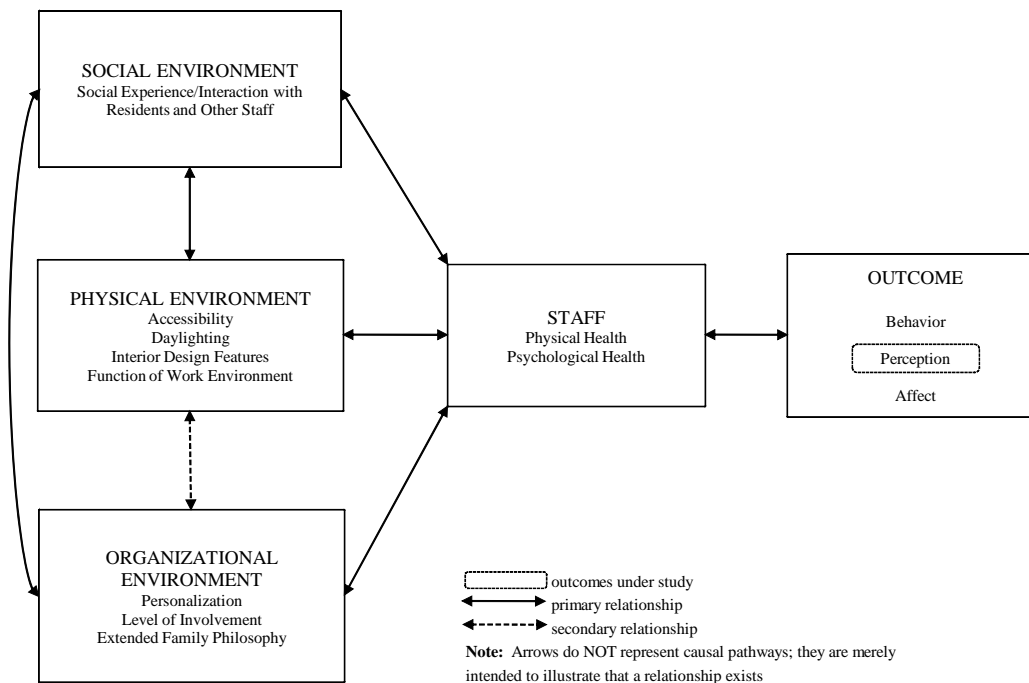
Figure 5.1 is the model of results for the resident behavior and perception component of the study. The paths indicated with arrows do not represent a cause-effect relationship; rather, they indicate that a relationship of some kind exists between the categories. Data on psychological health and affect were not collected for this study but are included in the model to acknowledge that they most likely have some relationship to how the environment is perceived.

Figure 5.1. Diagrammatic Representation of Findings Related to Environmental Features Affecting Resident Behavior and Perception of Space



The model of results for the staff perception component of the study is shown in Figure 5.2. As with the resident model, the paths in the staff diagram do not represent a cause-effect relationship; rather, they indicate that a relationship of some kind exists between the categories. For staff, data on psychological health and affect were not collected for this study but are included in the model to acknowledge that they most likely have some relationship to how the environment is perceived. Because staff behavior was not a main focus of the study, it is not circled in outcome category of the model.

Figure 5.2: Diagrammatic Representation of Findings Related to Environmental Features Affecting Staff Perception of Space



The resident model helps to identify specific factors contributing to the interaction of the aspects depicted in Wesiman *et al's* (2000) Environment and Aging Model, which indicates an interrelationship between aspects of the physical, social, organizational, and personal environments in the overall environmental experience of elderly residents. The staff model builds from the Environment & Aging Model, demonstrating how the environments influence the overall environmental experience of staff in an assisted living setting.

5.6 Limitations

There were several limitations associated with this study. The limitations were related to sampling, time, individual differences, location of interviews, and data

collection methods used. Using convenience sampling for recruitment of resident participants resulted in a final sample that may not be representative of the two facilities overall. The resident sample was also restricted to those who staff indicated could carry on an interview conversation. For this reason, only residents showing few or no signs of dementia were interviewed. Therefore, the perceptions of residents with dementia are not reflected in the findings of this study.

There were also some threats to internal validity that should be acknowledged. Because the researcher was not permitted to manipulate the interior spatial features under study at the site, comparisons were made between two different facilities. Because residents at each site were different individuals, there are limitations to between-site perception comparisons that can be made.

The study findings cannot be generalized due to the small number of participants, however, the goal was not generalization but identification of patterns. The participants were mainly white, upper-middle to high-income females. Thus, the findings have to be interpreted within this context. The high female participation is not surprising as 75-80% of assisted living residents are women (Piotrowski & Rogers, 2007). Results may have been different if there were more male participants.

The study was also subject to time limitations. Prolonged engagement was not possible due to time constraints, and therefore, conclusions that can be drawn from the observation data are limited. However, in the 12 hours of observation done by the researcher at each site, and in the interview responses, patterns of use began to appear, so the observation data are useful in conjunction with the participant interviews for understanding space use at the facilities. Another drawback of the time limitations

was that the researcher was unable to perform a member check with the interview participants. This would have helped increase validity of the findings by confirming that the researcher's interpretation of the participant interviews was accurate and true to what each participant meant in his/her responses.

The interviews were conducted in different parts of the facility based on availability of staff and residents. Whether or not the interview was held in the kitchen/dining/sitting area may influence the results. When answering interview questions, at least one resident participant at each site referred to items that were in the space where the interview was held (one in an individual's suite and one in the facility's activity room) rather than the spaces being asked about in the study. Another issue of interview location was that two sets of husband/wife participants were interviewed together, at the same time. It is possible that the presence of one's spouse may have influenced the participant's response. The researcher noticed that while the interview conversations with these couples went well, the participants occasionally interrupted one another, which may have prevented a participant from completing his/her thoughts on a topic.

5.7 Implications for Practitioners

The results of this study have several implications for design practitioners. First, staff seemed to prefer the smaller facility size of Valley Run and Pacific Breeze. While comparison to a larger facility was not done in this study, staff participants did refer to previous employment experiences they had at larger facilities, in the interview discussions, expressing preference for small over large facility size. This suggests support of literature stating that assisted living facilities housing fewer residents are

preferred by staff and residents. A future study should be done to compare Valley Run/Pacific Breeze to larger facilities. Designers and investors should consider the benefits of building smaller facilities, and finding ways to make them affordable while still being profitable.

The open kitchen concept used at Valley Run and Pacific Breeze elicited both positive and negative responses. Designers should be aware of the potential issues and find creative ways to incorporate the open kitchen-to-dining connection while at the same time including measures that will keep the space safe for users, especially residents with cognitive impairment who may be at risk of injury in the kitchen space. Because this was a feature highly valued by participants, allowing residents to help in the kitchen may be worth the few safety risks involved.

Accessibility concerns must be taken into account by design professionals. By providing adequate space for movement, especially around all sides of dining tables, problems with limited space may be reduced. To facilitate independence, designers should also specify chairs with arms and wheels whenever possible in the dining room.

When selecting materials, designers must take care to specify materials that are easy to maintain and durable. Appliances, furniture, and materials should be commercial-grade but with a residential appearance. Stainless steel appliances are seen in many residential kitchens today, so designers may want to explore whether or not residents perceive them negatively or not. Manufacturers of appliances, fabrics, and other items used in assisted living facilities need to continue developing commercial-grade products that have a residential appearance. Many times, furniture

manufactured for the hospitality industry is used in assisted living facilities; but as evidenced in this study, those items are often perceived as belonging in a hotel or hospital, not in a home.

Findings of this study also indicate that non-white walls are preferred by both staff and residents. Practitioners should incorporate colored walls in their designs, even if just on selected focal walls. This will likely help to reduce the institutional appearance associated with white walls.

When designing the lighting for assisted living facilities, designers and architects should aim to create a balance of natural and artificial light throughout. Skylights were viewed very positively in this study, so they should be considered when possible. While natural lighting is desired, the quality of the views available from windows is also important. If possible, the views individuals have should be considered at the time of site selection, and the siting of the building. Connection to nature through the provision of gardens, attractive grounds with paths for walking, and the inclusion of plants indoors should also be incorporated into facility design.

From a personal standpoint as a designer, the most valuable outcome of this study was to see the occupants use the space and to hear directly from them what works and what areas could be improved. Practitioners should try to incorporate observation of existing facilities and discussions with residents and staff of those facilities. Using the feedback from the individuals who use the space every day can help designers improve existing plans and create innovative solutions to current challenges in long term care design. Designers should also consider including staff and residents in the selection process if possible because, as seen in this study, many

of them value having input on the design of their living/work environment.

Conducting post-occupancy evaluations of all facilities six to twelve months after occupancy would also be beneficial.

5.8 Suggestions for Future Research

While this study provided supporting evidence for existing recommendations for assisted living facilities, there are many topics for future research suggested by the study. First, the study should be replicated at similar facilities in other locations to see if residents and staff at facilities under different ownership and/or in different regions have similar perceptions of interior features. Similar studies with longer observation periods should be conducted for a more in-depth understanding of how individuals use the space, and what features of the space support or inhibit user activities. It may also be beneficial to conduct the study as a participant observer (living or regularly volunteering at the facility if possible), rather than a non-participant, as was done in this study. As a participant observer, the researcher would become more familiar with the residents, staff, and the building itself, and could incorporate his/her own perceptions of the facilities.

Future studies should explore the same topics of this study, but at larger assisted living facilities, in order to compare the results with those herein. Perceptions between facilities with open versus closed kitchens may also be of interest to designers of future facilities.

There are multiple examples of this smaller facility design in European countries. Future studies could be conducted to compare the American model to that used in Europe.

Studies with more diverse resident and staff populations should be conducted, and future studies should include residents with dementia so that results are more indicative of how individuals with dementia use and/or perceive the space. In the study conducted at Valley Run and Pacific Breeze, residents with dementia spent more time in the space than did most of those who were not experiencing as severe cognitive decline. Understanding the perceptions of the primary users of the space is important when creating interior environments.

The colored ceilings at Pacific Breeze were based on a research study done in Germany. Future studies could focus on this specific feature. A translation of the study could be obtained and then the study could be replicated in the U.S.

Studies on color preference of older adults are few to none. Future research could explore the topic of color preference of older adults in assisted living facilities. The Munsell color references for the wall, ceiling, and carpet colors used at the facilities studied here can be found in Appendix E. It is important to note that the Valley Run wall and ceiling color, as well as the carpet colors at both facilities, were matched using a digital image of the material. Therefore, the color of the actual material may vary slightly from that pictured.

There were many features at Pacific Breeze (*e.g.* ceiling color, lighting, colored walls, open plan) intended to influence behavior. Future research should focus on implementing the design features one at a time, to see what the individual effects are and if they differ from the combined effects. If similar effects are produced by more than one of the features, designers and owners could evaluate which feature(s) would be most cost-effective in producing the desired outcomes.

Finally, one of the limitations of this study is that it compared perceptions of different individuals in two different environments. For increased internal validity, A before and after comparison study should be conducted, using one facility and one group of participants under two conditions. For example, the first part of the study could be done in a facility with white walls. For the second part of the study, the walls would be painted a color. After the participants were given time to get over the initial effects of the change in color, a second study would be conducted. Then the two conditions could be compared.

5.9 Conclusion

This study explored the effect of interior spatial features on resident behavior and resident and staff perception of space. Findings indicate that interior spatial features do have an effect on residents' use of space in the kitchen/dining/sitting areas of the two facilities studied. Resident and staff perception of space is also influenced by interior spatial features. Key features affecting both residents and staff included issues of accessibility, homelike elements (*e.g.* non-white walls, residential scale), an open kitchen/dining connection, ease of maintenance, and connection to nature.

Also, the findings indicate a participant preference for smaller-sized facilities. While this is a recently evolving design in the United States, there is literature highlighting examples of the European models that have worked (Regnier, 1994). This exploratory study adds to that body of knowledge.

Brawley (2006) states: "The gift of design is a very special opportunity to contribute to people's lives, especially in healthcare environments and in moments of profound need" (p.307). Given the large number of older adults residing in assisted

living facilities – over 50 million Americans (Basler, 2006) – and the projected figures on the aging population, it is important to build on the current research on how the individuals in these facilities are affected by the environment, so that supportive, healthy housing options are available for older adults.

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APPENDICES

APPENDIX A:
DEMOGRAPHIC SURVEYS

Resident General Information Survey
Rochelle Neumeyer, Researcher
Oregon State University

ID# _____

1) Gender

- Female
- Male

2) Age (in years)

- 51-60
- 61-70
- 71-80
- 81-90
- 90+
- Prefer not to answer*

3) Marital Status

- Married
- Widowed
- Divorced or separated
- Single/Never married
- Other (explain) _____

4) Ethnic background

- White, non-Hispanic
- Asian
- Latino/Hispanic
- Native American/American Indian
- Black, African American
- Pacific Islander
- Other (explain) _____
- Prefer not to answer*

5) Highest level of formal education

- Primary (up to grade 5)
- Secondary (up to grade 8)
- Some high school
- High school graduation
- High school plus technical college
- Some years of college
- Bachelors degree
- Graduate degree
- Other (explain) _____
- Prefer not to answer*

6) Please rate your overall health:

- Very poor
- Poor
- Fair
- Good
- Excellent

7) Do you have difficulty with vision (with glasses, if worn)?

- No difficulty
- Little difficulty
- Considerable difficulty
- Blind

8) Do you have difficulty with hearing (with aid, if worn)?

- No difficulty
- Little difficulty
- Considerable difficulty
- Deaf

9) How difficult is it for you to get around this building?

- Not difficult at all
- Somewhat difficult
- Very difficult

10) Have you fallen while living here?

- Yes
- No

10a) If yes, how many times? _____

10b) Where did you fall? _____

11) How many years/months have you lived here?

Staff General Information Survey
Rochelle Neumeyer, Researcher
Oregon State University

ID# _____

1) Gender

- Female
- Male

2) Age (in years)

- 18-30
- 31-40
- 41-50
- 51-60
- 61-70
- 71-80
- 81-90
- 90+
- Prefer not to answer*

3) Marital Status

- Married
- Widowed
- Divorced or separated
- Single/Never married
- Other (explain) _____

4) Ethnic background

- White, non-Hispanic
- Asian
- Latino/Hispanic
- Native American/American Indian
- Black, African American
- Pacific Islander
- Other (explain) _____
- Prefer not to answer*

5) Highest level of formal education

- Secondary (up to grade 8)
- Some high school
- High school graduation
- High school plus technical college
- Some years of college
- Bachelors degree
- Graduate degree
- Other (explain) _____
- Prefer not to answer*

6) Do you have difficulty with vision (with glasses, if worn)?

- No difficulty
- Little difficulty
- Considerable difficulty
- Blind

8) How long have you worked here?

- Less than 1 year
- 1-5 years
- More than 5 years

Years/Months employed at current facility: _____

9) What is your job designation?

- Community/Operations Manager
- Residential Service Coordinator
- Staff Nurse
- Health Care Aide
- Activities Coordinator
- House Chef
- Other (explain) _____

10) Number of years/months of experience in profession (in current and other facilities)

APPENDIX B:
INTERVIEW GUIDES

Rochelle Neumeyer
Oregon State University
M.S. Thesis

Resident Perception of Space
Interview Guide

Research Question: How do residents perceive the spatial features in the kitchen and dining area of the facility? (spatial features focused on in study are color, lighting, furniture, and flooring)

1. Describe a place that you find very comfortable. Perhaps somewhere in another home you've lived in...
 - a. What about that place made you feel that way?
 - b. What colors were used in the space?
2. Do you think this building shares any of the characteristics of that place?
3. What is your general feeling about this kitchen and dining space?
4. What do you particularly like about it?
5. What things would you change about the design? Why?
6. What types of activities do you do in this space?
 - a. What do you like doing in this space?
7. Is it difficult to walk or move around in this kitchen/dining space?
 - a. Depending on their answer... Why is it easy/hard?
8. What do you think about the wall color in this space? Is there a different color you would prefer, and if so, what would that be?
9. How do you feel about the furniture here?
 - a. Is it comfortable?
 - b. Are the chairs easy to get in and out of?
 - c. Are the dining tables at comfortable height for eating and other activities?
 - d. What would change about the furniture arrangement?
10. How is the lighting in the space?
 - a. Brightness (e.g. too bright? too dim? just right?)
 - b. See if they say anything about natural light; if not, ask...

- c. How does it feel to be in this space in the morning?
 - i. How about the afternoon?
- 11. Is there anything in particular you like or dislike about the carpet?
 - a. If patterned, how do they feel about the pattern?
- 12. What do you think of the ceiling color?
 - a. More applicable at Facility B, which has a green ceiling (Facility A has a white ceiling), but will ask at both

Rochelle Neumeyer
Oregon State University
M.S. Thesis

Staff Perception of Space
Interview Guide

Research Question: How do staff perceive the spatial features in the kitchen and dining area of the facility? (spatial features focused on in study are color, lighting, furniture, and flooring)

13. Describe a place that you find very comfortable. Perhaps somewhere in a home you've lived in...
 - a. What about that place made you feel that way?
 - b. What colors were used in the space?
14. Do you think this building shares any of the characteristics of that place?
15. Have you worked in other assisted living facilities before?
 - a. How does the design of this facility compare to your other places of work?
16. What is your general feeling about this kitchen and dining space?
17. What do you particularly like about it? What do you dislike about it?
18. Are there specific aspects of the layout and design of this space that help or hinder your work?
19. What things would you change about the design?
20. What types of activities do residents do in this space?
 - a. What do residents like doing in this space?
21. Is it difficult for residents to walk or move around in this kitchen/dining space?
 - a. Depending on their answer... Why is it easy/hard?
22. What do you think about the wall color in this space? Is there a different color you would prefer, and if so, what would that be?
23. How do you feel about the furniture here?
 - a. Is it comfortable?
 - b. Are the chairs easy for residents to get in and out of?

- c. Are the dining tables at comfortable height for residents to eat and perform other activities?
 - d. What would you change about the furniture arrangement to make it easier for residents to move around in?
24. How is the lighting in the space?
- a. Brightness (e.g. too bright? too dim? just right?)
 - b. See if they say anything about natural light; if not, ask...
25. Is there anything in particular you like or dislike about the carpet?
- a. If patterned, how do they feel about the pattern?
26. What do you think of the ceiling color?
- a. More applicable at Facility B, which has a green ceiling (Facility A has a white ceiling), but will ask at both
 - b. Ask staff at Facility B: What is the purpose of the ceiling color?
 - i. Do the residents seem to notice the ceiling color?
 - ii. Do you think the ceiling color helps the residents? If yes, how?
27. Overall, does the space seem to help residents do what they need to do?
- a. What types of improvements do you think would make the space more supportive to the residents?
28. Are there any points we haven't covered that you think are important in understanding design and layout of your workplace?

APPENDIX C:
BEHAVIOR MAPPING CHART

Behavior Mapping in Long term Care Setting: Space Use/Activity Chart
 (use in conjunction with a floor plan of the space to link the activities in kitchen & dining areas)

Date: _____ **Place:** _____
Start time: _____ **End time:** _____

Main Activity: _____ **Planned Activity:** _____ **Dining:** _____
No Planned Activity: _____
 (check one)

Qualitative Field Notes:

Level of Activity	# Residents
No social activity	
Sleeping	
Sitting – no activity or social exchange	
Walking – no social exchange	
Watching TV	
Low	
Sitting – acknowledging	
Walking – acknowledging	
Passive participation in planned activity	
High	
Active engagement in planned activity	
Active conversation with another resident/staff/visitor	
Other Activities	
Verbally agitated	
Physically agitated/aggressive	

Notes: _____

APPENDIX D:
OBSERVATION DATA

Valley Run, House A
Resident Space Use

Time	Location							
	T	K	I	D	S	M	XT	ST
7:30am	1				1			
7:45am	5							
8:00am	6							
8:15am	7							
8:30am	5	1		1	2			
8:45am	5			1	2			
9:00am	2				3			
9:15am	2				2			
9:30am	2				2			
9:45am					3			
10:00am	1				4			
10:15am	2				4			
10:30am	2				3			
12:00pm	6				1			
12:15pm	10							
12:30pm	12							
12:45pm	4				1			
1:00pm		1						
1:15pm	1							
1:30pm								
1:45pm								
2:00pm								
2:15pm	1			1				
2:30pm	3			1				
2:45pm							1	
3:00pm	2			1				

Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Valley Run, House A
Staff Space Use

Time	Location							
	T	K	I	D	S	M	XT	ST
7:30am						2		
7:45am		1						
8:00am		1						
8:15am		1				1		
8:30am	1							
8:45am				1				
9:00am				1				
9:15am		2						
9:30am		1						
9:45am		1				1		
10:00am		1				1		
10:15am				1		1		
10:30am		1		1				
12:00pm		3		1				
12:15pm		3						
12:30pm	3	1		1				
12:45pm		1						
1:00pm		1						
1:15pm		1				1		
1:30pm						1		
1:45pm						1		
2:00pm								
2:15pm				1				
2:30pm				2				
2:45pm						2		
3:00pm	1	1						

Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Valley Run, House B
Resident Space Use

Time	Location							
	T	K	I	D	S	M	XT	ST
7:30am	5							
7:45am	5							
8:00am	4							
8:15am	4							
8:30am	5							
8:45am	7							
9:00am	7							
9:15am	8							
9:30am	6							
9:45am	7							
10:00am	3		2					
10:15am	5							
10:30am	1				4			
12:00pm	11							
12:15pm	11							
12:30pm	10							
12:45pm	9							
1:00pm	4			1				
1:15pm								
1:30pm				1			1	
1:45pm		1					1	
2:00pm								
2:15pm				1			1	
2:30pm								
2:45pm								
3:00pm								

Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Valley Run, House B
Staff Space Use

Time	Location							
	T	K	I	D	S	M	XT	ST
7:30am		1						
7:45am		1				1		
8:00am		1		1				
8:15am		1						
8:30am		3						
8:45am		1						
9:00am				1				
9:15am		2						
9:30am		3		1				
9:45am		1		2	1			
10:00am					7			
10:15am					6			
10:30am	1	1			1		1	
12:00pm		2					1	
12:15pm	1						2	1
12:30pm		2		1			1	
12:45pm	1	1				1	1	
1:00pm		1					1	
1:15pm							1	
1:30pm				1			1	
1:45pm							2	
2:00pm						2		
2:15pm				1			2	
2:30pm		1			2			
2:45pm					1	1		
3:00pm						1		

Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Pacific Breeze, Day 1
Resident Space Use

Time	Location							
	T	K	I	D	S	M	ST	
7:30am				1				
7:45am				1				
8:00am	2							
8:15am	4							
8:30am	4							
8:45am	3							
9:00am	5							
9:15am	2			1				
9:30am	2			1				
9:45am	4							
10:00am	3							
10:15am	4							
10:30am	2							
12:00pm	2				2			
12:15pm	3				1			
12:30pm	8				1			
12:45pm	9							
1:00pm	10							
1:15pm	6							
1:30pm	2	1			1			
1:45pm					1			
2:00pm					1			
2:15pm					1			
2:30pm	6				1			
2:45pm	5				1			
3:00pm	7			1	1			

Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Pacific Breeze, Day 1
Staff Space Use

Time	Location							
	T	K	I	D	S	M	ST	
7:30am						2		
7:45am		1						
8:00am		1		1				
8:15am		1		1		1		
8:30am		1						
8:45am		1		1				
9:00am		2						
9:15am		1		2				
9:30am		2						
9:45am		3		1				
10:00am	2	1		2				
10:15am	3	1					1	
10:30am	1							
12:00pm		1		1		1		
12:15pm		1						
12:30pm		1		2				
12:45pm	3	4						
1:00pm	5	2		1				
1:15pm	2	4						
1:30pm	1	1						
1:45pm				2				
2:00pm	1							
2:15pm	1							
2:30pm	2			1				
2:45pm		1						
3:00pm				2				

Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Pacific Breeze, Day 2
Resident Space Use

Time	Location							
	T	K	I	D	S	M	ST	
7:30am	1				1			
7:45am	2	1			1			
8:00am	3				1			
8:15am	1				2			
8:30am	3				1			
8:45am	2				1			
9:00am	3							
9:15am	1				1			
9:30am	2				1			
9:45am	3				1			
10:00am	1				2			
10:15am				2	2			
10:30am				1	4			
12:00pm	2				2			
12:15pm	1				2			
12:30pm	10							
12:45pm	10							
1:00pm	3			3				
1:15pm	1	1						
1:30pm		1		1	1			
1:45pm				4				
2:00pm	2	1		1				
2:15pm	1	1		1				
2:30pm	2			1	1			
2:45pm	7				1			
3:00pm	7							

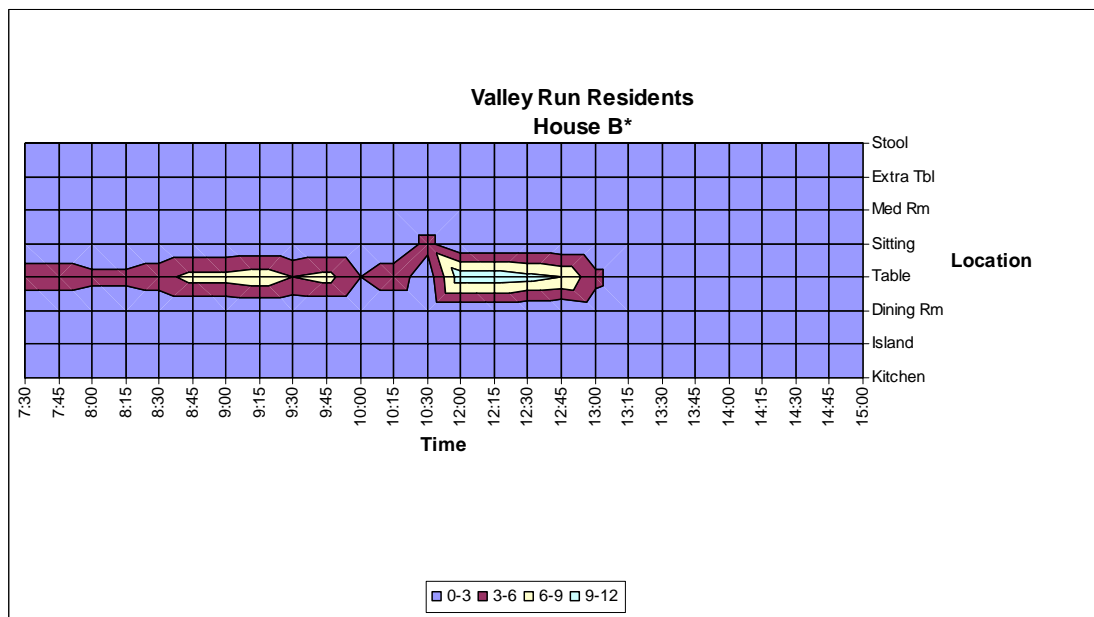
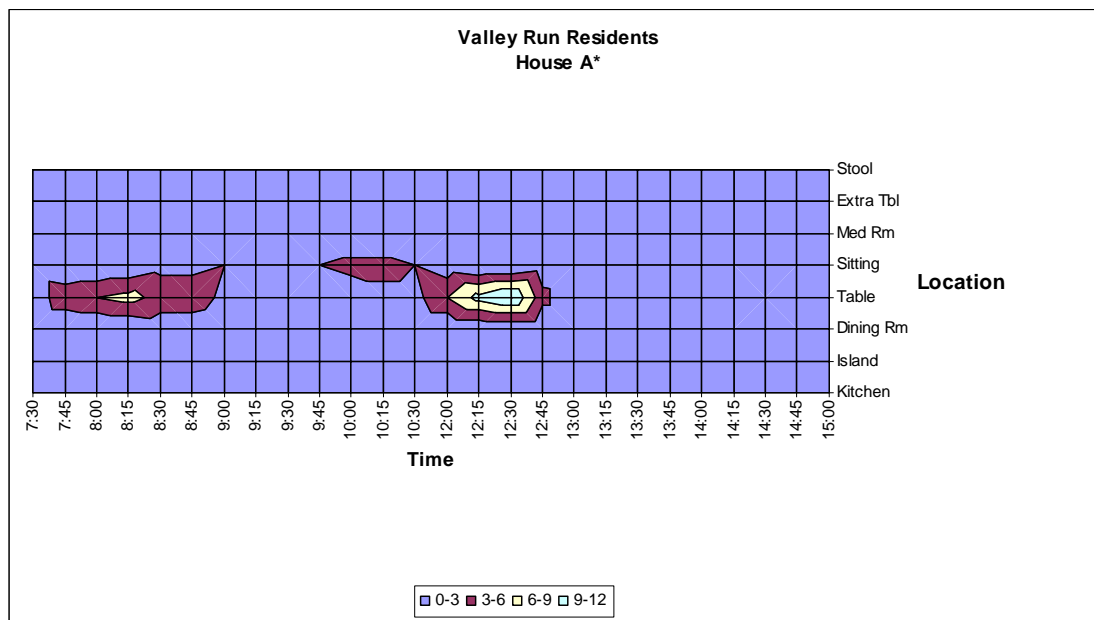
Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Pacific Breeze, Day 2
Staff Space Use

Time	Location							
	T	K	I	D	S	M	ST	
7:30am						2		
7:45am		2		1				
8:00am				1		1		
8:15am		1						
8:30am		2						
8:45am		1						
9:00am	1	1						
9:15am		1		2				
9:30am		1		2				
9:45am		2						
10:00am	2	1						
10:15am		1						
10:30am	1	1		1				
12:00pm		1		1				
12:15pm		1		1	1			
12:30pm		3						
12:45pm		2		2				
1:00pm		1		2				
1:15pm				2				
1:30pm	1							
1:45pm				1				
2:00pm	2							
2:15pm	1	1						
2:30pm					1			
2:45pm	2			1				
3:00pm				2				

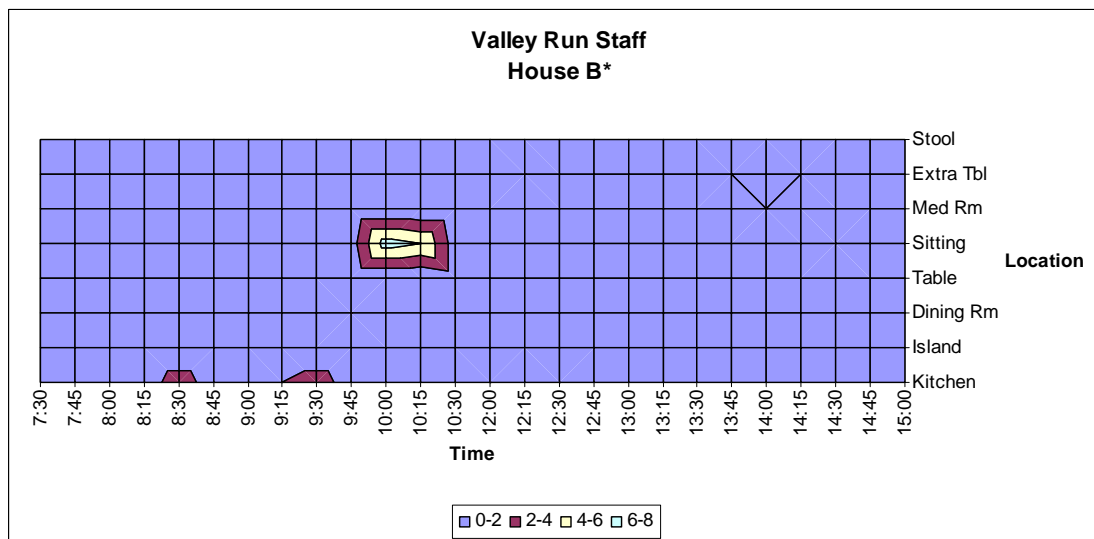
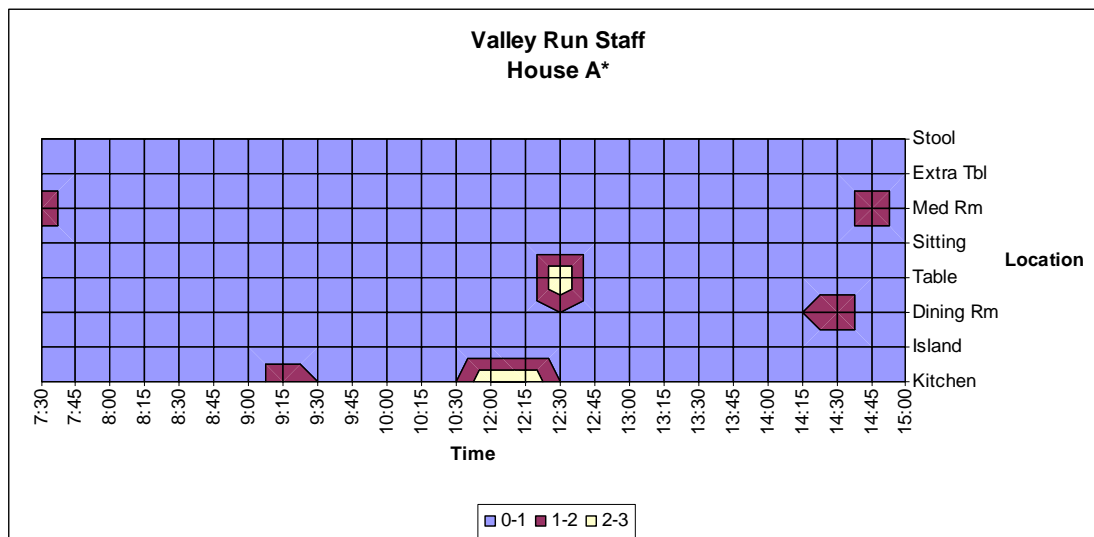
Legend	
T	at table
K	in kitchen work space
I	standing at island
D	walking in dining rm
S	sitting room
M	med room
XT	extra table
ST	stool

Valley Run Residents Space Use



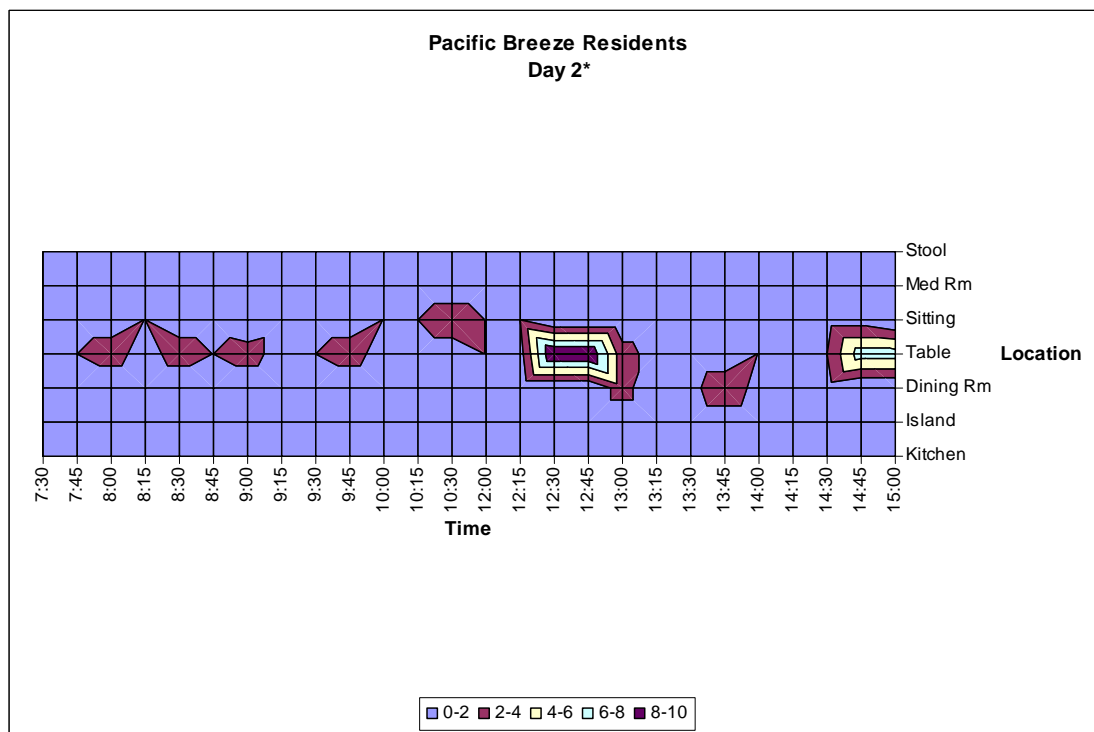
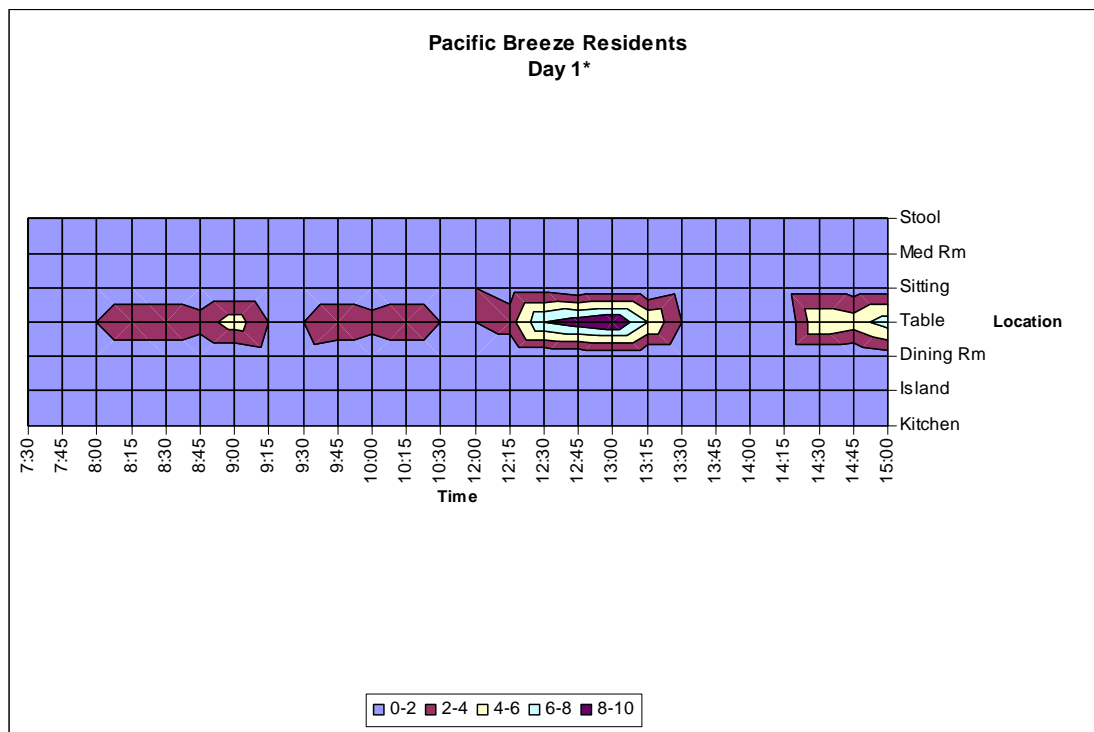
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Valley Run Staff Space Use



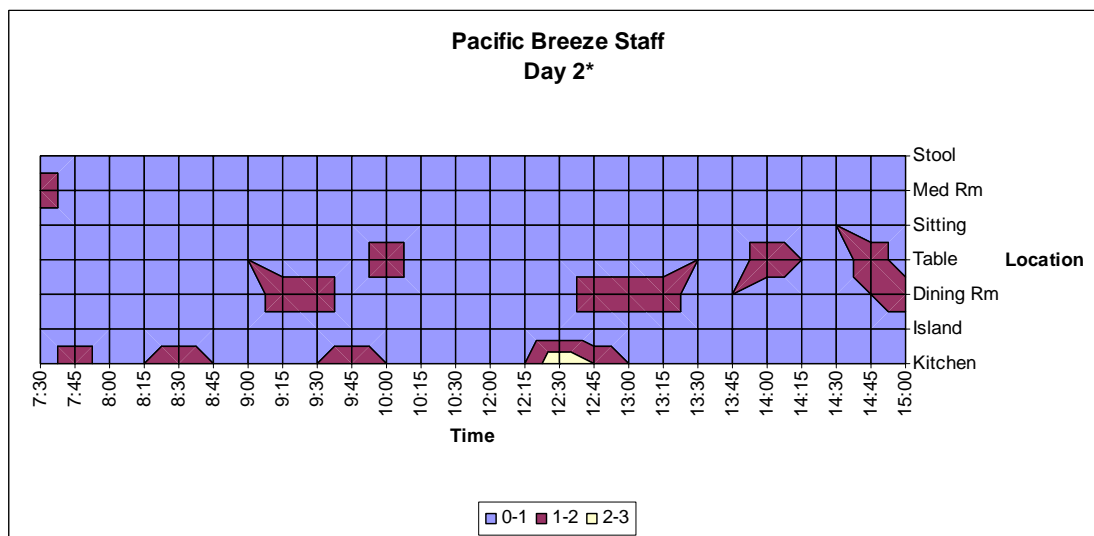
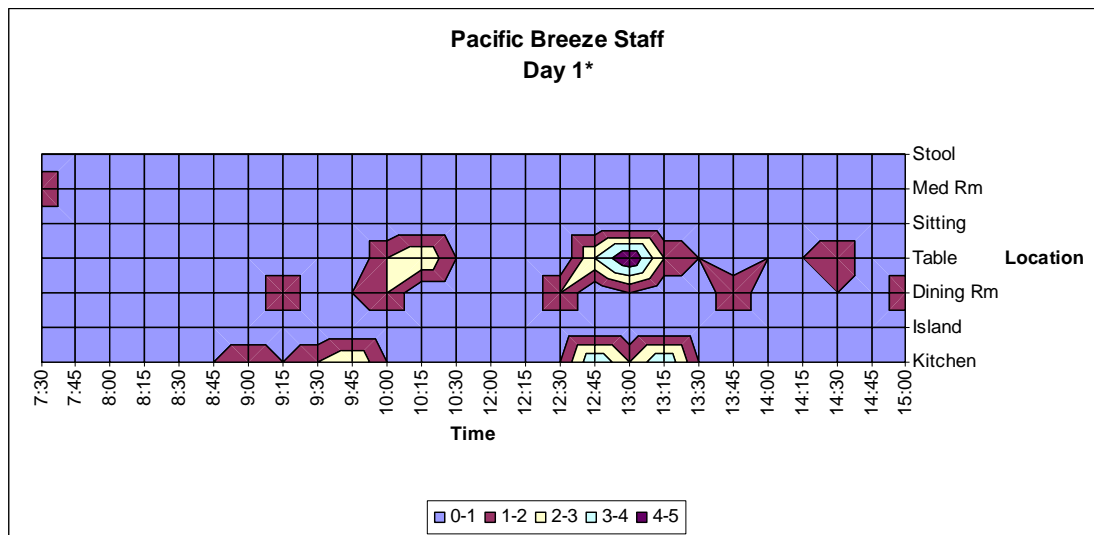
*Units are in people

Pacific Breeze Residents Space Use



*Units are in people

Pacific Breeze Staff Space Use



*Units are in people

APPENDIX E:
MUNSELL COLOR REFERENCES

Munsell Color References

Sample	Location	Munsell Match
	Valley Run House A Kitchen/Dining Carpet	light color: 10GY, 8/1 dark color: 10GY, 4/2
	Valley Run House A Sitting Area Carpet	2.5B, 6/4
	Valley Run House B Carpet	5R, 4/8
	Valley Run Ceiling/Wall Paint	10YR, 9/1
	Pacific Breeze Dining/Sitting Carpet	10YR, 8/2
	Pacific Breeze Ceiling Paint	7.5Y, 8/2
	Pacific Breeze Wall Paint	5YR, 7/6