Reviewer’s report

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

Version: 1 Date: 29 Nov 2017

Reviewer: Sandra Simmons

Reviewer’s report:

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Overall, the authors were very responsive to the review comments, and the manuscript is much improved with more clarity as to the intent of the DEAP tool and the assessment methods. This large cross-sectional study required a tremendous amount of data collection and the authors are to be commended on this effort. However, there are inconsistencies between the Methods and Results sections and some of the data presentation is a bit misleading as it pertains to significance. These inconsistencies need to be addressed before publication. In fairness to the authors, many of the below comments were not raised in the initial review.

Methods:

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.

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.

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.

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.

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).

(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.

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

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

Home characteristics should be in a separate Table along with the number of facilities (or dining rooms) listed and the N for each percentage.

- 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.

- Clarify the meaning of "renovations to unity"
- 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.

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.

Based on the data shown in Table 2, there are only three items that are uniquely and significantly associated with "homeliness" (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.

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

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

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.

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.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes
Does the work include the necessary controls?  
If not, please specify which controls are required in your comments to the authors.

Unable to assess

Are the conclusions drawn adequately supported by the data shown?  
If not, please explain in your comments to the authors.

No

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?  
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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Please indicate the quality of language in the manuscript:

Acceptable

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