Author’s response to reviews

Title: Construct Validity of the Dining Environment Audit Protocol: A Secondary Data Analysis of the Making Most of Mealtimes (M3) Study

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DEAP Tool: The additional description of tool items and response options is helpful, although an Appendix of the tool itself is still recommended, particularly if manuscript word length is an issue. The authors present the DEAP tool as "observation-based" when, in reality, there are several items that rely either largely or solely on staff self-report (e.g., use of restraints, noise level and staff response to resident requests). The authors need to be specific about which items rely solely on staff self-report (and the structured questions posted to staff as part of the assessment) versus those that rely solely on observation, or possibly some items rely on both data sources.

Response: Clarity on DEAP items with respect to what is observational vs. where staff input is required is now provided. As well the two questions asked of staff are now located together in the text.

While the authors reference a prior study for inter-rater reliability, this study showed that reliability was poor for at least two DEAP items: (1) use of restraints, which was noted in this prior study as not observable in an empty dining room and, thus, relied on staff self-report alone; and, clutter. I find the latter interesting because the extent of "clutter" in a dining room could vary greatly during an actual mealtime period when staff, residents, wheelchairs and meal tray carts are added to the physical dining room environment. If these items showed poor reliability
in prior work, it is unclear why these items remained in the current version of the tool, especially when inter-rater reliability was not established for the observers in this study. This brings into question the analytical results, particularly as it relates to the "clutter" item, in the absence of reliability for this item.

Response: The reviewer is correct that clutter will vary from meal to meal, but in DEAP this is focused on the relatively permanent fixtures of the space (e.g. number of chairs/tables in the area and thus congestion) that can affect functionality of the space. The individual items within DEAP (e.g. clutter) are not meant to be used on their own in analyses. As noted in the inter-rater reliability study, the summative scores of homeliness and functionality are to be used in such analyses and these had good reliability. For the current study, to determine construct validity, it was relevant to determine what individual items of DEAP were independent factors in the homeliness and functionality scores, to determine if these were overlapping or distinct constructs of the physical features of a dining room. It is noted in the limitations section of the paper that some items within DEAP have poorer reliability, which could have influenced these regression analyses.

There are some inconsistencies between the Methods and Results sections wherein a measure is mentioned but then data are not presented or vice versa. Examples: The ADL measure is not described in the Methods section but is reported in the Results section in the text only, not in Tables 1 or 5. History of weight loss and BMI are described in the Methods section but then not reported in the Results section in either Tables 1 or 5. Please be sure that all measures are adequately described in the Methods section and then subsequently reported in the Results section, or removed from both sections of the paper.

Response: These inconsistencies have been fixed in text and tables.

Resident and Facility characteristics should be summarized in two separate Tables because the Ns are different. For both, the total number of residents (N=639) and Homes / Dining Rooms should be delineated at the top of the table. Then the N corresponding to each percentage can be added in parentheses within the Table for each measure.

Response: Table 1 has been separated into two tables as recommended.

For Table 1:

(a) All data should be shown for the total sample (N=639). Suggest adding sub-headings to Table 1 and organizing the measures by Demographic Characteristics (gender, age), Medical & Functional Characteristics (diagnoses, medications, dementia status, CPS score, DRS score, ADL score) and Nutritional Characteristics (eating assistance, MNA-SF, history of weight loss, caloric intake and BMI).

Response: Thank you for this suggestion and organizational changes have been made.
(b) It also would be helpful to add the possible score range in the first column immediately after each measure for ease of reference (e.g., Cognitive Performance Score (range 0-6): Mean (SD), Depression Rating Scale (range 0-33): Mean (SD), etc…). Incidentally, the average DRS score seems very low for a LTC sample.

Response: Score ranges are provided in Table 1.

(c) Weight loss, Food Intake, BMI measures need to be added to Table 1.

Response: These have not been added to this table. MNA-SF was used in analyses and includes weight loss and BMI items, thus is the better summative measure to use to describe nutrition. Reference to weight loss and BMI have been removed from the text, where they were described in relation to MNA-SF, to reduce confusion on why these are not presented in tables.

(d) Medians and IQRs may be more appropriate for some measures rather than Means and SDs based on the distributions of the data.

Response: Table 5 does provide IQR for numerical variables.

- Proportion with a Dementia care unit could be moved to the home characteristics table with number of homes in the sample used as the denominator rather than number of residents.

Response: This has been fixed.

- Clarify the meaning of "renovations to unity"

Response: This was a typo and has been fixed.

- Number of residents/staff and ratio in dining room during a meal shown for facilities - This was not described in the Methods section. Is this based on staff self-report or the Mealtime Scan? Methods need to be added for these variables.

Response: Detail in the methods is provided on this data collection.

Table 2. Why are P values < .25 indicated as significant with an asterisk rather than the standard value of P< .05 as denoted in the analyses section? The corresponding text is also misleading as it seems the authors are "counting" anything with a P<.25 as "significant" in the following text: "Almost half (13/33) of the DEAP variables were significantly associated with the homeliness score while 18 of 33 variables were significantly associated with functionality score at the bivariate level." Similarly, it is also stated that, "For example, having a mix of seating arrangements was significantly associated with a higher homeliness score, while having less obstacles and clutter was significantly associated with a higher functionality score.” Table 2 shows that a mix of seating arrangements was not significantly associated with either scale (P values were .12 and .74) and, as mentioned earlier, there are concerns about the reliability of the "clutter" item.
Response: Statistical significance is now denoted as p<0.05 with a separate symbol to indicate those variables included in the regression models as p<0.25, which promoted an inclusive first model. The results text has been fixed to only describe those with p<0.05 association.

Based on the data shown in Table 2, there are only three items that are uniquely and significantly associated with "homelikeness" (e.g., view of garden, dangerous items secured, distance from rooms) and three items uniquely and significantly associated with "functionality" (e.g., lighting intensity, clutter, rounded edges) and 4 additional items that are significantly correlated with both scales, for a total of 7 items per scale. The remainder have P values > .05 and are, thus, not statistically significant. The Results section should present these findings clearly.

Response: Thank you for this recommendation. This has been noted in the results those variables significant at p<0.05. Of note, significant at p<0.25 was used to build the regression models to be as inclusive as possible.

Table 2 would be easier to follow if significant items were listed together for each scale.

Response: The table is currently set up in the order of the DEAP form and by type of variable (categorical vs. numerical) which is considered by the authors to be logical for readers.

Why were weight loss and BMI not examined in Table 5?

Response: MNA-SF includes these variables and provides a summary of nutrition risk.

Discussion:

The authors should comment on whether all items should necessarily be retained in this version of the DEAP tool. It seems that some items either have poor reliability, based on prior work, and/or questionable validity based on the data presented such that a revised version of the tool should be used in future studies.

Response: Thank you for this recommendation and revisions to the tool are now noted in the Discussion.

It should be stated explicitly that a one-time static assessment may not be meaningful in isolation, especially when multiple items rely heavily, if not solely, on staff self-report. A more comprehensive understanding of mealtime practices in a LTC environment would require coupling this assessment with the Mealtime Scan or other structured observations of the mealtime care process to understand how residents and staff interact in the physical dining room space.

Response: Thank you for this recommendation. It is now noted that DEAP is most useful when coupled with the MTS.