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Mealtime Verbal Interactions among Nursing Home Staff and Residents with Dementia: A Secondary Behavioral Analysis of Videotaped Observations

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Abstract

Aims: To characterize dyadic mealtime verbal interactions and examine the associations with staff and resident characteristics.

Design: A secondary analysis of 110 videotaped mealtime observations collected from a dementia communication trial during 2011–2014.

Methods: Videos involved 25 residents with dementia and 29 staff in nine nursing homes. Verbal behaviors (utterances) were coded during 2018–2019 using the Cue Utilization and Engagement in Dementia mealtime video-coding scheme, addressing 8 positive behaviors and four negative behaviors. Bivariate analyses and multivariate regression models were used.

Results: Staff spoke three times more frequently (76.5%) than residents (23.5%). Nearly all staff utterances were positive (99.2%); 85.1% of residents' utterances were positive and 14.9% negative. Staff positive utterances were correlated with their negative utterances and resident positive and negative utterances. Staff negative utterances were correlated with resident negative utterances. Resident positive and negative utterances were correlated. Resident positive utterances were significantly associated with staff caregiving length in the current nursing home (OR = 1.430, 95% CI = 1.008, 2.027). Resident negative utterances were significantly associated with resident gender (female vs. male, OR = 11.892, 95% CI = 1.237, 114.289) and staff years worked as a

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caregiver (OR = 0.838, 95% CI = 0.710, 0.989). Staff positive and negative utterances were not associated significantly with any participant characteristics.

Conclusions: Staff engage residents using primarily positive verbal strategies. Staff-resident mealtime verbal interactions were dynamic, interactive and complex and related to multiple individual characteristics.

Impact: Positive dyadic mealtime interactions are critical to engage residents in eating. Little work has characterized dyadic mealtime interactions, limiting the development of effective interventions. Findings showed staff-resident mealtime verbal interactions were primarily positive, inter-related and associated to multiple individual characteristics. Findings inform directions to improve mealtime care practice and develop person-centered mealtime interventions targeting modifiable factors, including staff caregiving experiences.

Keywords

behavioral coding; communication; dementia; mealtime; nursing; nursing home; verbal; dyadic interactions; staff; videos

INTRODUCTION

Dementia, one of the major causes of dependency disability among older adults (≥65 years), affects 50 million people in 2019 worldwide (World Health Organization., 2019). International literature indicates that 28%−83% of nursing home (NH) residents with dementia are dependent on activities of daily living and 14%−56% are malnourished (Schüssler et al., 2014). In the United States (U.S.), dementia affects 5.8 million older adults and 48%−70% of NH residents in 2020 (Alzheimer's Association., 2020). Among NH residents with dementia, 44.6–60.2% in Taiwan (Chang, 2012; Chang et al., 2017) and 32–85% in the U.S. (Alzheimer's Association., 2020; Liu et al., 2016) experience mealtime difficulties. Mealtime difficulties, defined as the functional, cognitive and behavioral symptoms that interfere with the process of getting food into the mouth and swallowing it (Aselage & Amella, 2010; Liu et al., 2014), often result in low intake (Keller et al., 2017; Lin et al., 2010; Namasivayam-MacDonald et al., 2018) and subsequent malnutrition and dehydration (Bell et al., 2015; Chang & Roberts, 2011), leading to increased confusion, infection, weight loss, morbidity, mortality and decreased quality of life (Hanson et al., 2013).

BACKGROUND

Mealtime care is provided multiple times every day for residents needing assistance and is a critical component of daily care in promoting function and nutrition. Multilevel factors (i.e., resident, staff, environmental) influence mealtime difficulties (Liu et al., 2016; Liu et al., 2017; Liu et al., 2018) and intake (Liu, Jao, et al., 2019; Wen Liu et al., 2020; Liu, Williams, et al., 2019). Person-centered, individualized mealtime care that acknowledges resident preferences and supports independence through positive engagement and social interactions is critical to promote eating performance and improve intake (Liu et al., 2015; Liu et al., 2017; Liu et al., 2018; Liu, Williams, et al., 2019; Reimer & Keller, 2009). Staff have

opportunities to engage residents in eating but often provide complete assistance even to residents with potential functional ability to eat by themselves, which disenables engagement, reinforces dependence and functional decline and associates with decreased intake (Liu et al., 2018; Liu, Williams, et al., 2019).

While evidence is emerging on the importance of positive staff-resident (dyadic) interactions during mealtime care, little work has characterized dynamic and complex mealtime interactions, limiting the development of effective interventions to manage mealtime difficulties and insufficient intake. Prior studies have examined temporal associations of staff behaviors with resident agitation (Gilmore-Bykovskyi et al., 2015) and aspiration (Gilmore-Bykovskyi & Rogus-Pulia, 2018) during mealtime and temporal associations of staff behaviors with resident agitation (Roth et al., 2002) and resistiveness to care (Belzil & Vézina, 2015) during hygienic care routines. Another study shows that both positive and negative/neutral interactions during care-related activities (not mealtime specific) are associated with interaction location and resident participation level and suggests more research on the role of resident and staff characteristics on quality of dyadic interactions in dementia care (Paudel et al., 2019). Overall, little research has quantitatively characterized patterns and distributions of mealtime-specific dyadic interactions or examined the role of staff and resident characteristics. More information is needed on how staff and residents interact and how dyadic mealtime interactions differ by individual characteristics.

To characterize dyadic mealtime interactions, a feasible and valid tool is needed to assess dyadic verbal and nonverbal behaviors. Current observational measures that assess staff mealtime behaviors (Liu et al., minor revision), resident mealtime behaviors (Aselage, 2010) and dyadic mealtime interactions (Gilmore-Bykovskyi, 2015; Keller et al., 2013; Phillips & Van Ort, 1993) capture limited aspects of mealtime interactions and warrant further psychometric testing. Additionally, most measures are developed for direct on-site observations, with only a few developed for videotaped observations. These measures include the Feeding Traceline Technique that only assesses simple characteristics of the intake process and lacks feasibility (Phillips & Van Ort, 1993) and a behavioral coding scheme that assessed only staff behaviors (Gilmore-Bykovskyi, 2015). The use of videotaped observations and behavioral coding schemes has become an emerging methodology for assessing complex and dynamic mealtime interactions, allowing for repeated viewing and coding of multiple factors, more precise measurement and deeper levels of analysis not achievable with direct on-site observations.

To address this gap, we refined the Cue Utilization and Engagement in Dementia (CUED) Mealtime Video Coding Scheme based on multiple established observational tools, addressing an inclusive list of verbal and nonverbal behaviors from staff and residents in dementia mealtime care (Aselage, 2010; Edahiro et al., 2012; Lann-Wolcott et al., 2011; Liu et al., 2018). The CUED assesses characteristics of resident intake process (Part I) and dyadic verbal (Part II, focus of this study) and nonverbal (Part III) mealtime interactions (W. Liu et al., 2020). This tool will facilitate understanding of dyadic mealtime interactions and guide the development and evaluation of innovative mealtime care interventions with a focus on supporting resident independence through positive dyadic interactions.

THE STUDY

Aims

The purpose of this study was to characterize dyadic mealtime verbal interactions and examine associations: 1) among verbal behaviors; and 2) of verbal behaviors with staff and resident characteristics.

Study Design

This descriptive study was a secondary analysis of archived videotaped mealtime observations collected during 2011–2014 from a clinical trial that evaluated the efficacy of a dementia communication intervention to improve NH staff communication and decrease resident resistiveness to care (Williams et al., 2016).

Participants

The parent study enrolled 127 staff and 83 residents from 13 NHs in Kansas, United States. Eligibility criteria for residents included: 1) a diagnosis of dementia; 2) long-stay status; 3) staff-reported resistiveness to care; 4) capacity to hear staff communication; and 5) a surrogate decision maker available to provide informed consent. Eligibility criteria for staff included: 1) ≥18 year old; 2) English speaking; 3) permanent employee status; and 4) provided direct care for a resident ≥2 times/week over the previous month (Williams et al., 2016).

In this study, baseline videos were selected from the parent study archived inventory if they: 1) captured mealtime activities, 2) lasted ≥1 minute, 3) captured interactions between one primary staff and one resident and 4) were of adequate quality to capture verbal and nonverbal behaviors. In total, 1,125 baseline videos were screened, among which 110 videos were eligible for this study. Prior work described the screening procedures (Wen Liu et al., 2020). The 110 videos involved 29 staff (mean age=34.9 years, 82.8% female, 79.3% non-Hispanic, 72.4% white, 72.4% completed or were receiving college education, 100% Certified Nursing Assistants, mean caregiving length=8.9 years, mean working length in the current NH=3.7 years) and 25 residents (mean age=84.6 years; 60% female, 92% non-Hispanic, 100% white) in 9 NHs. Residents had moderately severe to severe dementia (range=6.6–7.4) as measured by the Functional Assessment Staging in Alzheimer's Disease Scale (total score ranges from 1, normal cognition, to 8, very severe dementia) (Sclan & Reisberg, 1992). Residents had moderate levels of comorbidities (range=19–36) as measured by the Modified Cumulative Illness Rating Scale (Knoefel & Patrick, 2003). Residents had moderate levels of functional ability in performing activities of daily living (range=12–39) as measured by Minimum Data Set 3.0 Section G (ADL self-performance and support provided) (Centers for Medicare & Medicaid Services, 2013).

Ethical Considerations

Ethical approvals were obtained through Institutional Review Boards of universities where the studies were conducted. In the parent study, NHs were first enrolled and randomized to the intervention or waiting list control group. In each enrolled NH, staff and resident participants were provided with information about the study and recruited with written

consent (staff) and surrogate consent from the resident's Legally Authorized Representative and resident assent (resident) (Williams et al., 2016).

Data Coding

Part II of CUED codes for staff and residents' verbal behaviors include eight positive behaviors and four negative behaviors (Table 1). All utterances in the videos were transcribed and then coded second-by-second using Noldus Observer® 14.0 (Noldus Information Technology Inc., Leesburg, VA, USA) during 2018–2019. Four research assistants were trained by the first author through coding gold standard videos following a standard CUED coding manual (W. Liu et al., 2020). Each full sentence ended with a period or a question mark was considered as an utterance [e.g., "No?" was considered an utterance; "mmh. …(silence)… maybe not." was considered two separate utterances] (Gilmore-Bykovskyi, 2015). Each utterance was assigned one code. When an utterance could be relevant to two codes, it was assigned to the code that was more objective and less judgmental. For example, if a "verbal refusal" behavior occurred without a clearly heard "controlling voice", it was coded as verbal refusal (unless a controlling voice was clearly heard). The rationale was verbal refusal was easier to identify based on content and more likely to reach agreement across coders, while controlling voice was more judgmental and subjective and different coders may have different perspectives on whether a voice was controlling or not. The feasibility, ease of use and inter-rater reliability (percent agreement ≥ 85% and Cohen's Kappa ≥ .80) (McHugh, 2012) was established for Part II of CUED among trained coders using the study sample before they independently coded the sample.

Variables

Coded data representing staff and resident utterances were exported from Noldus Observer® to Excel worksheets. Four variables were created to represent positive and negative utterances by staff and residents:

- *Staff positive utterances* were operationalized as the number of positive utterances by staff towards residents per minute, calculated as the total number of staff positive utterances divided by video duration.
- *Staff negative utterances* were operationalized as whether staff made any negative utterances in each video, using a two-category indicator variable: 0 utterances and 1 or more utterances.
- *Resident positive utterances* were operationalized as whether resident had any positive utterances in each video, using a two-category indicator variable: 0 utterances and 1 or more utterances.
- *Resident negative utterances* were operationalized as whether resident had any negative utterances in each video, using a two-category indicator variable: 0 utterances and 1 or more utterances.

Resident eating function was conceptualized as the level of resident functional ability to initiate and complete intake episodes and was operationalized as the average proportion of all intake episodes initiated and completed by an individual resident (Wen Liu et al., 2020; Liu, Williams, et al., 2019). It was calcuated as the total number of intake episodes initiated

and completed by an individual resident divided by the total number of intake episodes in all videos that involved the same resident, using data on characteristics of intake process (CUED Part I) coded from the same video sample in prior work (Liu, Williams, et al., 2019). Based on the distribution, a three-category variable was created to represent resident eating function: dependent (0% to 25%), partially (in)dependent (greater than 25% to less than 75%) and independent (75% to 100%). In this sample, 36.0% of the residents were independent eaters, 40.0% were partially (in)dependent eaters and 24.0% were dependent eaters.

Video Duration is conceptualized as the time period during which dyadic mealtime interactions occurred and is operationalized as the length of each videotaped observation (in minutes). In this study, all video captured resident mealtime activities with assistance from one primary care staff. Most videos captured part of the mealtime rather than the whole mealtime.

Data Analysis

All statistical analyses were performed in SAS 9.4 (SAS Institute Inc., 2017). The level of significance alpha=.05 was used. Descriptive statistics were calculated to summarize distributions of positive and negative utterances from staff and residents. Bivariate analysis was used to examine relationships: 1) among staff and resident positive and negative utterances; and 2) of utterances with staff characteristics (age, years as caregivers, years worked in the current NH, education, gender, race), resident characteristics (age, comorbidity, gender, dementia stage, functional status, eating function) and video duration. Pearson correlation coefficients were used when both variables were continuous; independent samples t-test or ANOVA when one variable was continuous and the other was categorical; Fisher's exact test when both variables were categorical.

Multiple linear regression analysis was used to examine associations between participant characteristics and staff positive utterances as a dependent variable. Multiple logistic regression analysis was used to examine associations between participant characteristics and staff negative utterances, resident positive utterances and resident negative utterances as dependent variables. No adjustment for potential effects of clustering of videos within staff, residents, or dyads was made, because the small number of videos for most staff, residents and dyads, compared with the number of variables used in the study, would not allow robust estimation. All multivariable models controlled for video duration because the videos in the sample have varying durations. Continuous covariates were centered at the sample means. Video duration was natural log-transformed prior to centering. Because the complete set of resident characteristics was available for only 18 out of 25 residents, prior to the regression analyses, multiple imputation was employed to replace missing values with plausible values for resident age (N=1), comorbidity (N=3), functional status (N=2) and dementia stage (N=7). A total of 25 complete data sets were created and analyzed using regression analyses as described above. The results of 25 regression analyses for each dependent variable were combined to generate valid statistical inferences (Schafer, 1999).

Validity, Reliability and Rigor

All verbal codes in Part II of CUED were identified from established tools, including Person-Centered Behavior Inventory (Coleman & Medvene, 2013), Task-Centered Behavior Inventory (Lann-Wolcott et al., 2011) and a prior behavioral tool (Gilmore-Bykovskyi, 2015), indicating content validity. Part II of CUED demonstrated feasibility and good inter-coder reliability through ratings of randomly selected 22 videos of the study sample across four trained coders (percent agreement range=94.5–97.6%, all $p<.001$, ± 1s tolerance; Cohen's Kappa range=.94-.97, 95% CI=.93, .98, ±1s tolerance) (W. Liu et al., 2020). For ease of use, it took an average of 5.12 hours to transcribe utterances and 4.16 hours to code utterances for a one-hour video (W. Liu et al., 2020).

Results

Characteristics of Staff-Resident Utterances

A total of 2,800 utterances from staff and residents were coded (Table 2). Staff spoke three times more frequently (76.5%) than residents (23.5%). Most staff utterances were positive (99.2%) and few (0.8%) were negative. For residents, 85.1% of their utterances were positive and 14.9% were negative. For staff, the most frequent positive utterances were orientation/giving instructions (31.2%) and showing interest (21.2%), followed by showing approval/agreement (10.8%). Other less frequent positive utterances, including giving choices (9.5%), asking for help/cooperation (8.9%), assessing for comfort/condition (8.9%) and gaining attention verbally (7.9%), occurred with similar frequency. There were few staff negative utterances, including verbal refusal, unsure-negative and controlling voice.

For residents, the most frequent positive utterances were showing interest (36.3%), showing approval/agreement (33.9%) and unsure-positive (20.2%). Other less frequent positive behaviors included asking for help/cooperation (6.2%), orientation/giving instructions (2.9%) and assessing for comfort/condition (0.5%). Residents' negative utterances were primarily verbal refusal (61.2%), unsure-negative (27.6%) and controlling voice (10.2%), followed by interrupting/changing topic (1.0%).

Characteristics of Videos

The 110 videos lasted from 1 minute to 23.8 minutes (mean=4.5, SD 4.0, Table 3). The average number of staff positive utterances was 4.7/minute (SD 3.2, range=0–13.4). Staff negative utterances were not present in 97 videos (88.2%); one staff negative utterance was observed in 10 videos (9.1%) and two utterances in 3 videos (2.7%). There were no resident positive utterances in one-third of the videos (31.8%); one or more (up to 8) resident positive utterances were observed in the remaining videos (68.2%). There were no resident negative utterances in two-thirds of the videos (68.2%); one or more (up to 13) resident negative utterances were observed in the remaining videos (31.8%).

Relationships among Staff-Resident Utterances

Staff positive utterances were associated with staff negative utterances and with resident positive and negative utterances. Specifically, the mean number of staff positive utterances/minute was greater in 1) videos that also had staff negative utterances, compared with videos

without staff negative utterances (6.7, SD 2.8, vs. 4.5, SD 3.2, t=−2.41, p=.02), 2) videos with resident positive utterances, compared with videos without resident positive utterances (5.5, SD 3.3, vs. 3.1, SD 2.2, t=−4.60, p=<.001) and 3) videos with resident negative utterances, compared with videos without resident negative utterances (6.8, SD 2.9, vs. 3.7, SD 2.8, t=−5.30, p<.001).

Staff negative utterances were associated with resident negative utterances. Resident negative utterances were observed in 61.5% of videos with staff negative utterances, compared with 27.8% of videos without staff negative utterances (Fisher's exact test, p=.02). Resident positive and negative utterances were associated. Resident negative utterances were observed in 8.6% of videos without resident positive utterances, compared with 42.7% of videos with resident positive utterances (Fisher's exact test, p<.001).

Relationships between Staff-Resident Utterances and Characteristics of Staff, Residents and Videos

Bivariate analysis showed that 1) staff positive utterances were significantly associated with staff race and resident age, dementia stage and eating function; 2) Staff negative utterances were not correlated with any characteristics; 3) Resident positive utterances were correlated with years staff worked in the NH and resident age and dementia stage; and 4) resident negative utterances were associated with resident dementia stage (Table 4).

All participant characteristics except staff education were included in multivariable models. Staff education was excluded because: 1) it was not associated with either staff or resident utterances in the bivariate analysis; and 2) staff years as caregivers and years in current NH which were included in the model were conceptualized as indicators of staff education. Staff positive and negative utterances were not significantly associated with any participant characteristics (Tables 5 & 6). Resident positive utterances were significantly associated with staff caregiving length in the current NH (Table 7). An additional year of working as an assisting staff in the current NH was associated with a 1.43-time increase in odds of resident making positive utterances (OR=1.43, 95% CI = 1.01, 2.03). Resident negative utterances were significantly associated with resident gender and the overall length of staff working as a caregiver (Table 8). An additional year of working as an assisting staff was associated with a decrease in odds of residents making negative utterances (OR=0.84, 95% CI=0.71, 0.99). Compared with male residents, the odds of making negative utterances were almost 12 times greater in female residents (OR=11.89, 95% CI=1.24, 114.29).

Discussion

This study described characteristics of mealtime verbal interactions between NH staff and residents with dementia and examined relationships among dyadic verbal behaviors and with characteristics of staff and residents. In the study, staff verbally engaged residents using primarily positive strategies (99.2%, 4.7 positive utterances/minute) and most positive utterances were showing interest or approval/agreement, providing orientation and giving instructions. These findings affirm staff's critical role during mealtime, in that staff do spend time having friendly conversations with residents while engaging residents and have some skills in providing positive interactions using varied verbal strategies.

The findings are consistent with a recent study that identified 96% of staff verbal and nonverbal behaviors as positive during mealtime care to NH residents with dementia (Gilmore-Bykovskyi et al., 2015). Prior research on other NH care-related (not mealtime) dyadic interactions reported similar findings in that staff behaviors were primarily positive and neutral (vs. distracting and negative). One study reported 83.8% of dyadic interactions were positive with the rest being neutral (10.8%) or negative (5.4%) among staff and cognitively impaired residents (Paudel et al., 2019). Another study reported that 32.1% of staff verbal behaviors were neutral, 18.7% positive, 5.4% distraction, 4.7% negative and 39.1% of the interaction duration showed absence of behaviors or other behaviors impossible to rate in hygienic care routines (Belzil & Vézina, 2015). A recent qualitative study reported three cases of staff negative verbal prompts in three NHs intending to maintain or promote resident eating independence (Palese et al., 2018).

In this study, staff negative behaviors were sparse (0.8%), mostly rejecting or not responding to residents' request or providing directions in a pushy way and were less frequent than previously reported. While staff negative behaviors may be few, the impact on residents should not be ignored. Residents may resist food or care, disengage from eating and show other behavioral symptoms such as agitation, resulting in low intake and risk of aspiration (Gilmore-Bykovskyi et al., 2015; Gilmore-Bykovskyi & Rogus-Pulia, 2018). Future research needs to identify, prevent and decrease negative dyadic interactions during dementia mealtime care.

Interestingly, while residents in this study showed resistiveness to daily care based on staff report, residents' verbal behaviors were primarily positive (85.1%) and communicated interest and approval/agreement, indicating residents were engaged in conversations and were satisfied with staff assistance for most of the meal. Residents' had more negative utterances (N=98) than staff (N=16), mostly refusing to eat in general or refusing to eat certain food, responding to staff unpleasantly and interrupting staff. These behaviors should be interpreted with caution rather than simply treated as challenging or resistive behaviors. These behaviors may be indicators that residents were not satisfied with the type of food or care being provided, or the way food or care being delivered. This information may indicate a need to understand the intent of residents when they refuse or interrupt staff verbally. For example, when residents refuse staff verbally, staff may ask for reasons if possible, ask for preferences and/or offer alternative food choices. Both unsure-positive and unsure-negative behaviors were observed more frequently in residents compared with staff, indicating residents may not be heard clearly in a fair amount of their communication to staff. When residents' utterances were indistinguishable, staff may solicit the resident to repeat and/or observe resident nonverbal behaviors for potential cues.

Staff-Resident Mealtime Verbal Interactions

This study showed staff-resident positive and negative behaviors are interrelated. In a mealtime care scenario that involved one-on-one interaction, when staff made more positive utterances, the resident was more likely to make positive and/or negative utterances. When the staff made a negative utterance, the resident was more likely to make a negative utterance. For both staff and residents, making positive utterances was related to an

increased chance of making negative utterances. These findings are interesting because they provide evidence to support the dynamic, interactive and complex features of staff-resident mealtime verbal interactions, affirming the critical role of both staff and residents in the interactions. While this study is one of the first that describes the inter-relationships among staff and resident verbal behaviors, further research is needed in larger samples of mealtime care scenarios that involve caregivers and people with dementia in varied care settings.

Staff Caregiving Length and Race

In this study, longer staff tenure in the current NH was associated with residents making positive utterances and more experience as nursing staff was associated with residents not making negative utterances during mealtime. These findings are consistent with prior research that experienced nursing staff expressed less frustration during mealtime care of residents with dementia, because they learned mealtime care skills and became familiar with residents through experiences (Liu et al., 2018). Nursing staff tenure may be an indicator of caregiving skills and experiences in delivering dementia (mealtime) care and staff working length in the current NH may be an indicator of their familiarity and closeness of relationship with residents with dementia. While bivariate analysis showed White staff made more positive utterances to residents than African American staff, such difference was not identified in multivariate analyses. Such racial difference may be related to cultural differences. Few studies have previously examined the role of staff characteristics on mealtime interactions. While findings are interesting and provide preliminary data on the role of staff caregiving length and race, more research is needed to examine the role of other staff characteristics using larger and diverse samples.

Resident Gender, Age, Dementia Stage and Eating Function

This study showed that female residents were more likely to make negative utterances than male residents. Such difference was not identified in prior research (Paudel et al., 2019). In this study, resident age and dementia stage were not associated with staff-resident positive and negative utterances. Such findings were consistent with a recent study that showed resident age and cognitive status were not associated with positive and negative/neutral dyadic interactions during care-related activities other than mealtime (Paudel et al., 2019). This study is the first that examined the role of resident eating function on mealtime interaction and found resident eating function was not associated with dyadic positive and negative verbal interaction. However, our prior research showed resident eating function (i.e., the likelihood of initiating and completing intake attempts by residents) was associated with positive and continuous staff engagement (Liu et al., 2017; Liu, Jao, et al., 2019; Liu, Williams, et al., 2019). Future research is needed to examine the role of resident characteristics on dyadic mealtime verbal interactions using larger diverse samples.

Implications for Clinical Practice

This study provided preliminary information to inform directions to improve dementia mealtime care practice. First, the interrelated dynamics of staff-resident verbal interaction indicate that staff verbal behaviors in a positive (negative) way may evoke resident verbal responses in a positive (negative) way and vice versa. Staff need to be attentive to verbal messages delivered to residents as well as residents' responses during mealtime care. In

addition, dyadic verbal interactions were correlated with several staff and resident characteristics (i.e., gender, direct care tenure and experiences in NHs). Certain groups of residents (e.g., female residents) were more likely to speak negatively and staff need to be more attentive when interacting with these residents in daily mealtime care. Also, staff tenure and caregiving experience were associated with resident positive and negative utterances, but not related to the use of staff positive utterances. Staff tenure and caregiving length are important but not the only factors to consider when determining whether a staff needs specific training in awareness and skills related to person-centered mealtime care. Additionally, it seems crucial to retain staff, especially those with longer tenure and caregiving experiences, because experienced staff are more likely to increase positive utterances and reduce negative utterances among residents. Quality dyadic verbal interactions are associated with improved food intake (Wen Liu et al., 2020). Continuing efforts at the institutional and staff levels, such as targeted staff training and staff retention, are needed to improve the quality of interactions.

Implications for Future Research

This study adds to the literature on staff-resident mealtime interactions in terms of the patterns and distributions, inter-relationships among staff-resident verbal behaviors and relationships with individual characteristics. While this study is consistent with prior research in showing that staff verbal behaviors are mostly positive, three considerations for interpreting these findings are offered. First, the CUED includes eight positive verbal behaviors and four negative verbal behaviors generated from daily routine care, rather than mealtime care and may not address all aspects of mealtime-specific dyadic interactions. Compared with positive verbal behaviors, negative verbal behaviors may be more difficult to code. For example, controlling voice depends on the coder's judgement of the speaker's voice and tone and was not used when a more objective code can be applied to the utterance. Future research may need to refine CUED through identifying additional verbal behaviors occurring in mealtime care. Second, while the use of videotaped observations is the gold standard for behavioral research and the study sample was collected following standard procedures (Williams et al., 2016), it is possible that participants were aware of videotaping and may not interact in the same way as they do without videotaping or tend to perform more positively than they usually do. Future research may need to examine characteristics of dyadic verbal interactions using direct on-site observation and compare with findings from videotaped observations. Third, the study findings were derived from a small sample of NH staff and residents with advanced dementia and all residents were White. Future research is needed using larger diverse samples of residents with dementia and caregivers during mealtime in varied care settings (e.g., residential care, home care).

Future Research Directions

This study focused on only verbal behaviors of staff and residents. Our team is collecting data on staff-resident nonverbal behaviors using the video sample and CUED (part III). We will characterize staff-resident nonverbal interactions and their relationships with individual characteristics and then combine staff-resident verbal and nonverbal behaviors to address several research aims: 1) examine relationships between dyadic verbal and nonverbal interactions; and 2) examine the role of dyadic verbal and nonverbal interactions on resident

intake. In addition, we have coded the time point that each action (i.e., the start and end of each intake episode, each verbal/nonverbal behavior) occurred relative to the video duration, informing the sequence of actions in each video. Such in-depth data will allow investigation of temporal relationships between staff and resident behaviors and between dyadic interactions and resident intake using sequential analyses. Data obtained will help identify specific staff positive behaviors that trigger resident positive behaviors, reduce resident negative behaviors and/or precede successful resident intake. Such information will guide the development of effective, person-centered mealtime care interventions through positive dyadic interactions to improve resident behaviors and intake.

Limitations

We used videos that captured part of the meal rather than the whole meal and one-on-one interactions. Limited staff negative utterances were observed in the sample. Staff-resident dyads varied across videos and the (in)consistency of dyads may have potential impact on quality of interactions, warranting further investigation. The analyses were not adjusted for potential effects of clustering of videos within staff, residents, or dyads because the small number of videos for most staff, residents and dyads, compared with the number of variables used in the study, would not allow robust estimation. The study findings may only generalize to NH direct care staff and residents with moderately severe to severe dementia and staff-reported resistiveness to care in the United States, rather than other care settings in the country (e.g., home-care, assisted living, hospitals) or different care settings in other countries.

Conclusion

Staff-resident mealtime verbal interactions are primarily positive, inter-related and related to multiple individual characteristics. Findings inform directions to improve dementia mealtime care practice and develop person-centered mealtime care interventions targeting modifiable factors (e.g., staff caregiving experiences). This study is exploratory in nature as the first to examine associations among verbal interactions as well as between verbal interactions and individual characteristics. Future research is needed to confirm the findings through identification of mealtime-specific verbal behaviors, use of real-time on-site observations and use of larger diverse samples in different care settings.

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study from which videos used in this study were collected. M. Batchelor is the developer of the original version of the CUED coding scheme. K. Williams and M. Batchelor also contributed to technical support for the Noldus Observer XT software, and revision of the manuscript. E. Perkhounkova contributed to data analysis, interpretation of findings, and manuscript draft and revision. M. Hein contributed to data cleaning and management, and manuscript revision. All authors meet the criteria for authorship and have approved the final draft submitted. All those entitled to authorship are listed as authors.

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Table 1.

Codes of Verbal behaviors (Utterances) for Staff and Residents in Part II of CUED

Behavior types	Description
Positive behaviors	
Asking for help/cooperation	Questions that one person asks for the other person's help during a caregiving task; or one person attempts to gain the other's cooperation with a task through negotiation
Assessing for comfort/condition	Questions one asks the other if s/he is comfortable and takes steps to make the other more comfortable
Giving choices	Questions that one asks for the other's opinion, point of view, permission, or perspective relating to a caregiving task
Orientation/giving Instructions	Statements one tells the other about what is going to happen during a task or offers guidance to support the other in carrying out a task
Showing approval/agreement	Statements that one expresses gratitude or appreciation for the other including expression of approval, agreement, praising, rewarding or showing respect or admiration directed to the other
Showing interest	Friendly conversation that one conveys an interest in the other and responses to the other that serve to actively keep a conversation going
Gain attention verbally	Statements that one makes in order to redirect the other's attention to task, or one calls the other's name in an attempt to get the other's attention
Unsure – positive	Utterance that is indistinguishable or unclear and sounds positive or person-centered based on tone and voice and the context of the interaction. These utterances usually cannot be attributed to a definite type.
Negative behaviors	
Interrupting/changing topic	Statements one makes that interrupt the other's v utterance, change the topic, or a response to a prior question or request with an unrelated statement or question
Verbal refusal/disagreement	Statements that one makes indicating resistance or objection to unwanted help, care, or options
Controlling voice	Statements one makes to the other in a controlling or rushed manner
Unsure – negative	Utterance that is indistinguishable or unclear and sounds negative or task-centered based on tone of voice and the context of the interaction. These utterances usually cannot be attributed to a definite type.

Table 2.

Characteristics of Utterances by Staff and Residents (N=2,800 utterances)

	Staff		Resident	
Behavior types	**n**	**%**	**n**	**%**
Positive utterances	**2,126**	**99.2**	**560**	**85.1**
Orientation/giving instructions	663	31.2	16	2.9
Showing interest	450	21.2	203	36.3
Showing approval/agreement	230	10.8	190	33.9
Giving choices	201	9.4	0	0
Asking for help/cooperation	189	8.9	35	6.3
Assessing for comfort/condition	189	8.9	3	0.5
Gaining attention verbally	168	7.9	0	0
Unsure - positive	36	1.7	113	20.2
Negative utterances	**16**	**0.8**	**98**	**14.9**
Verbal refusal	5	31.2	60	61.2
Unsure - negative	3	18.8	27	27.6
Controlling voice	8	50.0	10	10.2
Interrupting/changing topic	0	0	1	1.0
Total	**2142**	**76.5**	**658**	**23.5**

Table 3.

Characteristics of Videos (N=110)

Variable	M (SD)	Range
Staff positive utterances/minute	4.7 (3.2)	0.0 – 13.4
Video duration (minutes)	4.4 (3.9)	1.0 – 23.8
Variable	**N**	**%**
Staff negative utterances		
0	97	88.2
1–2	13	11.8
Resident positive utterances		
0	35	31.8
1 – 8	75	68.2
Resident negative utterances		
0	75	68.2
1 – 13	35	31.8

Table 4.

The Association of Verbal Utterances by Residents and Staff with Staff, Resident, and Video Characteristics (N=110 videos)

	Staff positive utterances/min		Staff negative utterances			Resident positive utterances			Resident negative utterances		
				0	1–2		0	≥1		0	≥1
Characteristics	**r**	**p[h]**	**M(SD)**	**M(SD)**	**p[i]**	**M(SD)**	**M(SD)**	**p[i]**	**M(SD)**	**M(SD)**	**p[i]**
Staff age, years (n=110)	−0.03	.76	32.8(8.5)	30.5(7.8)	.34	30.5(7.2)	33.5(8.9)	.09	32.7(8.7)	32.2(8.1)	.75
Staff years as caregiver (n=110)	−0.10	.28	9.0(6.2)	7.4(5.6)	.39	8.0(6.9)	9.2(5.8)	.32	9.0(6.5)	8.4(5.2)	.65
Staff years in current NH (n=110)	−0.09	.33	5.0(4.4)	3.8(4.5)	.37	3.2(3.1)	5.7(4.7)	**.002**	4.6(4.1)	5.4(5.2)	.38
Resident age, years (n=105)	0.27	**.01**	84.0(7.2)	81.9(10.1)	.36	81.3(5.9)	84.9(8.1)	**.02**	83.5(6.5)	84.3(9.7)	.65
Resident comorbidity (n=93)	0.02	.81	27.3(4.7)	28.8(3.7)	.36	28.8(4.3)	26.8(4.7)	.05	27.2(4.6)	27.9(4.6)	.52
Resident Functional status (MDS-ADL) (n=98)	−0.07	.51	23.5(5.0)	25.6(5.3)	.19	25.1(6.4)	23.1(4.1)	.12	23.7(5.6)	23.8(3.3)	.93
Video duration, min (n=110)	−0.13	.18	4.3(4.0)	5.4(3.1)	.34	3.9(4.6)	4.7(3.6)	.34	4.0(3.8)	5.4(3.9)	.07
	M(SD)	**p[j]**	**n (%)**	**n (%)**	**p[j]**	**n (%)**	**n (%)**	**p[j]**	**n (%)**	**n (%)**	**p[j]**
Staff gender		.98			.75			.11			.06
Male (n=30)	4.7(2.9)		26 (86.7)	4 (13.3)		6 (20.0)	24 (80.0)		16 (53.3)	14 (46.7)	
Female (n=80)	4.7(3.3)		71 (88.8)	9 (11.3)		29 (36.3)	51 (63.8)		59 (73.8)	21 (26.3)	
Staff race		**.01**			.77			1.00			.54
White (n=54)	5.5(3.2)		47 (87.0)	7 (13.0)		17 (31.5)	37 (68.5)		35 (64.8)	19 (35.2)	
Black/African American (n=56)	3.9(3.0)		50 (89.3)	6 (10.7)		18 (32.1)	38 (67.9)		40 (71.4)	16 (28.6)	
Staff education		.68			.73			1.00			.47
High school (n=24)	5.0(3.2)		22(91.7)	2(8.3)		8(33.3)	16(66.7)		18(75.0)	6(25.0)	
College (n=86)	4.6(3.2)		75(87.2)	11(12.8)		27(31.4)	59(68.6)		57(66.3)	29(33.7)	
Resident gender		.19			.76			.68			.22
Male (n=66)	4.4(3.2)		59(89.4)	7(10.6)		20(30.3)	46(69.7)		48(72.7)	18(27.3)	
Female (n=44)	5.2(3.2)		38(86.4)	6(13.6)		15(34.1)	29(65.9)		27(61.4)	17(38.6)	
Resident dementia stage[a]		**<.001**			1.00			**.004**			**.01**
Moderately severe[b] (n=51)	5.8(3.4)		45(88.2)	6(11.8)		10(19.6)	41(80.4)		31(60.8)	20(39.2)	

Characteristics	Staff positive utterances/min		Staff negative utterances			Resident positive utterances			Resident negative utterances		
				0	1–2		0	≥1		0	≥1
	r	p[h]	M(SD)	M(SD)	p[i]	M(SD)	M(SD)	p[i]	M(SD)	M(SD)	p[i]
Severe[c] (n=33)	2.8(2.1)		30(90.9)	3(9.1)		17(51.5)	16(48.5)		29(87.9)	4(12.1)	
Resident eating function[d]		**<.001**[k]			.51[k]			.53[k]			.14[k]
Independent[e] (n=22)	5.9(3.6)		18(81.8)	4(18.2)		6(27.3)	16(72.7)		13(59.1)	9(40.9)	
Partially (in)dependent[f] (n=52)	5.5(3.2)		46(88.5)	6(11.5)		15(28.9)	37(71.2)		33(63.5)	19(36.5)	
Dependent[g] (n=36)	2.9(2.1)		33(91.7)	3(8.3)		14(38.9)	22(61.1)		29(80.6)	7(19.4)	

Note.

[a]Resident dementia stage was determined using the Functional Assessment Staging in Alzheimer's Disease (FAST);

[b]FAST score 6 to <7;

[c]FAST score ≥ 7;

[d]Proportion of food intakes (solid or liquid) initiated by resident;

[e]Independent: proportion of intakes initiated/completed by resident is 75 to 100%;

[f]Partially dependent: proportion of intakes initiated/completed by resident is > 25 to < 75%;

[g]Dependent: proportion of intakes initiated/completed by resident is 0 to 25%;

[h]p-values for Pearson correlation;

[i]p-values for independent sample t-test;

[j]p-values for Fisher's exact test;

[k]p-value for ANOVA. M(SD) = Mean (Standard Deviation).

Table 5.

Associations between Staff Positive Utterances and Characteristics of Staff and Residents

Characteristic	b[h]	95% CI[i]	SE	t	p > |t|[j]
Intercept	2.326	[0.078, 4.575]	1.144	2.03	0.043
Staff age	0.042	[−0.081, 0.164]	0.062	0.67	0.505
Staff years as a caregiver	−0.078	[−0.233, 0.076]	0.079	−1.00	0.320
Staff years in current NH	−0.143	[−0.463, 0.177]	0.163	−0.88	0.379
Resident age	0.086	[−0.050, 0.222]	0.069	1.24	0.216
Resident comorbidity (0–70)	0.039	[−0.208, 0.286]	0.124	0.31	0.754
Resident functional status (MDS-ADL, 0–60)	0.104	[−0.121, 0.328]	0.114	0.91	0.364
Video duration [ln(minutes)]	−0.506	[−1.316, 0.304]	0.413	−1.22	0.221
Staff gender (female vs. male)	0.180	[−2.225, 2.585]	1.221	0.15	0.883
Staff race (White vs. African American)	−0.693	[−2.607, 1.222]	0.972	−0.71	0.477
Resident gender (female vs. male)	1.007	[−1.221, 3.234]	1.128	0.89	0.373
Resident dementia stage[a] (moderately severe[b] vs. severe[c])	2.037	[−2.344, 6.418]	2.197	0.93	0.357
Resident eating function[d]					
Partially (in)dependent[e] vs. dependent[f]	1.439	[−2.058, 4.935]	1.765	0.82	0.417
Independent[g] vs. dependent[f]	1.703	[−1.222, 4.628]	1.481	1.15	0.252

Note:

[a]Resident dementia stage was determined using the Functional Assessment Staging in Alzheimer's Disease (FAST);

[b]FAST score 6 to <7;

[c]FAST score ≥ 7;

[d]Proportion of food intakes (solid or liquid) initiated by resident;

[e]Between 25% and 75% of food intakes initiated by resident;

[f]0 – 25% of food intakes initiated by resident;

[g]75% – 100%% of food intakes initiated by resident;

[h]b = unstandardized regression coefficient estimate;

[i] 95% CI = 95% confidence interval;

[j] p > |t| = p-values for a t-test of significance of an effect or a level of an effect.

Table 6.

Associations between Staff Negative Utterances and Characteristics of Staff and Residents

Characteristic	b[h]	SE	t	p > |t| [i]	Odds ratio	95% CI [j]
Intercept	−3.357	1.550	−2.17	.031	0.035	[0.002, 0.733]
Staff age	−0.067	0.106	−0.63	.529	0.935	[0.760, 1.152]
Staff years worked as a caregiver	−0.156	0.113	−1.38	.168	0.856	[0.686, 1.068]
Staff years worked in current facility	0.052	0.223	0.23	.816	1.053	[0.679, 1.634]
Resident age	−0.062	0.119	−0.52	.604	0.940	[0.743, 1.189]
Resident comorbidity (0–70)	0.067	0.191	0.35	.728	1.069	[0.732, 1.562]
Resident functional status (MDS-ADL, 0–60)	0.199	0.162	1.23	.220	1.220	[0.887, 1.678]
Video duration [ln(minutes)]	1.311	0.605	2.17	**.030**	3.710	[1.133, 12.146]
Staff gender (female vs. male)	−0.243	1.622	−0.15	.881	0.784	[0.032, 19.087]
Staff race (White vs. African American)	−2.177	1.436	−1.52	.130	0.113	[0.007, 1.899]
Resident gender (female vs. male)	0.520	1.346	0.39	.699	1.683	[0.120, 23.603]
Resident dementia stage[a] (moderately severe[b] vs. severe[c])	2.077	2.822	0.74	.463	7.984	[0.030, 2126.532]
Resident eating function[d]						
Partially (in)dependent[e] vs. dependent[f]	0.424	1.995	0.21	.832	1.528	[0.030, 77.421]
Independent[g] vs. dependent[f]	1.520	1.566	0.97	.332	4.572	[0.211, 98.966]

Note:

[a]Resident dementia stage was determined using the Functional Assessment Staging in Alzheimer's Disease (FAST);

[b]FAST score 6 to <7;

[c]FAST score ≥ 7;

[d]Proportion of food intakes (solid or liquid) initiated by resident;

[e]Between 25% and 75% of food intakes initiated by resident;

[f]0 – 25% of food intakes initiated by resident;

[g]75% – 100%% of food intakes initiated by resident;

[h]b = unstandardized regression coefficient estimate;

[i] p > |t| = p-values for a t-test of significance of an effect or a level of an effect;

[j] 95% CI = 95% confidence interval.

Table 7.

Associations between Resident Positive Utterances and Characteristics of Staff and Residents

Characteristic	b[h]	SE	t	p > |t| [i]	Odds ratio	95% CI [j]
Intercept	−0.840	1.360	−0.62	.538	0.432	[0.029, 6.375]
Staff age	0.001	0.071	0.02	.983	1.001	[0.870, 1.153]
Staff years worked as a caregiver	−0.011	0.079	−0.14	.885	0.989	[0.846, 1.155]
Staff years worked in current facility	0.357	0.177	2.02	**.045**	1.430	[1.008, 2.027]
Resident age	0.059	0.083	0.70	.486	1.060	[0.897, 1.253]
Resident comorbidity (0–70)	−0.181	0.165	−1.10	.276	0.834	[0.599, 1.161]
Resident functional status (MDS-ADL, 0–60)	−0.011	0.128	−0.08	.933	0.989	[0.768, 1.274]
Video duration [ln(minutes)]	0.884	0.426	2.07	**.038**	2.419	[1.049, 5.578]
Staff gender (female vs. male)	1.607	1.616	0.99	.323	4.987	[0.200, 124.171]
Staff race (White vs. African American)	0.656	1.212	0.54	.589	1.928	[0.175, 21.278]
Resident gender (female vs. male)	0.337	1.316	0.26	.799	1.400	[0.102, 19.207]
Resident dementia stage[a] (moderately severe[b] vs. severe[c])	0.653	2.770	0.24	.814	1.922	[0.007, 497.937]
Resident eating function[d]						
Partially (in)dependent[e] vs. dependent[f]	−0.611	2.191	−0.28	.781	0.543	[0.007, 43.245]
Independent[g] vs. dependent[f]	1.344	1.957	0.69	.495	3.834	[0.076, 193.698]

Note:

[a]Resident dementia stage was determined using the Functional Assessment Staging in Alzheimer's Disease (FAST);

[b]FAST score 6 to <7;

[c]FAST score ≥ 7;

[d]Proportion of food intakes (solid or liquid) initiated by resident;

[e]Between 25% and 75% of food intakes initiated by resident;

[f]0 – 25% of food intakes initiated by resident;

[g]75% – 100%% of food intakes initiated by resident;

[h]b = unstandardized regression coefficient estimate;

[i] p > |t| = p-values for a t-test of significance of an effect or a level of an effect;

[j] 95% CI = 95% confidence interval.

Table 8.

Associations between Resident Negative Utterances and Characteristics of Staff and Residents

Characteristic	b[h]	SE	t	p > |t| [i]	Odds ratio	95% CI [j]
Intercept	−1.878	1.116	−1.68	.093	0.153	[0.017, 1.375]
Staff age	−0.002	0.065	−0.04	.971	0.998	[0.878, 1.134]
Staff years worked as a caregiver	−0.176	0.084	−2.09	**.037**	0.838	[0.710, 0.989]
Staff years worked in current facility	0.152	0.159	0.96	.339	1.164	[0.852, 1.590]
Resident age	0.009	0.062	0.15	.882	1.009	[0.893, 1.141]
Resident comorbidity (0–70)	0.024	0.125	0.19	.848	1.024	[0.797, 1.317]
Resident functional status (MDS-ADL, 0–60)	0.112	0.101	1.11	.266	1.119	[0.918, 1.365]
Video duration [ln(minutes)]	1.314	0.416	3.16	**.002**	3.720	[1.647, 8.403]
Staff gender (female vs. male)	−1.058	1.138	−0.93	.353	0.347	[0.037, 3.262]
Staff race (White vs. African American)	−1.480	1.056	−1.40	.162	0.228	[0.029, 1.818]
Resident gender (female vs. male)	2.476	1.147	2.16	**.032**	11.892	[1.237, 114.289]
Resident dementia stage[a] (moderately severe[b] vs. severe[c])	1.595	2.052	0.78	.440	4.927	[0.082, 294.349]
Resident eating function[d]						
Partially (in)dependent[e] vs. dependent[f]	0.198	1.659	0.12	.905	1.220	[0.046, 32.419]
Independent[g] vs. dependent[f]	1.299	1.404	0.93	.356	3.666	[0.229, 58.624]

Note:

[a]Resident dementia stage was determined using the Functional Assessment Staging in Alzheimer's Disease (FAST);

[b]FAST score 6 to <7;

[c]FAST score ≥ 7;

[d]Proportion of food intakes (solid or liquid) initiated by resident;

[e]Between 25% and 75% of food intakes initiated by resident;

[f]0 – 25% of food intakes initiated by resident;

[g]75% – 100%% of food intakes initiated by resident;

[h]b = unstandardized regression coefficient estimate;

[i] p > |t| = p-values for a t-test of significance of an effect or a level of an effect;

[j] 95% CI = 95% confidence interval.