

Effects of Magnesium L-Threonate on Sleep, Recovery, and Neurocognitive Performance in Collegiate Athletes

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Purpose:

This randomized, double-blind, placebo-controlled trial investigates the effect of magnesium L-threonate (MgT) supplementation on sleep quality, recovery, and neurocognitive performance in NCAA Division I athletes, using wearable technology (WHOOP) and validated perceptual recovery outcomes.

Why Magnesium L-Threonate?

- Essential mineral for:
 - sleep regulation
 - muscle recovery
 - neuromuscular signaling
- MgT helps modulate neurotransmitters that influence deep sleep and parasympathetic tone

Methods:

Participants: 107 NCAA Division I athletes

Design: Randomized, double-blind, placebo-controlled trial over a 4-week period

Intervention: Randomized to 1 g of Magnesium L-Threonate nightly or placebo pill

Measurements:

Objective Metrics (via WHOOP):

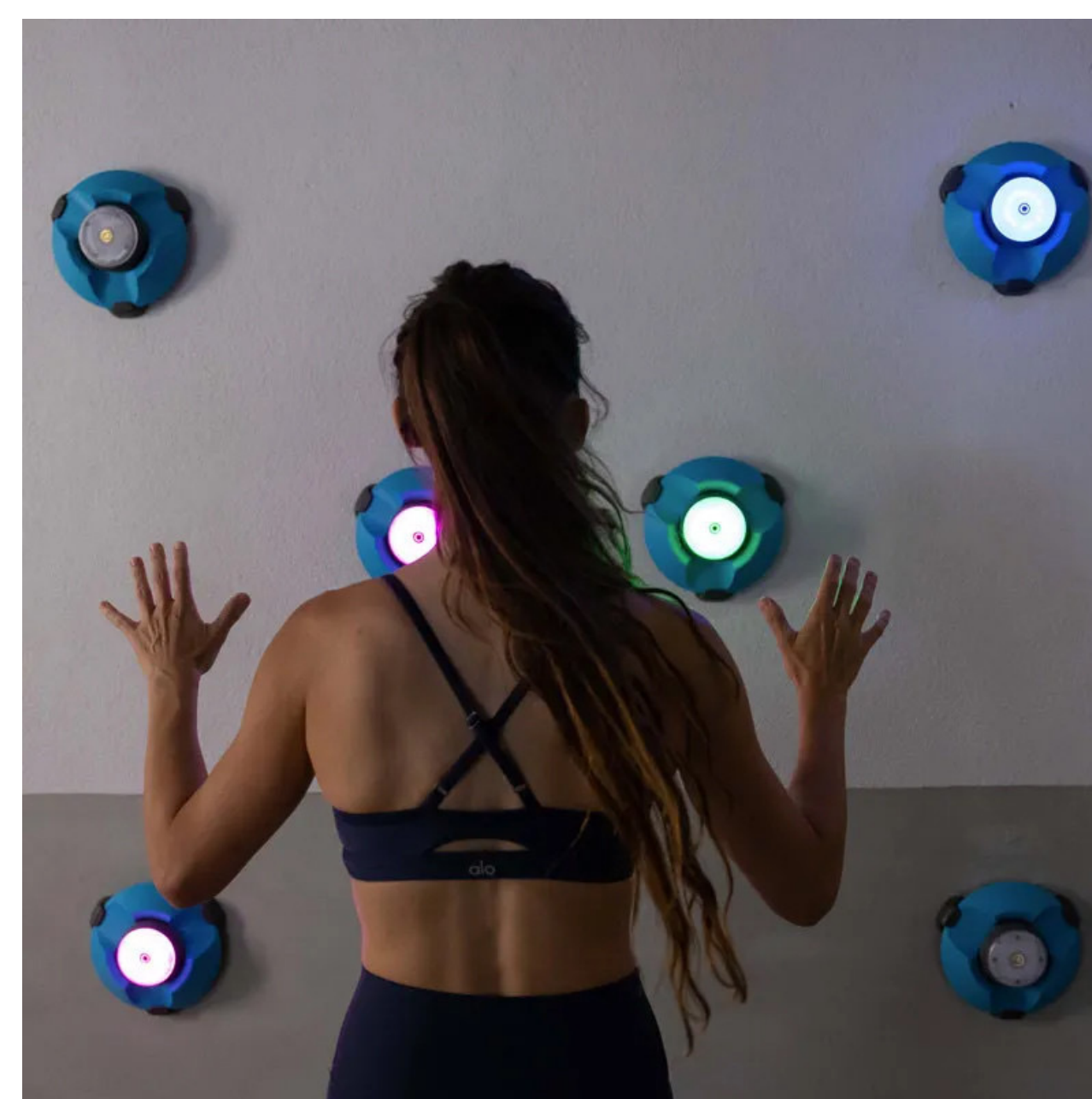
- Heart Rate Variability (HRV)
- Resting Heart Rate (RHR)
- Sleep duration & stages

Subjective Metrics:

- DOMS Likert Scale (0–6)
- Modified Borg Recovery Scale (6–20)
- Sleep Quality (0–10)
- Menstrual cycle questionnaire

Performance:

- Counter movement jump (height & concentric power)
- BlazePod Reaction Time tests
- Grip Strength



Study Cohort Demographics

Magnesium Threonate RCT · UCLA Varsity Athletes · N = 107

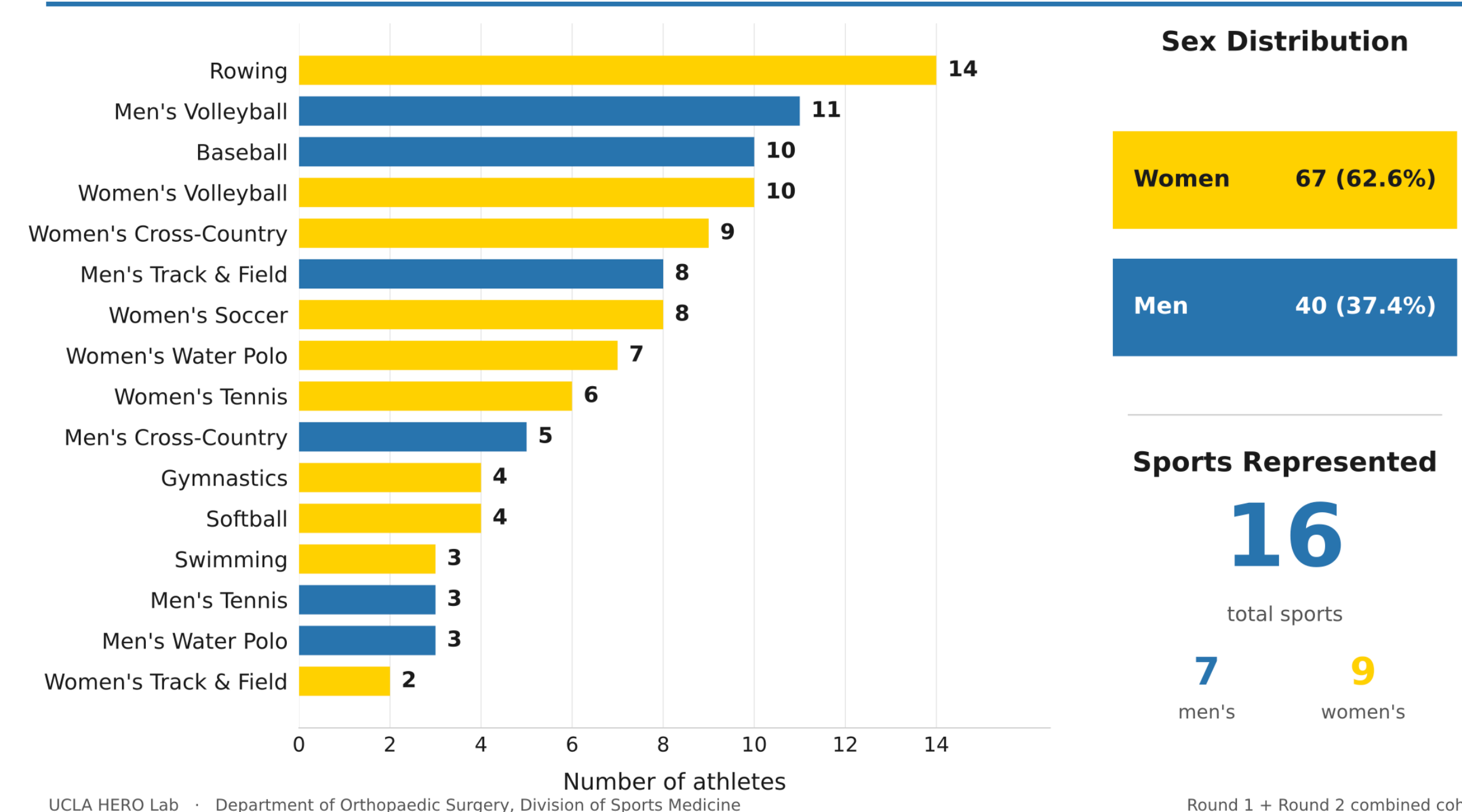
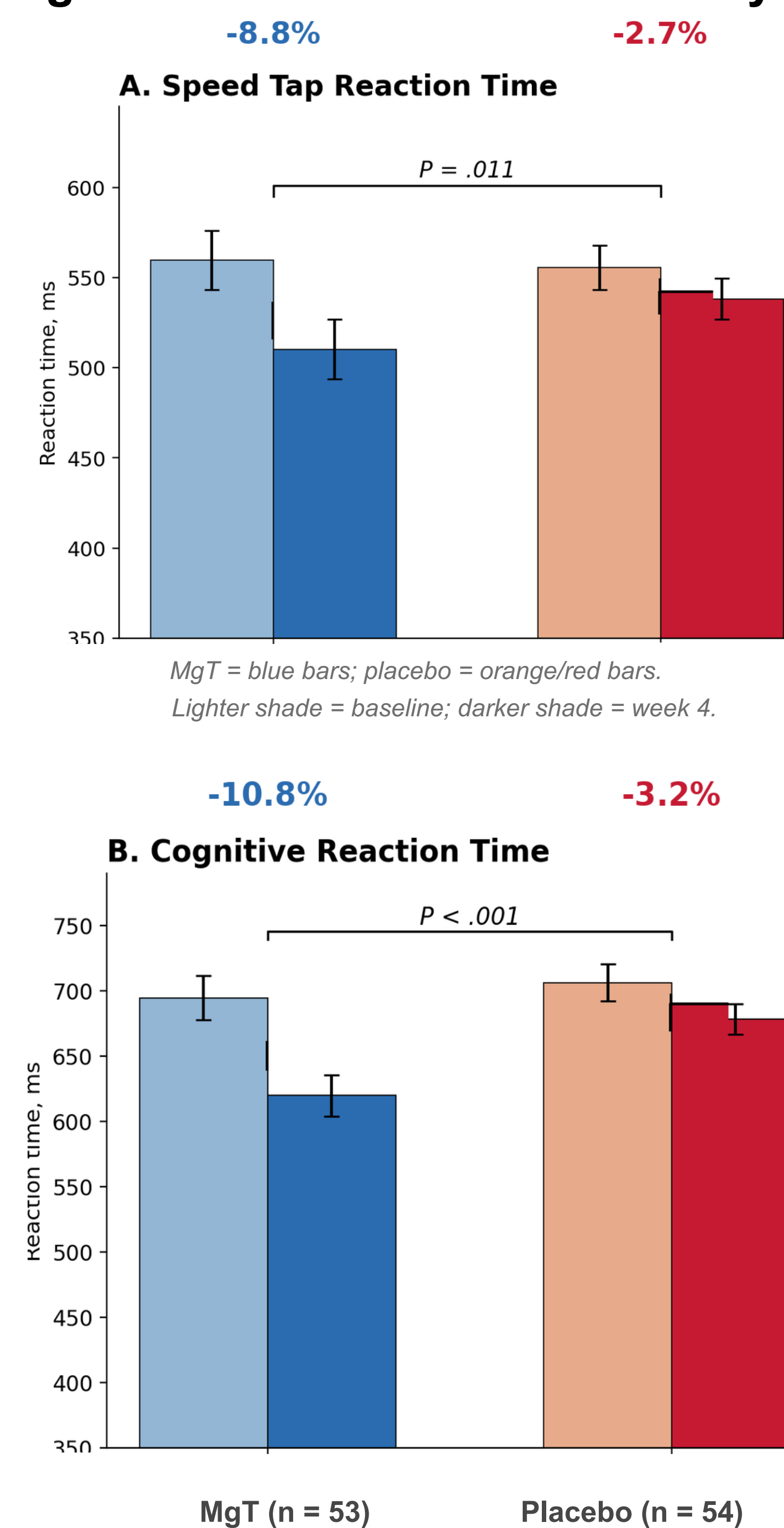


Figure 1. Reaction-time effects by group



Results:

- Primary Finding:** Faster cognitive reaction time (-52.3 ms; $P = .001$) in MgT cohort
- Sleep:**
 - Total sleep time (TST) increased at week 2 (+54.6 min; $P = .002$) and week 4 (+45.5 min; $P = .006$),
 - Higher sleep score at week 2 (+6.27 points; $P = .010$).
- Endurance subgroup:**
 - Sleep quality improved by week 3 (+0.83 points; $P = .030$)
 - DOMS decreased by week 4 (-1.15 points; $P = .041$).
- High adherence cohort ($\geq 90\%$):** Greater soreness reduction (-1.44 points; $P = .029$).
- Grip Strength:** No pooled between-group benefit; the largest magnesium-placebo difference was <1.1 lb.

Significance:

- Among the first randomized placebo-controlled Magnesium L-Threonate trials in NCAA athletes
- Integrates wearable sleep, neuromotor, and strength metrics
- Provides practical data to guide evidence-based supplement use in competitive sport

Conclusions:

- 28 days of Magnesium L-Threonate was associated with better sleep quantity and sleep quality.
- Neurocognitive performance improved, with the clearest pooled signal in cognitive reaction time.
- Benefits appeared within 2–3 weeks and were supported by both wearable and subjective measures.

Limitations:

- Short duration (4 weeks)
- Strict adherence throughout the study
- WHOOP provides estimates, not direct measurements

Acknowledgements:

- WHOOP for wearable tech and statistical support
- UCLA Sports Medicine Division
- Participating NCAA Division I athletes

