

Does Local Temperature Impact Cognitive Screening Results in Sheltered Unhoused Older Adults?

ASU Edson College of
Nursing and Health Innovation
Arizona State University

Alisa Squires, PhD(c), MSN^a, Richard Southee, PhD^b, and Heather M. Ross, PhD, DNP^a

Edson College of Nursing and Health Innovation^a, Arizona State University, and Central Arizona Shelter Services^b, Phoenix, AZ

Abstract

Background: The State of Arizona in the Southwestern United States commonly experiences overnight freezing temperatures in the winter months (32F/0C) and extremely high daytime temperatures in the summer months (110F/43C). For unhoused older adults, prolonged exposure to these temperatures may create new or exacerbate existing cognitive impairments. Utilizing the Montreal Cognitive Assessment (MoCA), up to 90% of unhoused older adults aged 55 and over screen positive for dementia or mild cognitive impairment (MCI). However, little is known about the seasonality of MCI and dementia presentation in unhoused older adults.

Methods: We evaluated MoCA scores for N=439 unhoused older adults seeking emergency homeless shelter services in Phoenix, Arizona. Data were analyzed using one-way analysis of variance (ANOVA) to assess differences in MoCA scores with average daily high and low temperatures. To determine whether there was a significant association between MoCA scores and average daytime high and nighttime low temperature from the month of screening completion, Pearson's correlation coefficient (r) was utilized.

Results: Using National Weather Service data, we reported average monthly high and low temperatures for January through November 2025, correlating to the dates of MoCA assessment. One-way ANOVA to assess MoCA score and average temperature was not significant for daily high ($p=.139$) or nighttime low temperatures ($p=.062$) in the month of the MoCA screening. MoCA score was also not significantly correlated to temperature using Pearson's correlation coefficient for average daytime high temperature ($r=-.024$) or average nighttime low temperature ($r=-.025$).

Conclusion: There is no statistically significant correlation between average daily high or low temperatures and MoCA score captured as a component of intake screening for older adults in an emergency homeless shelter, suggesting that MoCA scores are not subject to seasonality for older adults in an emergency homeless shelter. Additional research is needed to confirm these findings in unsheltered older adults, as seasonality of cognitive performance may have implications for care and response strategies for healthcare, social service, and public safety professionals serving older adults experiencing homelessness.

Introduction

Phoenix, Arizona is well known for dangerous summer heat and dehydration. Rising temperatures and severe weather conditions impair attention, memory, and decision-making, which are precisely the cognitive functions needed to exit homelessness (Buguet et al., 2023). Unhoused older adults are known to have high rates of dementia and mild cognitive impairment (MCI) compared to housed counterparts (United States Interagency Council on Homelessness, 2025). Harsh weather is of particular concern for unhoused older adults, whether in sheltered or unsheltered environments. We examined whether temperature was associated with cognition screening results in older adults in a large homeless shelter.

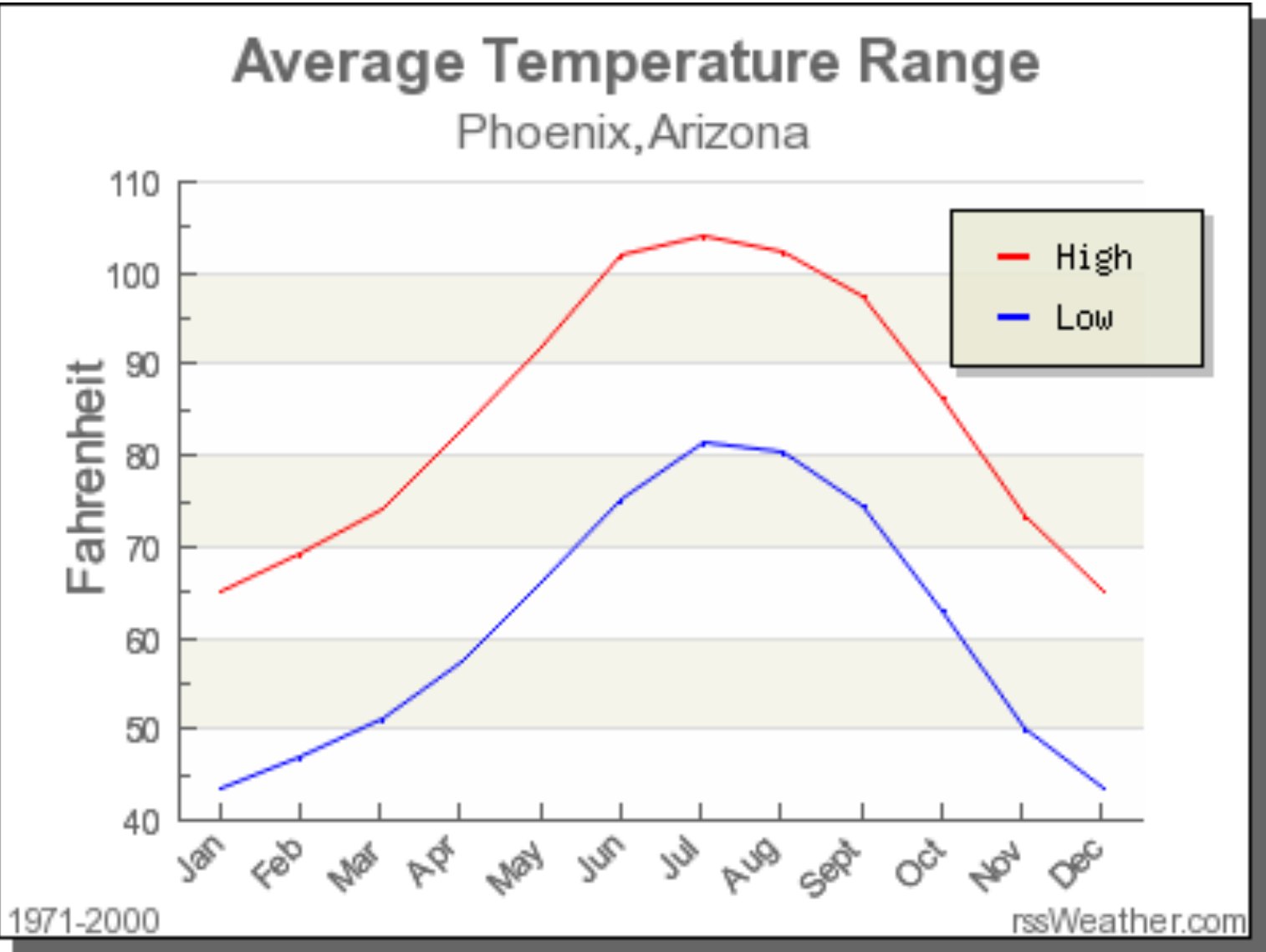
Methods

From January to November 2025, we assessed MoCA scores from adult clients aged 55 and over in a large urban congregate emergency homeless shelter (N=439) in Phoenix, Arizona undergoing the screening as part of the shelter's standardized new client intake process.

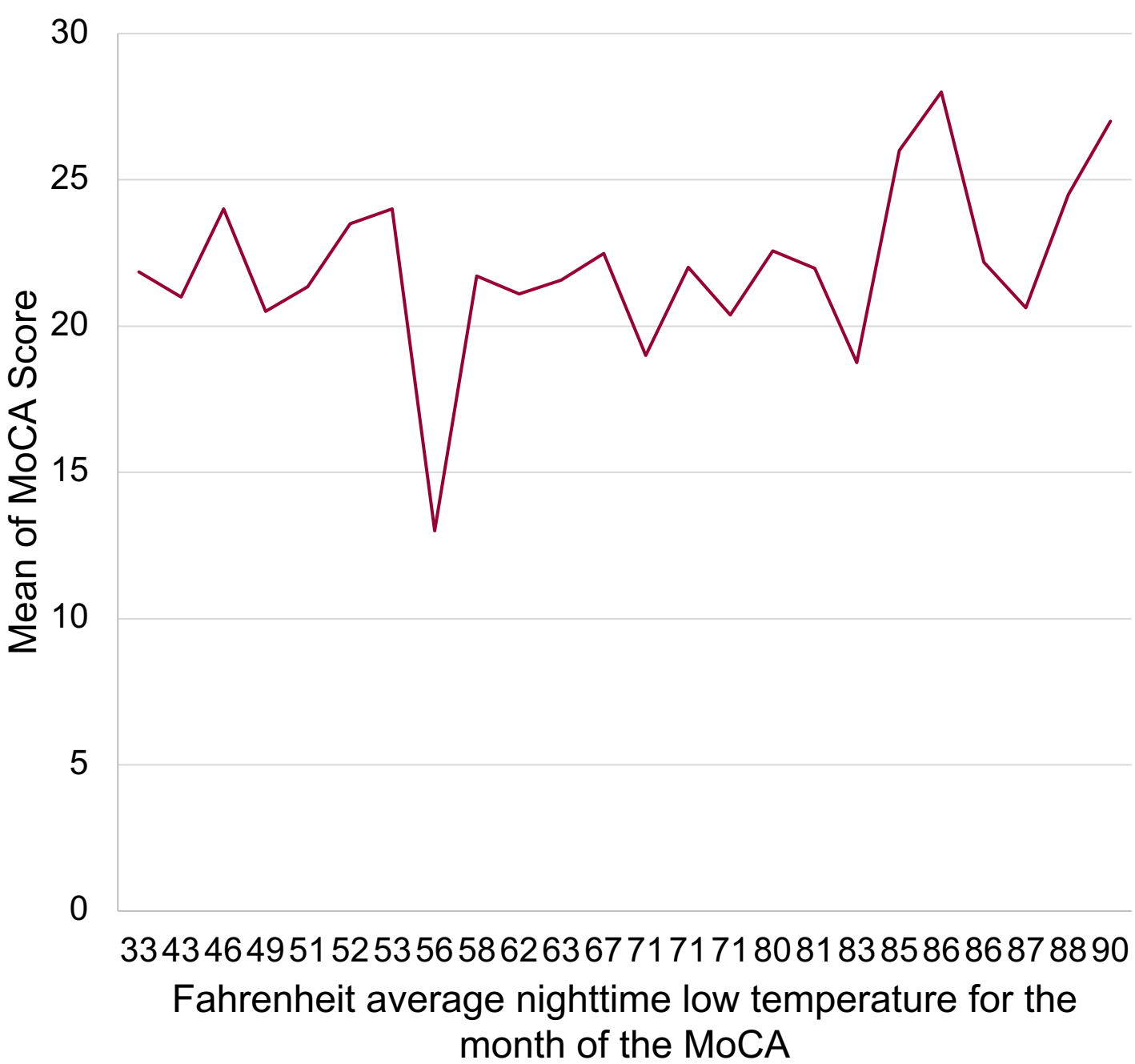
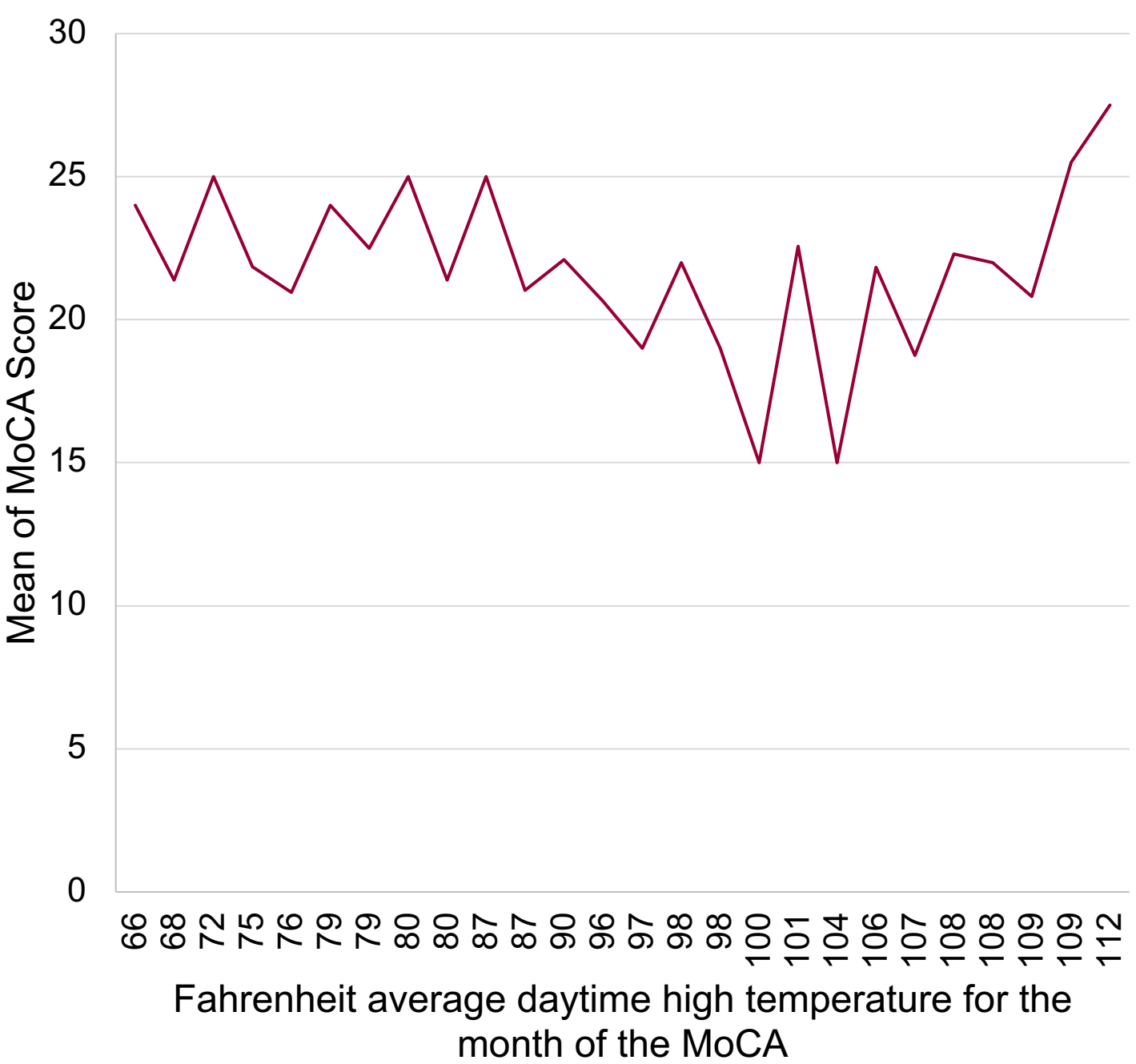
Leveraging National Weather Service data from 2025, we captured average daytime high and nighttime low temperatures corresponding to the months of these clients' MoCA screening completion.

Using one-way ANOVA tests, we evaluated whether MoCA scores differed by seasonality according to average monthly high and nighttime low temperatures.

To determine whether there was a correlation between MoCA scores and temperature, we utilized Pearson's correlation coefficient (r) tests.



Results



One-way ANOVA illustrated no significant difference in older adult clients' MoCA scores according to average daytime high ($p=.139$) or nighttime low temperature ($p=.062$) from the month of screening completion. Pearson's correlation coefficient demonstrated no significant correlation between MoCA scores and average daytime high ($r=-.024$, $p=.620$) or average nighttime low temperature ($r=-.025$, $p=.616$).

Conclusion

Older adults experiencing homelessness are disproportionately affected by dementia and MCI, and unhoused individuals experience more direct environmental exposures due to the nature of homelessness. With rising temperatures in desert environments, the cognitive impacts of extreme weather exposure have been demonstrated to influence brain function. Therefore, we sought to understand the seasonality of dementia and MCI presentation in older adults experiencing homelessness seeking emergency shelter services in Phoenix, Arizona.

There is no statistically significant difference or correlation of MoCA scores by date with the average local daily high and low temperatures in the month of the screening according to one-way ANOVA and Pearson's correlation tests. This implies that unhoused older adults' performance on dementia and MCI screening is not dependent on seasonal time of year of the screening's completion.

Additional research is needed to validate these findings in unhoused older adults seeking shelter services in rural and urban non-desert and colder climates as well as in unsheltered older adults who may be especially prone to cognitive impacts of dehydration and extreme weather exposure. This research is important to consider for older adults navigating homelessness and the medical, social service, public health, and public safety personnel working to meet the healthcare, housing, safety, and social support needs of some of society's most vulnerable members.

References

Buguet, A., Radomski, M. W., Reis, J., & Spencer, P. S. (2023). Heatwaves and human sleep: Stress response versus adaptation. *Journal of the Neurological Sciences*, 454, 1-9. <https://doi.org/10.1016/j.jns.2023.120862>

United States Interagency Council on Homelessness. (2025). *Homelessness prevention series: Spotlight on older adults*. <https://www.usich.gov/guidance-reports-data/federal-guidance-resources/homelessness-prevention-series-spotlight-older>

Acknowledgements

We would like to thank the leadership and staff at Central Arizona Shelter Services, Arizona's oldest and largest emergency shelter for people experiencing homelessness, for their partnership and support.

For more information

Please contact Alisa Squires at asquire2@asu.edu