DINING LAYOUT EFFECTS ON ATTENDANCE, COMMUNICATION, AND HAPPINESS IN OLDER ADULTS

By

Juliana Bertolucci

A Thesis Presented to

The Faculty of Humboldt State University

In Partial Fulfillment of the Requirements for the Degree

Master of Arts in Psychology: Academic Research

Committee Membership

Dr. Christopher Walmsley, Committee Chair

Dr. Brandilynn Villarreal, Committee Member

Dr. Rebecca Sharp, Committee Member

Dr. Amber Gaffney, Program Graduate Coordinator

December 2023

Abstract

DINING LAYOUT EFFECTS ON ATTENDANCE, COMMUNICATION, AND HAPPINESS IN OLDER ADULTS

Juliana Bertolucci

Our growing national age and the unique challenges presented by the COVID-19 pandemic stress the importance of conducting applied research that identifies effective systems of support for older adults as they age. Behavioral Gerontology is a promising field that applies behavior-analytic procedures to age-related issues. The current behavioral research has primarily focused on older adults in assisted living or nursing homes with major neurocognitive disorders. The current study hopes to add to behavioral gerontological research by applying previous research methods to novel populations. Direct observations were used to examine the effects of manipulating the physical dining layouts on the attendance, communication, and happiness levels of community-dwelling older adults in a congregate meal setting. The findings indicate indices of happiness, and communication increased in the social layout when compared to the original layout. Attendance increased in the personal layout in comparison to the original layout, however, indices of happiness decreased. The personal and social layout both increased observed and total attendance compared to the original layout. The results suggest these research methods are amendable to older adults with and without various diagnoses.

Acknowledgements

I could not have undertaken this journey without the invaluable support, expertise and guidance of my thesis advisor and committee chair, Dr. Christopher Walmsley. Without his efforts paving a space for behavior analysis and behavioral gerontology, this thesis would not have been possible, and I would not have found my passion for behavioral psychology. I'd also like to express my deepest gratitude to my committee members, Dr. Brandilynn Villarreal, and Dr. Rebecca Sharp, for their valuable feedback and suggestions. Their extensive knowledge and insight were instrumental in shaping this thesis.

I am extremely grateful for Ashley Gouthier and Tasha Romo for providing me the opportunity to conduct my research at the Humboldt Senior Resource Center, and for the resources and support they provided.

I would like to extend my appreciation to my research assistant, Isabelle Rodriguez, for their dedication, hard work, and support in collecting data for this thesis.

I must also thank my family, friends, and partner for supporting me throughout this experience as this process would not have been possible without them.

Lastly, I would like to express my sincere gratitude to all of the participants. Their willingness to share their experiences and provide detailed feedback allowed this thesis to come to life.

Table of Contents

List of Tables

List of Figures

List of Appendices

Introduction

The overall national age in the United States has been rising for over a decade with the 65-and-over age group growing by 34% in comparison to 2010 Census data (United States Census Bureau, 2020; 2022). There are more individuals susceptible to developing age related disorders like major neurocognitive disorder (NCD), formally known as dementia, than ever before (United States Census Bureau, 2020). The cost of NCD care for older adults is expensive even with partial insurance coverages (Seladi-Schulman, 2020; U.S. Centers for Medicare and Medicaid Services, 2022). Our growing aging population and the accompanying concerns stress the importance of conducting applied research that identifies effective systems of support for older adults as they age.

The COVID-19 global pandemic has presented specific hardships for the older adult population and the individuals that serve them. Recent studies concluded that individuals with symptoms or a diagnosis of NCD have been disproportionately impacted by the pandemic resulting in higher infection rates, more severe cases of COVID-19, and higher mortality rates (Zimmerman et al., 2020). Assisted living facilities and senior resource centers promptly restructured their systems to continue safely serving the older adult population (Wilson et al., 2020). For example, instead of the usual congregate meal setting, The Area One Agency on Aging nutrition services funding was reallocated to providing older adults with pick-up and home-delivered meals 7 days a week (Wilson et al., 2020). As funding shifts to pre-pandemic priorities, research should identify the current needs of older adults to directly inform the systems of support implemented during reopening. Senior community resources should provide quality service prior to an

older adult's transition to higher needs (e.g., assisted living) as a strategy to maintain their independence and prevent overwhelming the systems of care. Researching quality community support interventions allows resource centers to make data-based decisions to increase quality of service delivery, especially during the reopening phases of the pandemic.

Relevant Literature

Behavioral Gerontology is a promising field that applies behavior analytic procedures to age related issues. Behavior-analytic research with older adults has shown that environmental variables (e.g., staff attention, lounge layouts) can influence behavior (Baker, Hanley, & Matthews, 2006; Sharp et al., 2019). Environmental variables have been examined to create behavior-analytic interventions that improve the well-being of older adults with or without various diagnoses (e.g., Alzheimer's, Parkinson's). For example, Zarcone et al. (1993) detailed the use of time sampling procedures to assess quality of care for individuals with developmental disabilities. Shore et al. (1995) extended these results by utilizing direct observations with time sampling procedures to assess quality of care in a nursing home. These previous studies identified time sampling procedures as a reliable data collection method allowing for further research to manipulate the relevant variables.

Time sampling has been used to manipulate a variety of variables within care homes for individuals with NCD. Sharp et al. (2019) collected data at a 14-bed hospital ward arranged to look like a care home using direct observations with a momentary time sampling method. Using a multi-element design, the authors examined the effects of three

lounge layouts (i.e., small group, activity-specific, and edge of the room) on the engagement, indices of happiness, and communication in individuals with NCD. They found that the small group layout had more communication while the activity-specific layout had more engagement. Indices of happiness were overall low but did increase in group seating in comparison to adjacent seating.

Physically rearranging furniture layouts are an example of a behavior-analytic intervention called prosthetic environments. Prosthetic environments refer to environmental variables that maintain or increase one's performance of certain behaviors. They have been widely used with children (e.g., feeding devices, special clothing) and individuals with physical disabilities (e.g., braille books, hearing aids), however, they have not been used as often to address environmental barriers the older adult population faces (Lindsley, 1964). Lindsley (1964) emphasized the need for behavioral research on the use of prosthetic environments among older adults by presenting various prosthetics aimed to address the needs of the older adult community. For example, Lindsley (1964) suggested the use of "response force amplifiers" (e.g., throat microphones) to amplify one's voice to help facilitate communication among older adults. Behavioral research on the use of prosthetic environments among the older adult population has focused on older adults with higher support needs (e.g., assisted living, NCD) (Lindsley, 1964). Further research should address the literature gap by examining the effects of prosthetic environments on the quality of life among older adults with lower support needs.

Happiness is a critical component to one's quality of life, however, it is difficult to conceptualize within behavioral principles and procedures. Behavioral research on

indices of happiness was first explored among individuals with developmental disabilities (Green & Reid, 1996). Indices of happiness have since been assessed among other populations including the older adult population (Moore et al., 2007; Watkins et al., 2017). Further assessing indices of happiness among the older adult population can allow senior resource centers to make data-based decisions that ensure the supports in place effectively increase or maintain one's quality of life.

The Current Study

While there is behavioral research on increasing attendance, communication, and indices of happiness among the older adult population, the focus has been on older adults with neurocognitive or developmental disorders (Sharp et al., 2019; Green & Reid, 1996). Particularly, research has prioritized increasing these variables among older adults living in assisted living or nursing homes (Moore et al., 2007; Watkins et al., 2017). The purpose of the current study is to examine the effects of manipulating the physical dining layouts on the attendance, communication, and indices of happiness of community-dwelling older adults in a congregate meal setting. Prior research has indicated that manipulating lounge layouts can increase the indices of happiness, engagement, and communication of residents with NCD in an assisted living facility (Sharp et al., 2019). This study hopes to add to the behavioral gerontological research by applying previous research methods to novel populations. The researcher hypothesized increased levels of attendance and indices of happiness in the personal layout in comparison to the original layout. In the social layout, the researcher hypothesized there will be similar levels of

attendance in comparison to the original layout and increased levels of communication and indices of happiness.

Methods

Participants/Setting

Observations occurred at a restaurant style congregate meal setting as part of the local senior resource centers' nutrition program located in Humboldt County, California. Meals are served Monday through Thursday from 11:30 a.m. to 1:00 p.m. and pick-up meals are allocated on Fridays. Reservations are required for dining in. Payment is not required for individuals over the age of 60, however, the center recommends a donation of $3.50 per meal. For individuals under the age of 60, there is a required fee of $8.00. The most current COVID protocols for the resource center were followed by participants, staff, and experimenters. There were between 17-47 individuals per observation period. The study included older adults who attended the nutrition programs' provided lunch during the observation period. To correspond with the nutrition programs' meal qualifications, older adults are considered individuals over the age of 60. All participants were notified of the study taking place prior to data collection through visual handouts on the dining room resource wall and tables. The researcher obtained a waiver of informed consent on March 3, 2023, from the university's Human Subjects Institutional Review Board, as the senior resource center is a public area used by local older adults living in the community, and attempting to obtain informed consent in this context would be uncommon (IRB 22-090). The consent procedure would likely inconvenience participants who use this community resource.

Measures

Attendance is already tracked by the nutrition program and was collected anonymously by the nutrition programs' staff each observation period. Attendance is defined as the total number of older adults who arrived at the lunchroom during mealtime. Observers obtained the total number of participants from staff at the end of the observation period. At 12:15 p.m. every observation session, observers recorded the number of participants at each table on the printed layout sheet for that week. The second attendance measure demonstrated the differences between antecedent control (e.g., getting people to attend) and contingency control (e.g., how long are people attending). Indices of happiness is defined as behaviors including facial expressions or vocalizations that indicate happiness in older adults (i.e., smiling, laughing) (Green & Reid, 1996; Moore et al., 2007).

Communication is defined as vocal and gestural exchanges between older adults receiving a meal at the nutrition program. Examples of communication include comments, jokes, pointing, and directed gazes between older adults in the dining area during the observation period. This definition purposely excludes vocal verbal exchanges between the staff or observers and the older adults using services as the study aims to address only the needs of the older adults using services (Sharp et al., 2019).
Direct observations were conducted during a 30 minute period between 12:00 p.m.-12:35 p.m. using a 20-s momentary time sampling method. At the start of the session, the observer identified a base to scan the room left to right. At the end of the 20-s interval, the observer identified the furthest left participant and then scored happiness first and

communication second. At the end of the next 20-s interval, the observer moved on to the next furthest left participant from base continuing in this pattern until the furthest right participant was observed. The base determined the order the observer recorded each participant, but the observer walked around the room to position themselves to observe the face of the current participant. Each observation for communication and happiness was coded as present or not present and recorded as 1 (*present*) or 0 (*not present*) on the data sheet. If the participants face was partially or temporarily blocked at the moment of observation, the observer recorded happiness as NO (not observable) on the datasheet and was coded as missing.

On Wednesdays, the center staff placed surveys on the resource table at the start of the observation period. As participants were greeted by center staff, they were notified of the available surveys and were instructed to fill out a survey as they left the cafe. This allowed participants that were not staying the full lunch service to provide their feedback without impacting the observation period. At 12:40 p.m. on Wednesdays, the observer handed each participant a survey and a writing utensil stating, “We are trying a new layout and would like your feedback”. Participants were instructed to leave the filled out survey on their table prior to leaving the facility. Refer to Appendix A for a visual representation of the four question survey. The first question asked participants whether they attended lunch any previous days of that week *(i.e., Did you eat lunch at the center any other days this week?)* and was recorded as 1(*yes*) or 0(*no*).

The next two questions addressed social validity of observed happiness *(e.g., Rate in general how happy you felt eating lunch)* and communication *(e.g., Rate in general*

how social you felt eating lunch) which will be rated on a 4-pt scale from 1(*not happy or not social*) to 4 (*very happy or very social*). The last question was open ended to allow participants the opportunity to address any other concerns or comments the participants have regarding the layout.

Procedures

A modified ABAB research design was used (ABCCBA), and a random number sequence generator determined the layout on a weekly schedule. A random number generator assigned each layout a number with a total of six different numbers to account for each layout being used twice. These randomly assigned numbers were then inputted into the random sequence generator to determine the layouts for each week. Refer to Table 1 for the layout conditions arrangements during each observation week.

Direct observations occurred at the nutrition program between the hours of 12:00 p.m. and 12:35 p.m., three days per week over the course of a six week data collection period. The six week period allowed each layout to be implemented twice which may have reduced the occurrence of participant reactivity to the novel layouts. There was one session per day during the observation period. The dining layouts were provided to staff and physically rearranged by staff on the Monday before lunch service. Participants that regularly use the resource centers' services were notified of the layout changes through the handouts located on the tables and resource wall in the dining room. Refer to Appendix B for a visual representation of the handouts available on the tables and resource wall. Refer to Appendix C for a visual representation of the monthly meal menu used to notify participants of layout changes online as well as at the center.

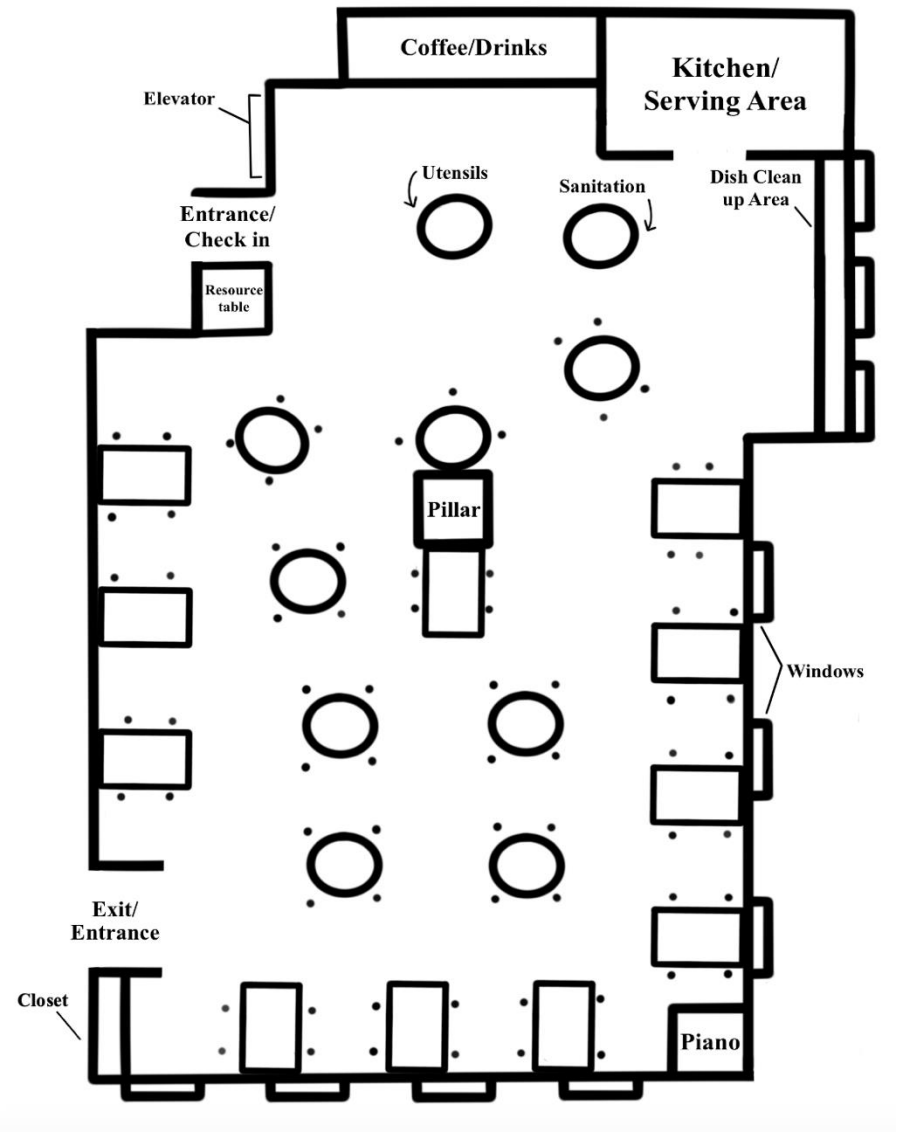
A second observer was present for 33% of sessions and collected data independently and simultaneously with the other observer. Point-by-point agreement was used to assess interobserver agreement by dividing the total number of agreements by the total number of agreements and nonagreements and multiplying by 100. The two observers agreed participants were or were not demonstrating happiness for 86% (range = 82% - 90%) of relevant observations. The two observers agreed participants were or were not engaging in communication for 94% (range = 90% - 98%) of relevant observations. For the measure of attendance, both the staff and the observer independently counted the number of participants on the sign-in sheet at the end of each observation period. The staff and observer agreed on the total number of participants for 100% of relevant observations.

Original Layout

Refer to Figure 1 for a visual representation of the original layout. This dining layout was arranged so that rectangle tables were along the perimeter walls and circle tables are in the middle of the room. This layout is how the dining room was previously arranged.

Figure 1

Original Layout

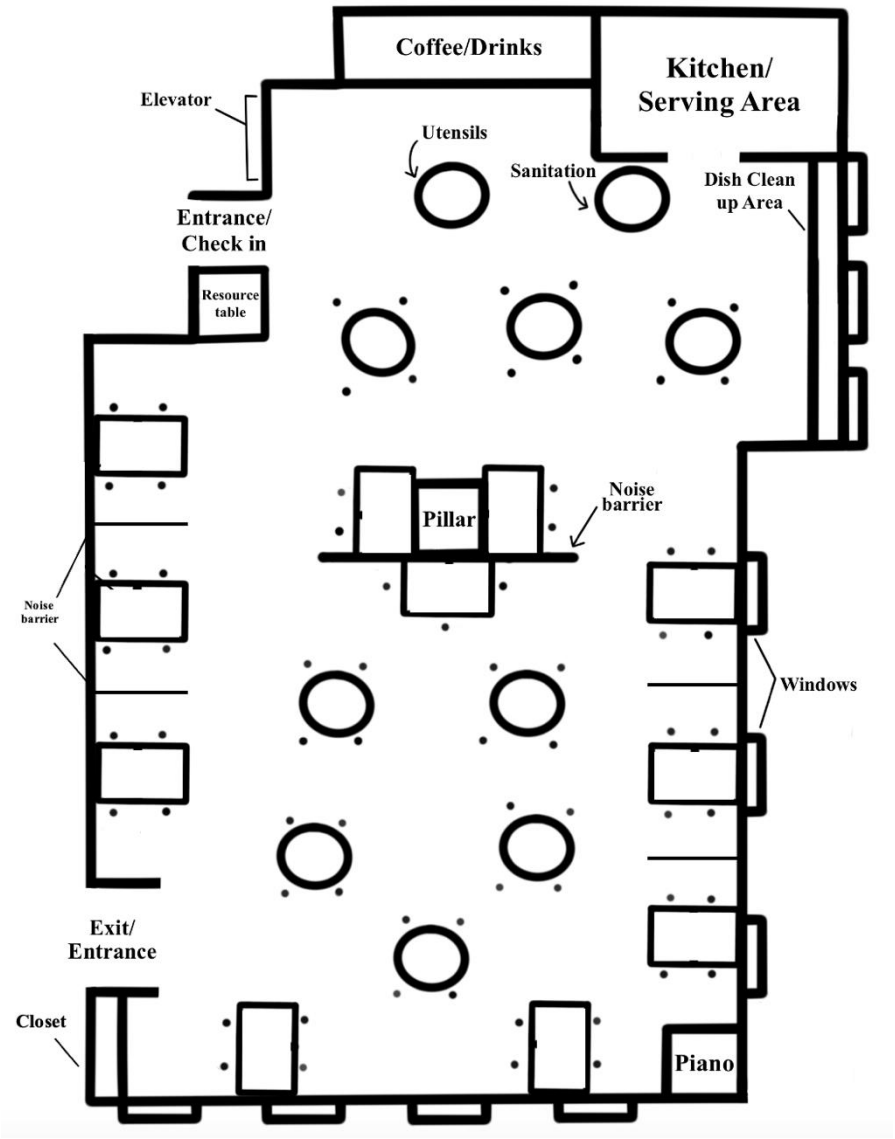


Personal Layout

Refer to Figure 2 for a visual representation of the personal layout. This dining layout was arranged so that rectangle tables were along the walls with curtains and circle tables are in the middle of the room. Noise reduction curtains were in five locations in the dining room during lunch to reduce the amount of echo and provide more privacy for participants. This layout was expected to increase attendance of participants using the dining services by accommodating those who may benefit from a hot meal but would enjoy more privacy and quiet while dining in.

Figure 2

Personal Layout



Social Layout

Refer to Figure 3 for a visual representation of the social layout. This dining layout was arranged so that rectangle and circle tables are balanced throughout the room. The larger rectangle tables were pushed together to allow more participants to sit together as a group. This layout was expected to maintain or increase the communication occurring during meals by promoting individuals to socialize with others.

Figure 3

Social Layout

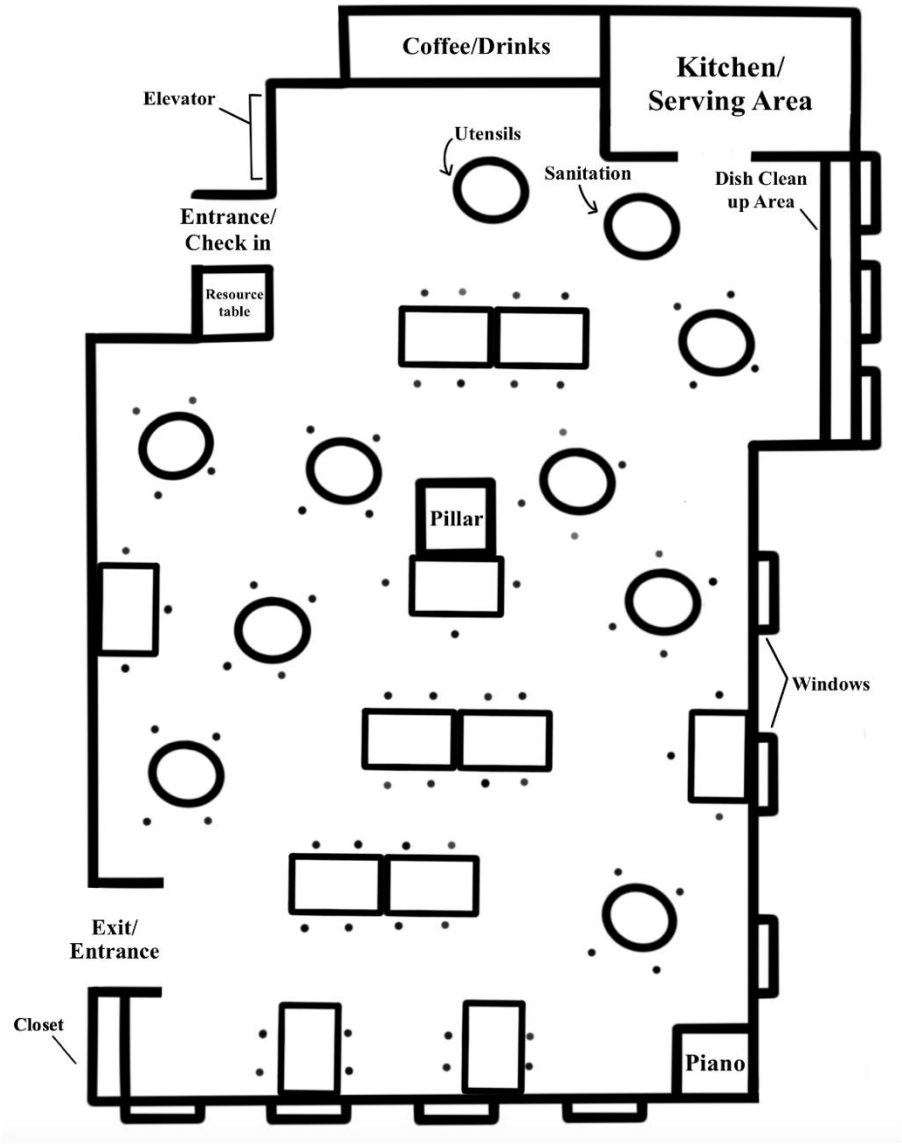


Table 1

Layout Condition Per Observation Week

Week	Layout
1	Original
2	Social
3	Personal
4	Personal
5	Social
6	Original

Results

The data were analyzed using descriptive statistics and statistical software (i.e., R Studio). Missing data from the participant survey (1.35%) and observer observations (1%) were screened and coded as missing before finding means to ensure non-responses did not skew the calculations. R Studio was used to obtain the mean attendance of participants, communication between participants, and indices of happiness among participants using the observational and survey data. Microsoft Excel was used to input the raw data, then to graph and analyze the visual demonstrations.

Figure 4 demonstrates the percentages of happiness observed across the three layout conditions. Higher levels of happiness were observed in the original (36%) and social layout (48%) than in the personal layout (32%). The personal layout had increased levels of happiness in the second observation (20%) than in the first observation (12%). The original layout had increased levels of happiness in the first observation (19%) than in the second observation (16%). The social layout had similar levels of happiness across observations, however, more happiness was observed in the first observation (25%) than in the second observation (23%).

Figure 4

Percent of Intervals Participants Were Observed Engaging in Happiness Across Each Layout Condition

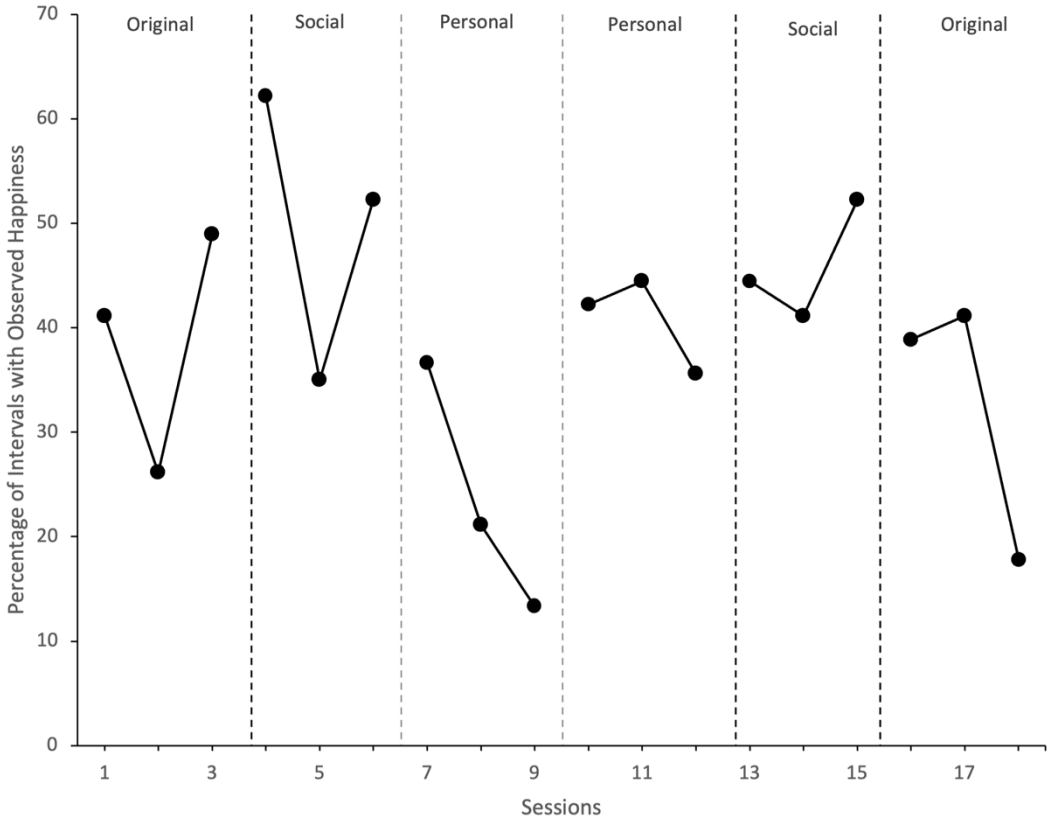


Figure 5 demonstrates the percentages of communication observed across the three layout conditions. Greater communication was observed in the original (78%) and social layout (79%) than in the personal layout (69%). The personal layout had increased levels of communication in the first observation (38%) than in the second observation (32%). The original layout had increased levels of communication in the second observation (41%) than in the first observation (37%). Similarly, the social layout had greater communication in the second observation (41%) than in the first observation (38%).

Figure 5

Percent of Intervals Participants Were Observed Engaging in Communication Across Each Layout Condition

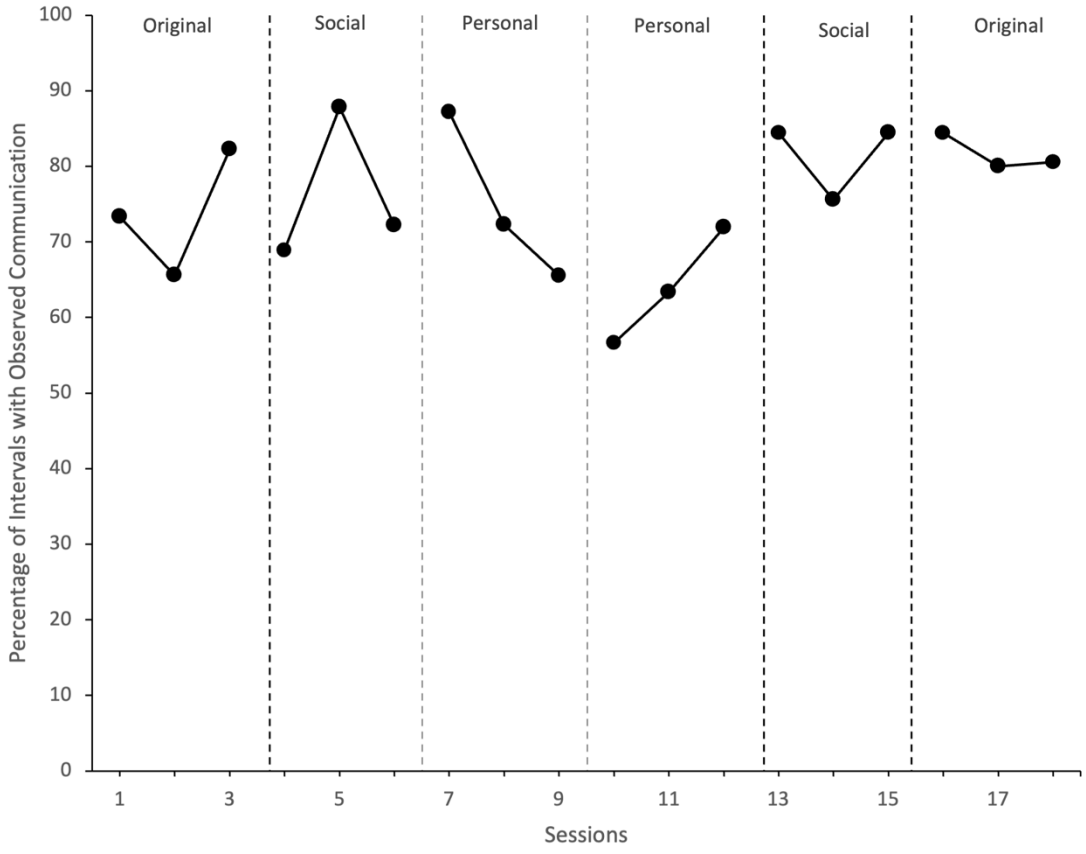


Figure 6 shows the observed attendance of participants across each layout condition obtained during the middle of the time sampling procedure, and Figure 7 shows the total attendance of participants across each layout condition. Greater numbers of observed attendance were seen in the social (n = 101) and personal (n = 92) layouts in comparison to the original layout (n = 72). Total attendance was greater in the social (n = 182) and personal (n = 169) layouts in comparison to the original layout (n = 155) as well.

Figure 6

Observed Number of Participants at 12:15 p.m. During Observation Period Across Each Layout Condition

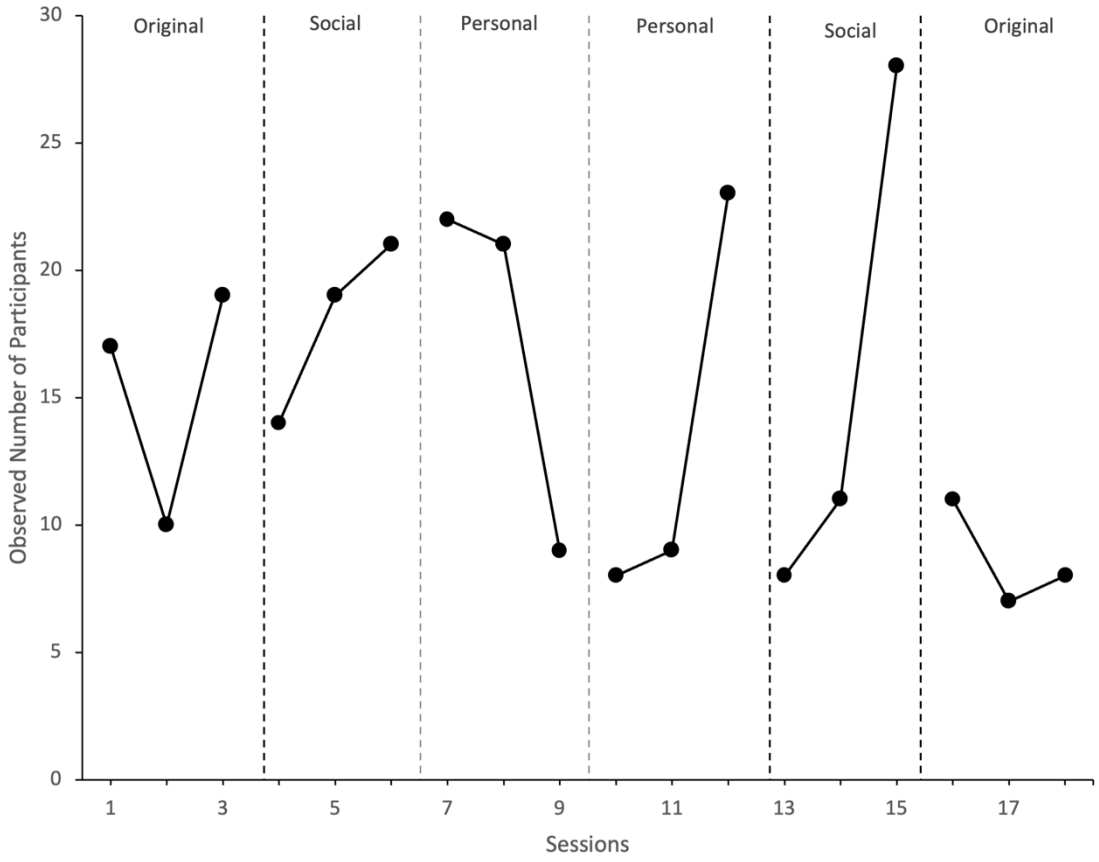


Figure 7

Total Overall Number of Participants Present During Observation Period Across Layout Condition

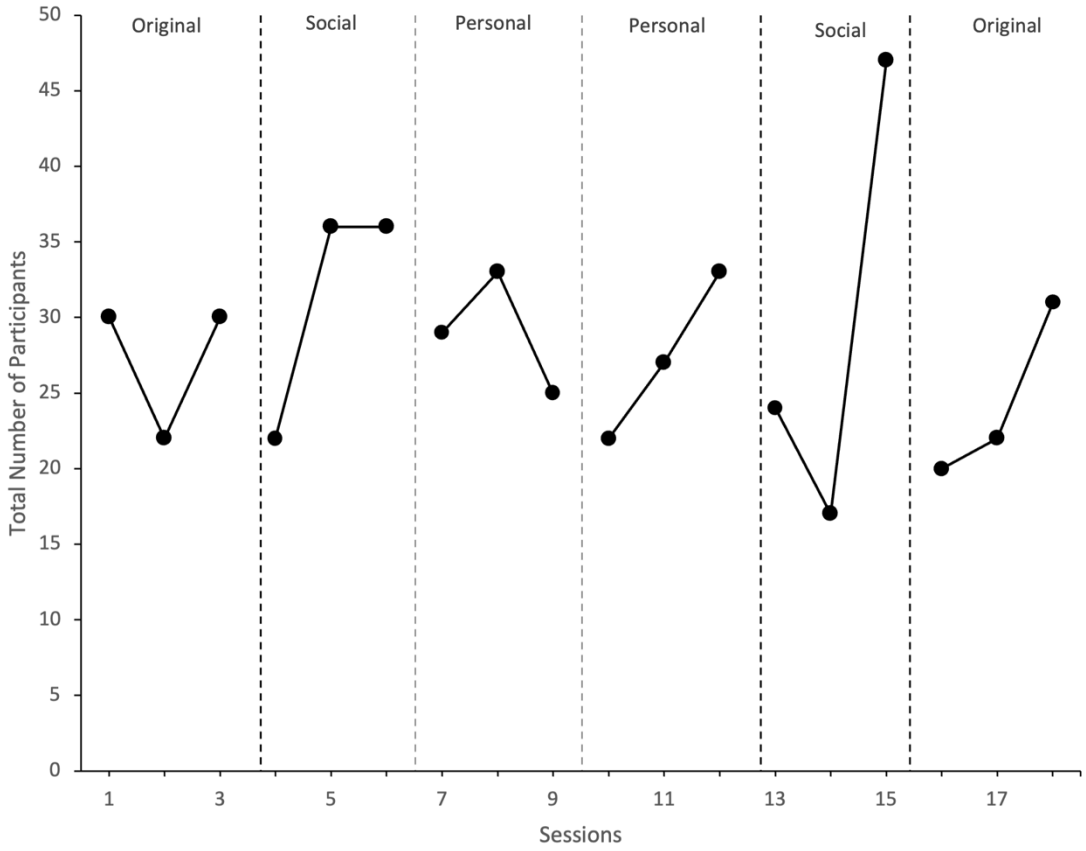
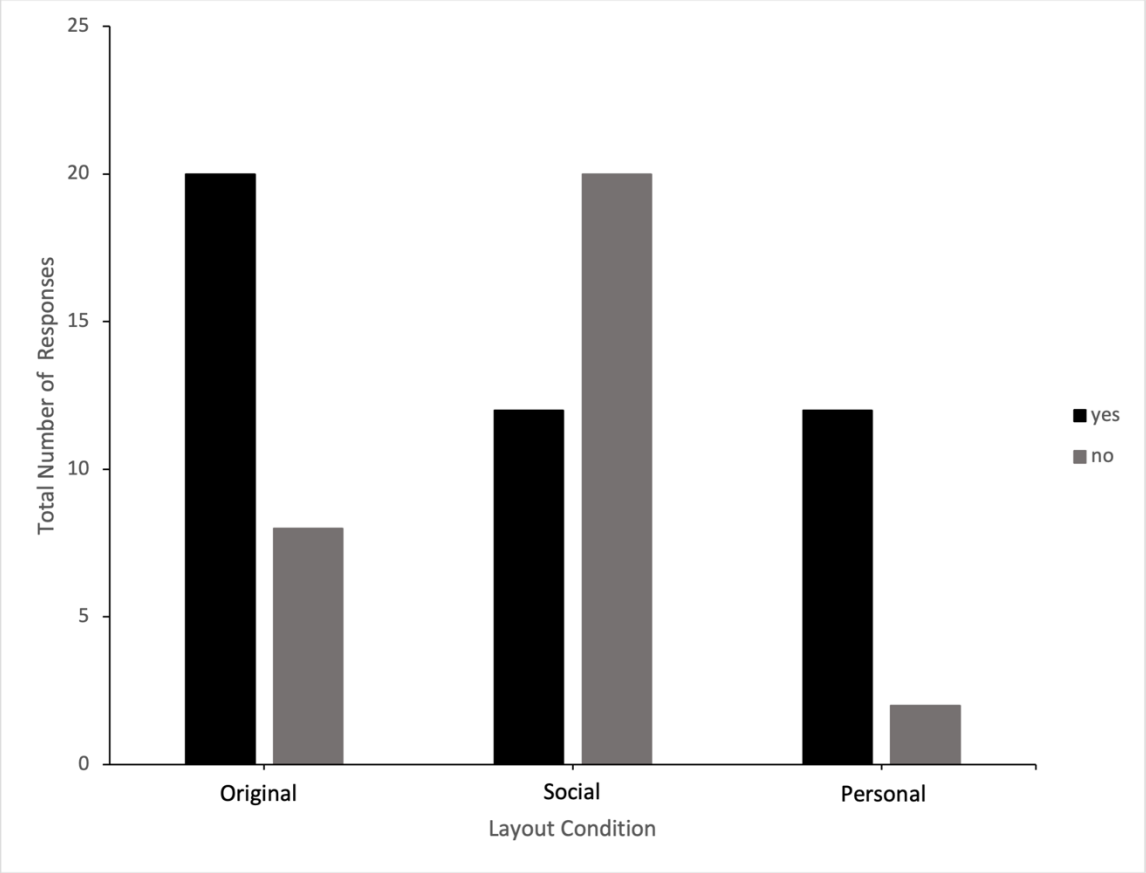


Figure 8 shows the number of participants who reported attending or not attending more than one lunch service in that week across layouts. The original (n = 20) layout had a greater number of participants who reported attending more than one lunch service when compared to the social (n = 12) and personal (n = 12) layouts. The social (n = 20) layout had the highest number of participants who reported only attending one lunch service that week in comparison to the personal (n = 2) and original (n = 8) layouts. Multiple participants' open responses in week five reference being out of town on previous days of the week (n = 5) which may account for the lower number of participants who attended more than one lunch service during the second social layout observation. Figures 7 and 8 demonstrate the social layout had lower observed and total attendance in session four and five, but both attendances sharply increased in session six. The changes in attendance levels during week five is consistent with the participants open responses reporting being out of town during session four and five, but in town during session six. The percentage of participants who were present on Wednesday and filled out a survey was highest in the original (46%) layout in comparison to the social (39%) and personal (24%) layouts.

Figure 8

Participants Who Reported Attending or Not Attending More Than One Lunch Service Across Layouts



Figures 9 and 10 demonstrate the percentage of participant ratings of happiness and communication across layout condition. A greater percent of participants rated happiness a four in the social (30%) layout in comparison to the original (20%) and personal (9%) layouts. Across all layouts, a higher percent of participants rated happiness a four (59%) or three (35%) in comparison to a two (4%) or one (1%) rating. Similarly, a greater percent of participants rated communication a four in the social (31%) layout in comparison to the original (22%) and personal (9%) layouts. A greater percent of participants rated communication a four (62%) or three (32%) in comparison to a two (5%) or one (0%) rating.

A Spearman's correlation analysis was conducted to examine the relationship between the percentage of intervals on Wednesdays with observed indices of happiness and the percentage of participants who rated happiness a three or four. To enable data comparison, the analysis only included data from Wednesday's observation sessions as surveys were allocated on each Wednesday of the observation period. Given the data, there is not sufficient evidence to establish a statistically significant relationship between observed indices of happiness and participants' ratings of happiness, R^2 (4) = .184, p = .70.

Figure 9

Percentage of Participants Rating of Happiness Levels Across Layout Condition Where Higher Percentages Represent Higher Percent of Participant Responses

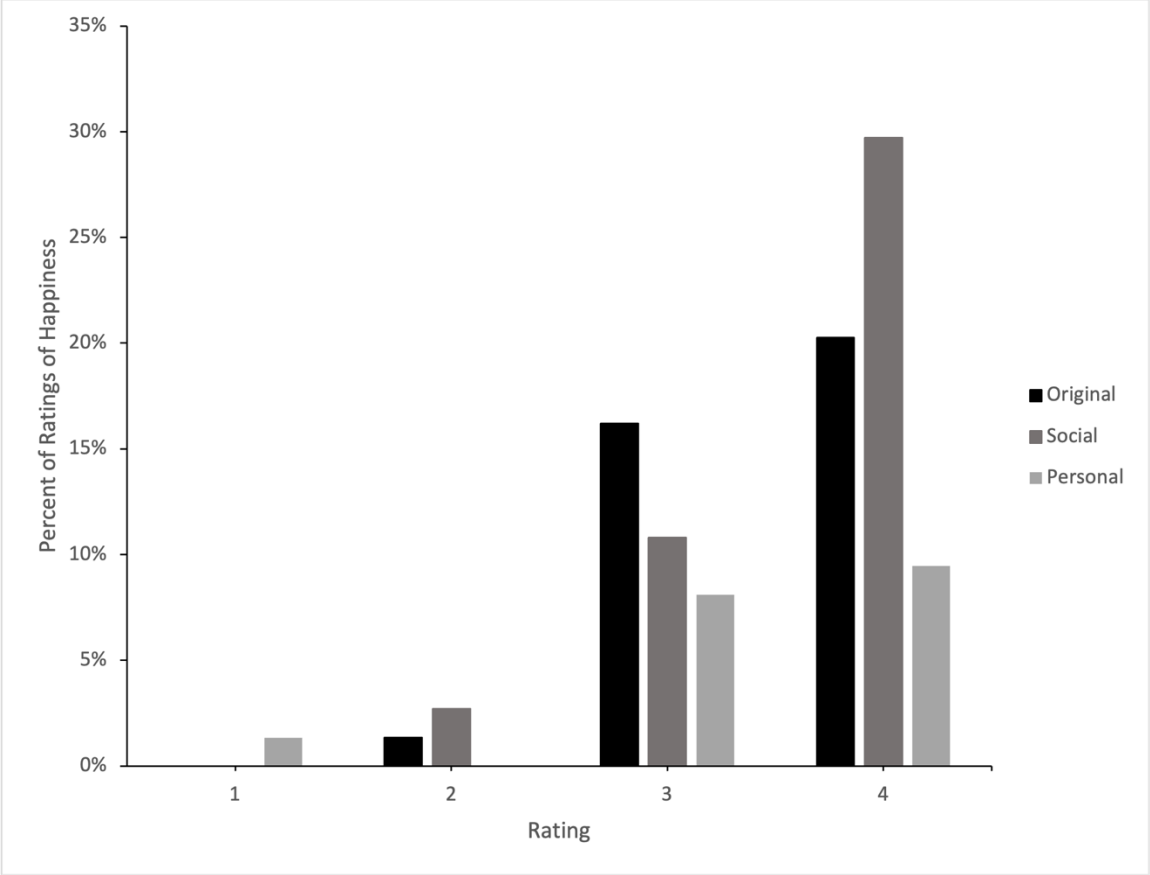
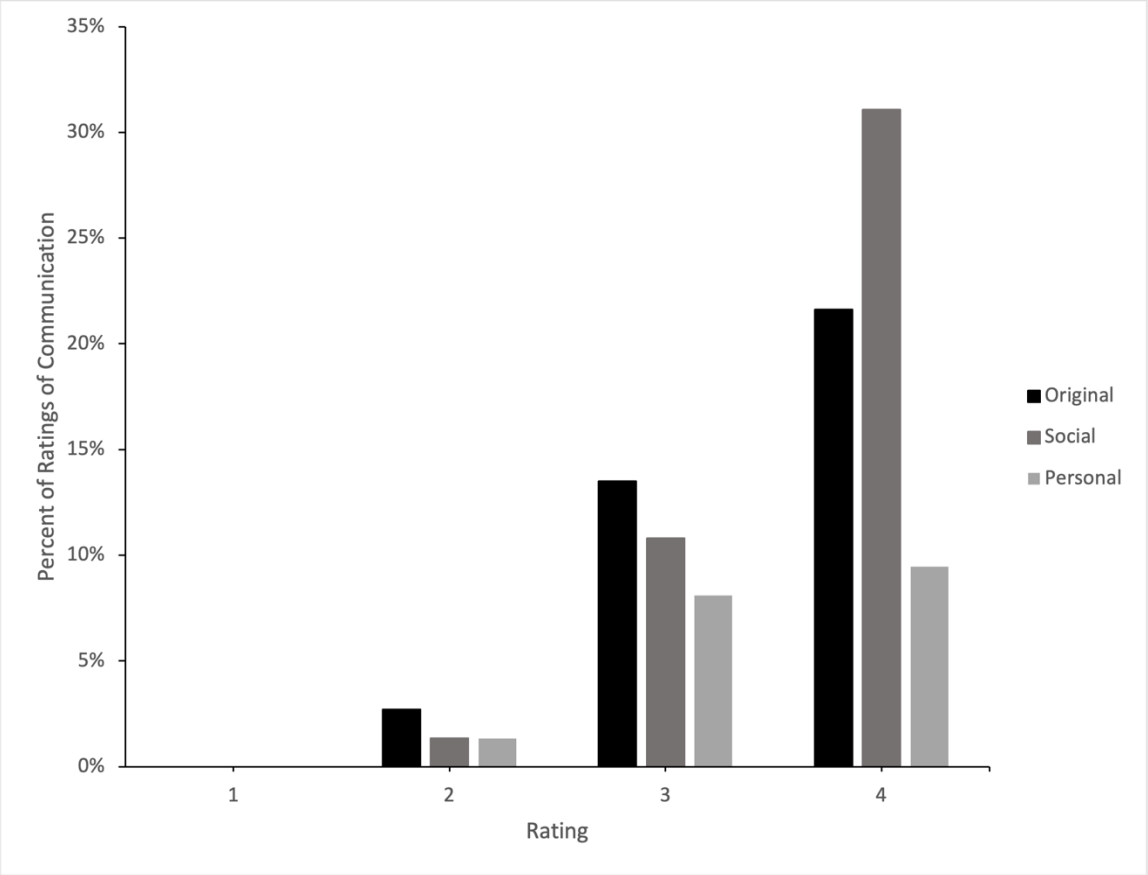


Figure 10

Percentage of Participants Rating of Communication Levels Across Layout Conditions Where Higher Percentages Represent Higher Percent of Participant Responses



Discussion

The current study aimed to examine the effects of three dining layouts on the attendance, communication, and indices of happiness of older adults in a congregate meal setting. There was support for majority but not all the hypotheses. The mean levels of communication and indices of happiness were expected to increase in the social layout when compared to the original layout which is consistent with the results of this study. The researcher hypothesized higher levels of attendance and indices of happiness in the personal layout and similar levels of attendance in the social layout when compared to the original layout. The results show the personal layout did increase observed and total attendance in comparison to the original layout, however, the percent of observed indices of happiness decreased. The observed and total attendance also increased in the social layout when compared to the original layout which contrasts with the researcher's hypothesis that attendance would be the same across the social and original layouts.

The data highlight that both antecedent (e.g., visual handouts) and contingency (e.g., experiencing layout) based interventions increased attendance levels in the social and personal layouts when compared to the original layout. The observed attendance was used to determine the effects of the contingency intervention whereas the total attendance helped determine the antecedent intervention effects. Refer to Table 2 to view the antecedent and contingency differences across layout conditions. There was a greater difference between the personal and original layout in the observed attendance (n = 20) in comparison to the total attendance (n = 14) which suggests the personal layout was influenced more by contingency based interventions in comparison to antecedent based

interventions. The difference between the social and original layout was similar in both the observed attendance (n = 29) and total attendance (n = 27) which suggests the combination of antecedent and contingency interventions influenced attendance in the social layout.

High noise levels were a consistent open-ended response from participants on the survey across all three layouts (n = 12). Participants that regularly ate at the café often sat at the circle tables in the middle of the room as they reported it helped with managing the noise while being able to talk with a group (n = 6). Participants that previously reported they preferred the round tables were observed sitting at the larger rectangle tables in the social layout as well as the smaller rectangle tables in the personal layout. Participants that regularly ate alone at middle tables were observed sitting at tables between the noise barriers against the wall. Participants did report the curtain noise barriers increased their ability to hear tablemates, but that it did not diminish the overall noise levels in the room (n = 5). Further research should formally examine the effects of using noise barriers in the social layout with a decibel meter, as uncomfortable noise levels were the highest report made by participants.

Communication Levels

The social layout increased attendance, happiness, and communication levels the greatest when compared to the original and personal layouts. Communication levels across all layouts were high (range 63%-88%) which may be accounted by the discriminative stimuli and social reinforcers present across prosthetic environments.

A discriminative stimulus tells us how to respond to the presentation of relevant environmental stimuli. Discriminative stimuli in the environment influences behavior differently for individuals with different abilities meaning that as we age discriminative stimuli that were once intense, are not as available to us for various age related issues. As Lindsley (1964) highlights, manipulating relevant discriminative stimuli can help identify adequate reinforcers for older adults and re-establish the reinforcing value of conditioned reinforcers. Prosthetics can amplify the reach of discriminative stimuli allowing older adults to contact the signals of available reinforcers at a higher rate (Lindsley, 1964). Relevant to this study, older adults that prefer socializing with larger groups had a higher rate of contact with available reinforcers in the social layout which is reflected in the higher levels of communication in the social layout. Based upon the open survey responses, older adults who preferred socializing also had a higher rate of contact with available reinforcers in the personal layout. While participants did report high levels of noise in the personal layout, they also reported that the curtains minimized noise levels at their table which increased their ability to communicate with their tablemates. Behaviorally speaking in the personal layout, the prosthetics minimized the rooms sound levels which amplified the discriminative stimulus' reach signaling the availability of social reinforcers. Overtime, the continued availability of social reinforcers in the presence of the prosthetics may have begun to re-establish the reinforcing value of socialization at the café, which may be reflected in Figure 4's increasing trend in the second personal layout observation week.

Communication levels increased with large group seating in the social layout which contrasts with Sharp et al.'s (2019) findings that communication increased in small group seating. The different obtained results suggest that different prosthetic environments are preferred by different groups of older adults. Sharp et al. (2019) rearranged the prosthetic environments for older adults with higher support needs whereas this study rearranged the prosthetic environments for older adults with lower support needs. Each group of older adults preferred a different prosthetic environment which demonstrates the validity of the methodology in assessing which prosthetic environments are more preferred by older adults. The different preferences of older adults across studies suggests that individualized care models will be most effective at addressing the needs of older adults and increasing the quality of service delivery for older adults. Future research should evaluate the effects of large and small group seating on the communication levels among various groups of older adults to establish the effective boundaries of group seating for increasing communication among the older adult population.

Indices of Happiness

Higher rates of happiness were observed in the social layout which is consistent with previous research where greater indices of happiness were recorded in group seating rather than adjacent seating (Sharp et al., 2019). Past behavioral research (Watkins et al., 2017) found that observed rates of indices of happiness were much lower than participants ratings. In line with these findings, the current study's data does not provide sufficient evidence to suggest a meaningful relationship between observed indices of

happiness and participants ratings of happiness. The correlation analysis did highlight a notable difference in the percentages of observed indices of happiness and participants ratings of their happiness. The percentage of participants who rated their happiness a three or four was higher than the percentage of intervals with observed indices of happiness. Turning to the data, participants rated their happiness a three or four for a total of 70 of 74 responses whereas the observers recorded happiness occurred a total of 206 of 540 intervals. Breaking it down further, the percentage of participants who rated their happiness a three or four was higher than the percentage of intervals with observed indices of happiness regardless of layout condition. The participants rated their happiness a three or a four in the original layout on 27 of 28 responses whereas observers recorded happiness as present on 60 of 180 intervals. In the social layout, participants rated happiness a three or four on 30 of 32 responses and observers recorded happiness as present on 94 of 180 intervals. In the personal layout, participants rated their happiness a three or four on 13 of 14 responses while observers recorded happiness as occurring on 52 of 180 intervals. Overall, the older adults reported being generally happy across the board whereas measuring indices of happiness may not have captured all behaviors corresponding to the construct of happiness. We must keep in mind that the small sample size ($N = 6$) may have resulted in low power to detect a statistically significant association. Increasing the sample size in future research may increase the statistical power to detect small effects and can provide a clearer picture of the possible relationship between observed and self-reported indices of happiness.

A point of departure between this study and Watkins et al. (2017) that may account for the results is the use of different measures. Watkins et al. (2017) utilized a 6-point rating scale for both observers and participants measures of happiness whereas the current researcher used time sampling procedures to measure observed indices of happiness and a 4-point rating scale to measure participants self-report of happiness. To strengthen the literature on overt measures of happiness, further research should examine the reliability of using time sampling procedures and self-reported ratings of happiness to measure one's happiness with a larger sample size. Continued research on indices of happiness should also account for individuals that are engaged in an individual activity (e.g., reading, on the phone) but may not exhibit overt indices of happiness to gain a more reliable measure of one's happiness.

Limitations

The current study had several limitations that should be considered. The center was closed for three weeks due to renovations following the first two weeks of data collection. The third week of data collection began on the first day of reopening. The café's renovations included new flooring which may have increased the participants' ratings of the personal, social, and original layouts. All layouts were observed twice with a total of six observations each, however, the personal layout was observed consecutively during weeks three and four. Participants' familiarity with the personal layout may account for the increasing trend of indices of happiness and communication seen in observation week four. Although participants were aware a psychology research study was being conducted and that observers were present walking around, their reactivity was

minimal over the six data collection weeks. On days with lower total and observed attendance, there were increased interactions between participants and site staff which may account for the slight differences in participant and observer ratings of communication.

Table 2

Differences between Total and Observed Attendance Across Layout Condition

Layout	Observed Attendance	Total Attendance	Observed Difference	Total Difference
Original	72	155	NA	NA
Social	101	182	29	27
Personal	92	169	20	14

Recommendations

The researcher applied previously established research methods to the novel population of community-dwelling older adults at a congregate meal site to generalize the applicability of behavioral research methods outside of the older adult population with NCD. Overall, the findings indicated the research methods were amenable to older adults with or without formal diagnoses. The researcher found changes in attendance, indices of happiness, and communication of older adults by rearranging the dining layouts at a congregate meal site. The social layout increased both indices of happiness and communication while the personal layout increased attendance levels when compared to the original layout.

The results emphasize the increasing need for person-centered care models and senior resources for older adult communities. The observational and survey data suggest the participants in this research study would benefit the most from dining layouts that increase the accessibility of socializing by minimizing the echo and overall noise levels throughout the room. Therefore, the researcher recommends the nutrition program to use a combination of both the social and personal layouts. Specifically, incorporating both the social layout's larger rectangle tables and the personal layouts noise barrier curtains. The researcher plans to disseminate this information to the local Area One Agency on Aging and senior resource center allowing these community organizations to make data-based layout decisions. Future research should focus on manipulating dining layouts to examine the impact of noise levels on attendance, happiness, and communication among older adults. As resource centers continue to shift back to pre-pandemic priorities,

incorporating person-centered care strategies (e.g., participant feedback on layout arrangements) within senior community resources may effectively increase the attendance, happiness, and communication among the older adult community.

References

Baker, J. C., Hanley, G. P., & Mathews, R. M. (2006). Staff-administered functional analysis and treatment of aggression by an elder with dementia. *Journal of Applied Behavior Analysis*, *39*(4), 469–474. https://doi.org/10.1901/jaba.2006.80-05

Green, C. W., & Reid, D. H. (1996). Defining, validating, and increasing indices of happiness among people with profound multiple disabilities. *Journal of Applied Behavior Analysis*, *29*(1), 67-78. https://doi.org/10.1901/jaba.1996.29-67

Lindsley, O. R. (1964) Geriatric behavioral prosthetics. In R. Kastenbaum (Ed.), *New Thoughts on Old Age* (3rd ed., pp. 41-60). Springer.

Moore, K., Delaney, J. A., & Dixon, M. R. (2007). Using indices of happiness to examine the influence of environmental enhancements for nursing home residents with Alzheimer's disease. *Journal of Applied Behavior Analysis*, *40*(3), 541-544. https://doi.org/10.1901/jaba.2007.40-541

Seladi-Schulman, J. (2020, May 13). *What does Medicare cover if you have dementia?* Healthline. https://www.healthline.com/health/medicare/does-medicare-cover-dementia-care

Sharp, R. A., Williams, E., Rörnes, R., Lau, C. Y., & Lamers, C. (2019). Lounge layout to facilitate communication and engagement in people with dementia. *Behavior Analysis in Practice*, *12*, 637-642. https://doi.org/10.1007/s40617-018-00323-4

Shore, B. A., Lehman, D. C., Smith, R. G., Iwata, B. A., & DeLeon, I. G. (1995). Direct assessment of quality of care in a geriatric nursing home. *Journal of Applied Behavior Analysis*, *28*(4), 435-448. https://doi.org/10.1901/jaba.1995.28-435

United States Census Bureau. (2020, June 25). 65 and older population grows rapidly as baby boomers age [Press release]. https://www.census.gov/newsroom/press-releases/2020/65-older-population-grows.html

United States Census Bureau. (2022, June 30). Nation continues to age as it becomes more diverse [Press release]. https://www.census.gov/newsroom/press-releases/2022/population-estimates-characteristics.html

U.S. Centers for Medicare and Medicaid Services. (2022). Program of all-inclusive care for the elderly (PACE). https://www.medicare.gov/your-medicare-costs/get-help-paying-costs/pace

Watkins, E. E., Walmsley, C., & Poling, A. (2017). Self-reported happiness of older adults in an assisted living facility: Effects of being in activities. *Activities, Adaptation & Aging*, *41*(1), 87-97. http://dx.doi.org/10.1080/01924788.2016.1272394

Wilson, T. L., Scala-Foley, M., Kunkel, S. R., & Brewster, A. L. (2020). Fast-track innovation: Area Agencies on Aging respond to the COVID-19 pandemic. *Journal of Aging & Social Policy*, *32*(4-5), 432-438.

Zarcone, J. R., Iwata, B. A., Rodgers, T. A., & Vollmer, T. R. (1993). Direct observation of quality of care in residential settings. *Behavioral Residential Treatment*, *8*(2), 97-110. https://doi.org/10.1002/bin.2360080204

Zimmerman, S., Sloane, P. D., Katz, P. R., Kunze, M., O'Neil, K., & Resnick, B. (2020). The need to include assisted living in responding to the COVID-19 pandemic. *The Journal of Post-Acute and Long-Term Care Medicine*, *21*(5), 572-575. https://doi.org/10.1016/j.jamda.2020.03.024

Appendix A

Did you eat lunch at the café any other days this week?

Yes No

Rate in general how happy you felt eating lunch at the café this week.

1	2	3	4
Not happy			Very Happy

Rate in general how social you felt eating lunch at the café this week.

1	2	3	4
Not social			Very social

Write below any other thoughts or comments you have regarding this week's lunch layout.

Appendix B

Welcome!

We are trying out some new café layouts!

This week it is the **Original** layout!

Personal

Social

A Psychology student will be walking around and observing because they are helping us find the best layout for everyone 😊

On Wednesday's, there will be a **brief survey** for you to share your feedback on the new layout.

If you have questions, **please ask Ashley/Café Staff,** or ask the student after their observation.

Appendix C

HUMBOLDT SENIOR RESOURCE CENTER'S APRIL 2023 MENU

Monday	Tuesday	Wednesday	Thursday	Friday
	= Layout change!	We are trying out new layout options! The cafe layout will change weekly for the next 6 weeks.		
Spaghetti W/Meatballs Spinach w/Garlic & Onions Bavarian Demi Loaf Peaches 3	**½ Chicken Salad Sandwich & Broccoli Cheese Soup** Quinoa Salad Grapes 4	**Pineapple Baked Ham** Scalloped Potatoes Peas & Carrots, Wheat Roll Fresh Fruit Cup Carrot Cake *Holiday Meal* 5	**Chicken Fried Steak** Mashed Potatoes w/Gravy Green Beans WW Roll Mandarin Oranges 6	**Lemon Herb Fish** Scandinavian Blend Veg Citrus Couscous Salad Honeydew Melon 7
Salisbury Steak Mashed Potatoes Peas & Carrots Bavarian Dark Bread Apricot 10	**Crustless Quiche** Potatoes O'Brien Scandinavian Blend Veg WW Biscuit Fruit Cocktail 11	**Beef Stroganoff w/ Egg Noodles** California Blend Veg Wheat Roll Mandarin Delight 12	**Ham & Bean Soup** Tomato Basil Salad Cornbread Cantaloupe 13	**BBQ Chicken** Baked Potato Corn w/ Red Peppers Strawberries WW Bread Stick 14
Chicken Noodle Casserole Spring Vegetables Wheat Roll Peaches 17	**Baked Fish Dijonnaise** Scalloped Potatoes Pacific Blend Vegetables WW Roll Pears 18	**BBQ Pork Rib** Rice Pilaf Mixed Vegetables Watermelon 19	**Taco Salad** Beef, Beans, Cheese, Lettuce, Tomato, Chips & Salsa Grapes 20	**Stuffed Baked Potato** Garden Blend Vegetables Tropical Fruit Salad Bavarian Demi Loaf 21
Meat Loaf w/ Gravy Mashed Potatoes California Blend Vegetable WW Demi Loaf Pineapple 24	**Split Pea Soup w/ Ham** Mediterranean Coleslaw WW Roll Tropical Fruit 25	**Green Chili Egg Bake** SF Blend Vegetables WW Biscuit Cantaloupe 26	**Chicken Parmesan** Ratatouille Apricots WW Garlic Bread Stick 27	**Shepard's Pie** Green Beans w/ Red Peppers Bavarian Demi Loaf Peaches 28

Arcata and Eureka lunch served 11:30 am– 12:15 pm, Fortuna lunch served 12:00–12:30 pm **Days vary by site**

For Reservations Call: Shayla in ARCATA @ 707-825-2027 ~ Ashley in EUREKA @ 707-443-9747 x1242 ~ Alisha in FORTUNA @ 707-725-6245

Low-fat or nonfat milk is served with each meal.
Menus are subject to change without notice.
A vegetarian alternative is available by reservation daily

Humboldt Senior Resource Center
Nutrition & Activities Program

$3.50 is the suggested contribution. No senior 60+ will be denied a meal. For those under 60 there is a fee.

The salt shaker indicates a higher sodium meal

= Layout change! **HUMBOLDT SENIOR RESOURCE CENTER'S June 2023 MENU Eureka**

Monday	Tuesday	Wednesday	Thursday	Friday
			**Taco Salad** Beef, Beans, Cheese, Lettuce, Tomato, Chips & Salsa Grapes 1	**Heritage Café Connection and Carry Out** 2
Meat Loaf w/ Gravy Mashed Potatoes Chuck Wagon Blend Vegetable Whole Wheat Roll Pineapple 5	**Split Pea Soup w/ Ham** Mediterranean Coleslaw Whole Wheat Roll Tropical Fruit 6	**Green Chili Egg Bake** SF Blend Vegetables WW Biscuit Grapes 7	**Chicken Parmesan** Ratatouille Apricots WW Garlic Bread Stick 8	**Heritage Café Connection and Carry Out** 9
Creamy Chicken & Vegetables SF Blend Vegetables Whole Wheat Biscuit Pears & Raisins 12	**Hot Roast Beef Sandwich** Mashed Potatoes w/Gravy Coleslaw w/ Carrots Watermelon 13	**Cheese Tortellini** Apple Feta Salad WW Roll Strawberries 14	**Fish w/ Sundried Tomato Pesto** Scalloped Potatoes Prince William Vegetables WW Roll Tropical Fruit 15	**Heritage Café Connection and Carry Out** 16
Chicken w/ Fire Roasted Tomato Spinach Tomato Couscous Green Beans w/ Red Peppers Caramel Apple Slices 19	**Macaroni & Cheese** Rainbow Coleslaw Fruit Cocktail Whole Wheat Roll 20	**Chili Verde Tacos** Black Beans, Corn & Rice Mexican Cole Slaw Pineapple Rings 21	**Spinach Lasagna** Green Salad WW Roll grapes 22	**Heritage Café Connection and Carry Out** 23
Spaghetti W/Meatballs Spinach w/Garlic & Onions Whole Wheat Roll Peaches 26	**½ Chicken Salad Sandwich & Broccoli Cheese Soup** Quinoa Salad Grapes 27	**Lemon Herb Fish** Garden Blend Vegetables Citrus Couscous Watermelon 28	**Chicken Fried Steak** Mashed Potatoes w/Gravy Green Beans Whole Wheat Roll Mandarin Oranges 29	**Heritage Café Connection and Carry Out** 30

Arcata and Eureka lunch served 11:30 am – 1:00 pm, Fortuna lunch served 12:00 pm – 12:30 pm **Days vary by site**

For Reservations Call: ARCATA @ 825-2027 ~ EUREKA @ 443-9747 ext. 1242 ~ FORTUNA @ 725-6245 ~ Pop-up Locations @707-496-7036
Low-fat or nonfat milk is served with each meal.

Menus are subject to change without notice.
A vegetarian alternative is available by reservation daily

Humboldt Senior Resource Center
Nutrition & Activities Program

$3.50 is the suggested contribution. No senior 60+ will be denied a meal. For those under 60 there is a fee.

The salt shaker indicates a higher sodium meal