

Subjective vs. Objective Adherence in a Dietary Intervention and the Influence of Baseline Cognitive Function

Introduction

- Accurate assessment of adherence is critical for evaluating the effectiveness of dietary interventions. However, many studies rely heavily on self-reported adherence, which is vulnerable to recall bias and may not align with objective indicators of dietary intake.^{1,3}
- Older adults may be particularly susceptible to inaccuracies in self-reported adherence due to age-related cognitive and memory impairments, which can affect their ability to monitor, recall, and report dietary behaviors accurately.^{2,5}
- While discrepancies between subjective and objective adherence measures are well documented,^{2,4} it remains unclear whether these discrepancies vary as a function of cognitive status, particularly in older adults.
- This study examined the relationship between subjective and objective measures of dietary adherence and to determine whether participant cognitive status moderates this association.

Hypotheses

1. Subjective reported adherence will be significantly positively associated with objective measures of dietary adherence.
2. The strength of the relationship between subjective and objective outcomes will depend on a participant's cognitive status at baseline.

Methods

Participants

- A total of 66 participants aged 57-85 were enrolled and randomly assigned to one of two dietary intervention arms.
- All participants engaged in a 10-week, group nutrition adherence program designed to support dietary and related health behavior change for older adults at increased risk for dementia. Data from the current study was collected at baseline and each week during the intervention phase.

Measures

- **Covariates:** Sex, Age, Education, Race
- **Cognitive status** was assessed at baseline using a telephone modified version of the Montreal Cognitive Assessment (MoCA) (version 8.3)
- **Objective adherence** to ketogenic diet was assessed across 10-week intervention period using daily urine ketone levels. (Values: 1= 0mg/dl, 2= 5mg/dl, 3=15mg/dl, 4= 40mg/dl, 5= 80mg/dl, 6= 160mg/dl)
- **Objective adherence** to Mediterranean diet was assessed across 10-week intervention period using data derived from 3-day food logs. Variable created using intake values from key food groups of Mediterranean diet: Dark green veggies, whole fruits, legumes, nuts, Oleic Acid, Saturated fats, added sugars, fiber, sodium, and total grains (0 points if consumption threshold not met and 1 point for meeting recommended consumption).
- **Subjective adherence** in both groups was assessed weekly across a 10-week intervention period using a self-rating adherence scale (0-10 scale) and averaged for analyses.

Analyses

- Hierarchical linear regression modeling using SPSS

Results

Descriptives of Sample

- The sample consisted of 66 participants, including 49 females and 17 males, with a mean age of 70.32 years (SD = 0.44)

Direct Effects between Subjective and Objective Adherence

- In the Mediterranean group, there was a statistical trend for subjective and objective adherence to be positively correlated ($r = .26, p = .076$); however, this relationship did not hold after accounting for covariates ($\beta = 0.24, p = 0.116$).
- In the ketogenic group, there was a statistical trend for a negative relationship between subjective and objective adherence only after accounting for covariates ($\beta = -0.37, p = 0.074$).

Interaction Effects of Cognitive Function on Subjective and Objective Adherence

- In the Mediterranean group, there was no significant interaction between diet adherence and MoCA scores ($\beta = -0.027$ and $p = 0.63$) when accounting for covariates. The overall model showed a positive trend but was not statistically significant ($r = 0.383, p = 0.492$) (Figure 1).
- In the ketogenic group, there was a significant moderation effect between subjective adherence and MoCA scores ($\beta = 1.30$ and $p = 0.023$), and the overall model showed a statistical trend for a positive relationship. (Figure 2).

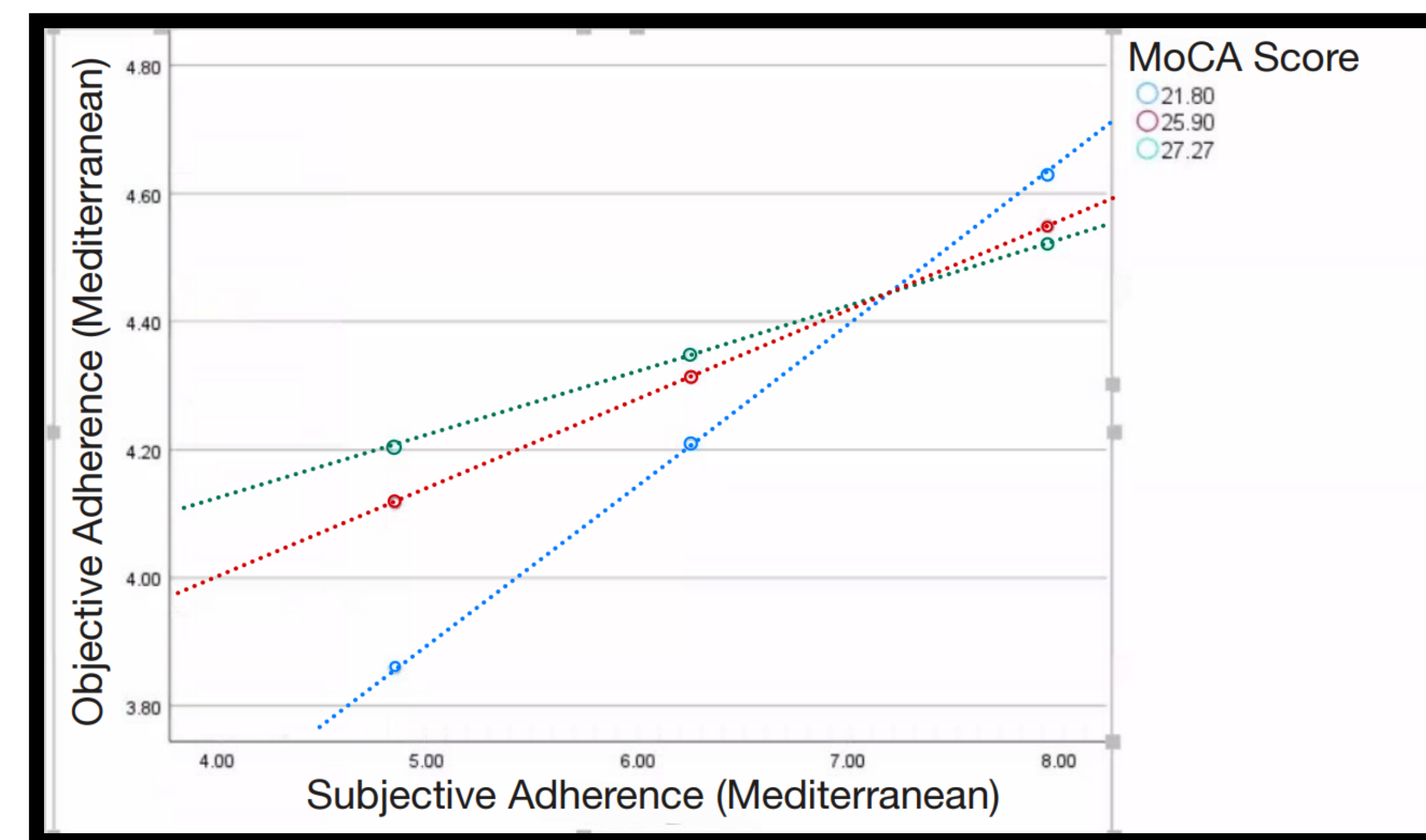


Figure 1: Interaction effect of MoCA Scores on relationship between subjective adherence and objective adherence to Mediterranean Diet

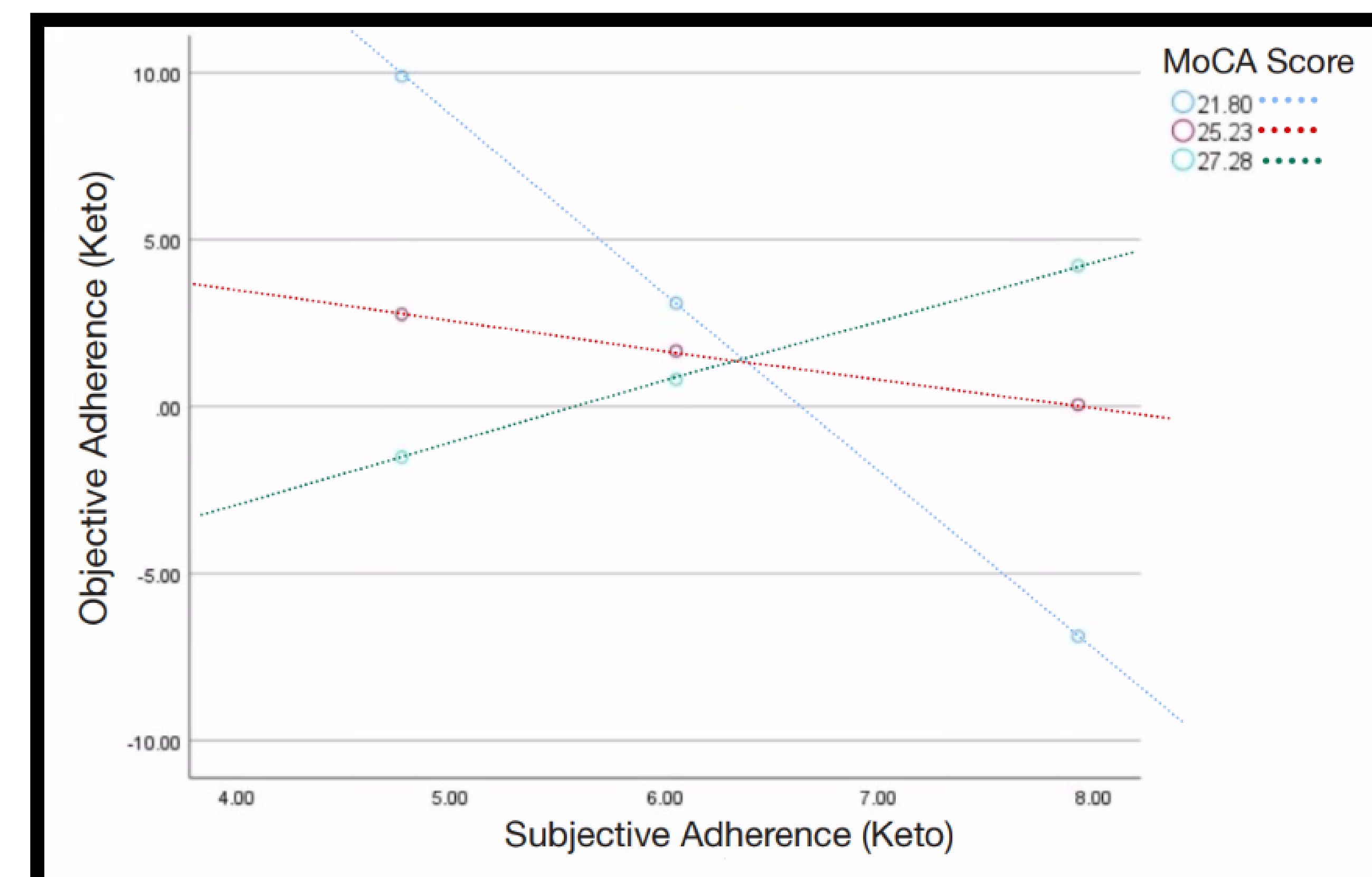


Figure 2: Interaction effect of MoCA Scores on relationship between subjective adherence and objective adherence to Modified Mediterranean Ketogenic Diet

Conclusions

- Contrary to our hypothesis, only statistical trends between objective and subjective adherence were identified, and furthermore the association between subjective and objective adherence in our ketogenic group was negative, though not significant.
- For individuals in a modified Mediterranean ketogenic diet intervention, lower baseline cognitive status was associated with greater discrepancies between self-reported and biologically measured diet adherence, suggesting impaired memory significantly reduces the accuracy of self-reported adherence and raise concerns about its reliability.
- Although this study focuses on a dietary intervention, prior studies examining other interventions have reported increasing discrepancies between self-reported and objective or informant-reported adherence as cognitive impairment worsens, with discrepancies sometimes emerging only after cognitive function falls below a certain threshold.^{5,6}
- For individuals in the Mediterranean diet intervention, cognitive status did not moderate the relationship between self-reported adherence and more objective measures of dietary adherence.
- Differences between the two intervention groups may be partially explained by variation in the objectivity of adherence measures. The ketogenic group used biologically measured urinary ketone values, providing a direct physiological indicator of adherence. In contrast, adherence to the Mediterranean diet was assessed using participant-reported food logs. Because these logs rely on self-report and were recorded without a standardized reporting time, potential inaccuracies in reporting may have introduced measurement error and influenced the observed results.

Future Directions

- Future studies should further examine the reliability of self-reported dietary intake in intervention trials and incorporate more objective measures, like biological markers, to minimize reporting bias and improve data accuracy. Larger studies are needed to determine whether similar patterns occur across other dietary interventions.

References

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