

# Neurocognitive Assessment of Los Angeles Firefighters after the 2025 Wildfires

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**Background.** First responders have a higher risk of developing dementia before the age of 65. The Los Angeles fires of January 2025 was one of the largest fires in U.S. history, requiring deployment of over 4,700 firefighters. We aimed to assess the baseline cognitive function of active-duty Los Angeles Fire Department (LAFD) firefighters.

**Methods.** We enrolled active-duty LAFD firefighters to undergo cognitive testing with the Montreal Cognitive Assessments (MoCA), with total scores categorized as normal ( $\geq 26$ ), mildly abnormal (23-25), and moderately abnormal ( $< 23$ ). We analyzed data overall and by age.

**Table 1. Characteristics of Active-Duty Firefighter Cohort.**

| Characteristics                     | Overall     |
|-------------------------------------|-------------|
| Sample Size (n)                     | 235         |
| Age, Mean (SD)                      | 42.9 (10.2) |
| Age, n (%)                          |             |
| <40 years                           | 96 (41)     |
| 40-50 years                         | 78 (33)     |
| >50 years                           | 61 (26)     |
| Male Sex, n (%)                     | 225 (96)    |
| Race, n (%)                         |             |
| White                               | 175 (74)    |
| Black or African American           | 26 (11)     |
| Asian                               | 18 (8)      |
| Native Hawaiian or Pacific Islander | 6 (3)       |
| Middle Eastern or North African     | 2 (1)       |
| Prefer Not to Say                   | 8 (3)       |
| Hispanic Ethnicity, n (%)           | 38 (16)     |
| MoCA Scores, Mean (SD)              |             |
| Overall                             | 26.3 (2.4)  |
| <40 years                           | 26.5 (2.2)  |
| 40-50 years                         | 26.4 (2.1)  |
| >50 years                           | 25.8 (2.8)  |
| MoCA Subdomain Scores, Mean (SD)    |             |
| Visuospatial/Executive              | 4.3 (0.8)   |
| Naming                              | 3.0 (0.1)   |
| Attention                           | 5.7 (0.7)   |
| Language                            | 2.2 (0.8)   |
| Abstraction                         | 1.9 (0.4)   |
| Memory                              | 3.3 (0.4)   |
| Orientation                         | 5.9 (0.4)   |
| Fire Site Exposure, n (%)           |             |
| Direct Fire Exposure                | 153 (65)    |
| No Direct Fire Exposure             | 82 (35)     |
| Fire Site Exposure Frequency, n (%) |             |
| One Time                            | 7 (3)       |
| Occasionally                        | 87 (37)     |
| Weekly                              | 22 (9)      |
| Daily or Almost Daily               | 30 (13)     |
| Not Specified                       | 7 (3)       |
| No Direct Fire Exposure             | 82 (35)     |

**Figure 1. Firefighter MoCAs Categorized by Age and Score Classification.** Distribution of MoCA scores, stratified by age and sex. Scores are defined as mildly abnormal if 23-25, and moderately abnormal if  $< 23$ .

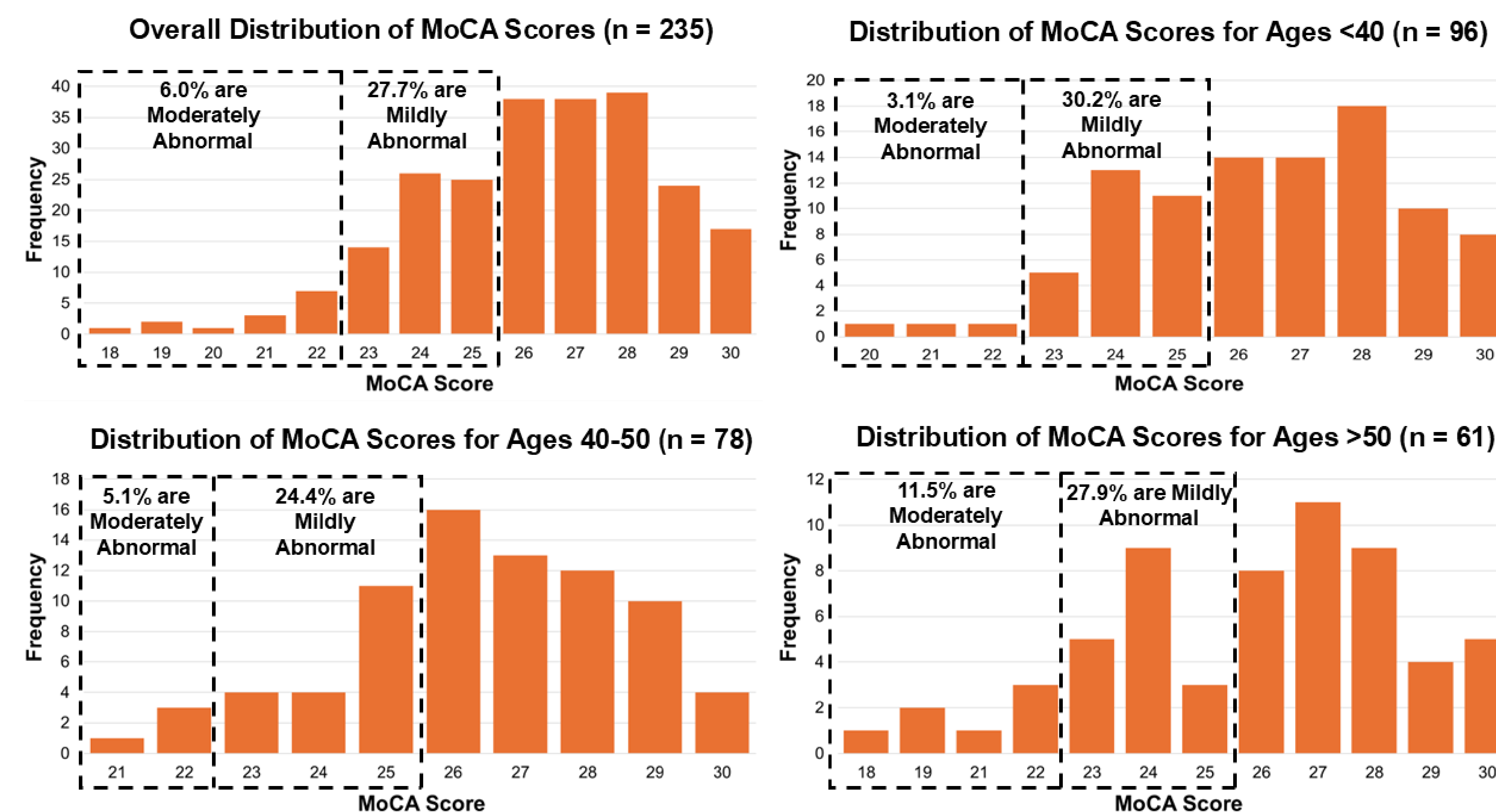
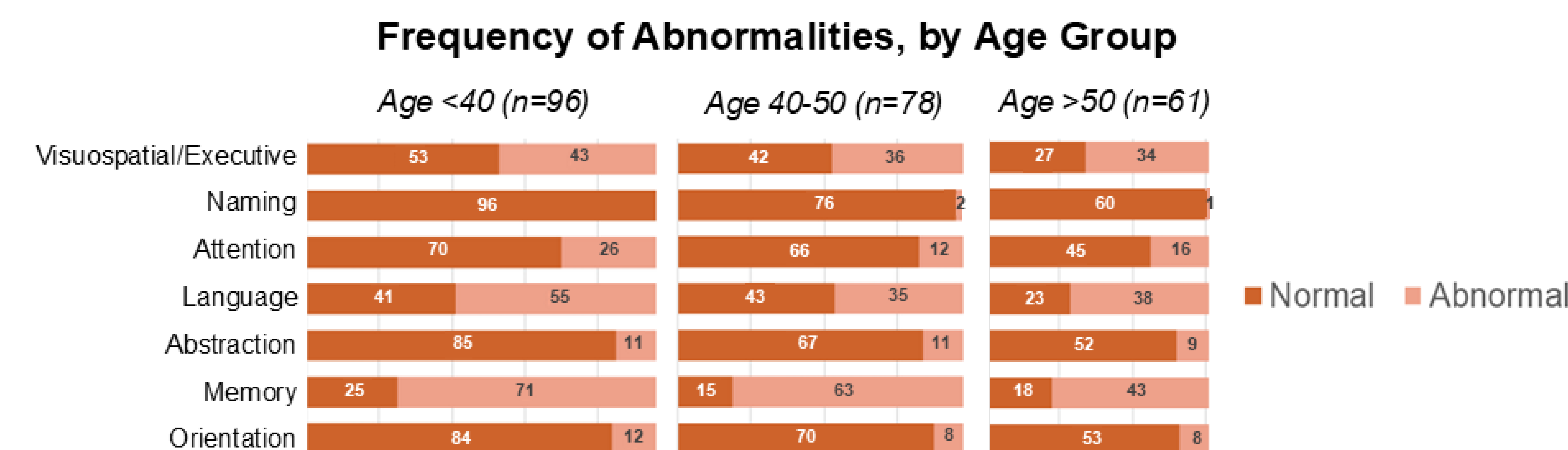


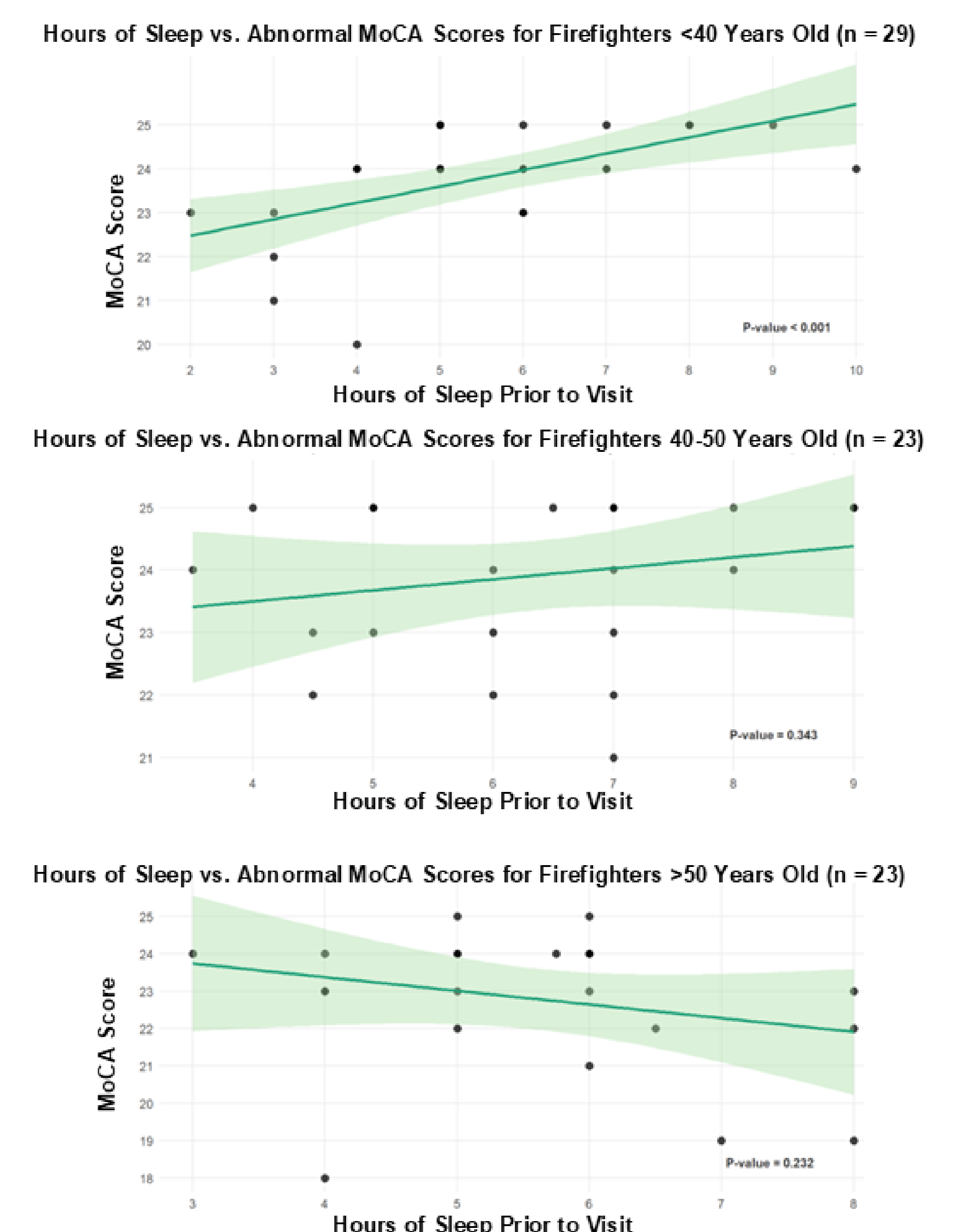
**Figure 2. Frequency of MoCA Subdomain Abnormalities by Age Group.** Graphical representation of the distribution of normal and abnormal scores for the various MoCA subdomains stratified by age group.



## Results

- Of the 235 firefighters (Table 1), 79 (33%) had mildly impaired cognitive performance (MoCA 18-25), with 65 (28%) of firefighters having mildly abnormal and 14 (6%) having at least moderately abnormal MoCA scores. Of the 61 firefighters aged  $> 50$ , 11.5% had moderately abnormal MoCA scores (Figure 1).
- A substantial proportion of abnormal scores were attributable to the delayed recall (75.3%) and sentence repetition (43.4%) subdomains (Figure 2).
- Linear regression analyses revealed a significant association of MoCA scores with self-reported pre-encounter hours of sleep ( $P < 0.001$ ) among participants age  $< 40$  years but not in participants aged 40 years or older (Figure 3).

**Figure 3. Correlation of Participants' Sleep Prior to Visits and MoCA Scores Stratified by Age.** Graphical representation of the correlation between the amount of sleep participants had prior to their visits and MoCA scores for all participants whose scores were abnormal ( $< 26$ ). P values were calculated using linear regression.



## Conclusion

A standardized neurocognitive assessment revealed a relatively high prevalence of abnormal scores in active-duty Los Angeles firefighters, especially in those age 50 or older. The extent to which cognitive testing results reflect transient situational as opposed to early neurodegenerative changes requires further investigation.