variability findings during this in-scanner task to out-of-scanner measures of verbal fluency.

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56 Chronic Musculoskeletal Pain, Biobehavioral and Psychosocial Resilience Index, and Brain Age Gap

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Objective: Chronic musculoskeletal pain is associated with neurobiological, physiological, and cellular measures. Importantly, we have previously demonstrated that a biobehavioral and psychosocial resilience index appears to have a protective relationship on the same biomarkers. Less is known regarding the relationships between chronic musculoskeletal pain, protective factors, and brain aging. This study investigates the relationships between clinical pain, a resilience index, and brain age. We hypothesized that higher reported chronic pain would correlate with older appearing brains, and the resilience index will attenuate the strength of the relationship between chronic pain and brain age.
Participants and Methods: Participants were drawn from an ongoing observational multisite study and included adults with chronic pain who also reported knee pain (N = 135; age = 58.3 ± 8.1; 64% female; 49% non-Hispanic Black, 51% non-Hispanic White; education Mdn = some college; income level Mdn = \$30,000 - \$40,000; MoCA M = 24.27 ± 3.49).
Measures included the Graded Chronic Pain Scale (GCPS), characteristic pain intensity (CPI) and disability, total pain body sites; and a cognitive screening (MoCA). The resilience index consisted of validated biobehavioral (e.g., smoking, waist/hip ratio, and active coping) and psychosocial measures (e.g., optimism, positive affect, negative affect, perceived stress, and social support). T1-weighted MRI data were obtained. Surface area metrics were calculated in FreeSurfer using the Human Connectome Project's multi-modal cortical parcellation scheme. We calculated brain age in R using previously validated and trained machine learning models. Chronological age was subtracted from predicted brain age to generate a brain age gap (BAG). With higher scores of BAG indicating predicated age is older than chronological age.
Three parallel hierarchical regression models (each containing one of three pain measures) with three blocks were performed to assess the relationships between chronic pain and the resilience index in relation to BAG, adjusting for covariates. For each model, Block 1 entered the covariates, Block 2 entered a pain score, and Block 3 entered the resilience index.
Results: GCPS CPI (R^2 change = .033, p = .027) and GCPS disability (R^2 change = 0.038, p = 0.017) significantly predicted BAG beyond the effects of the covariates, but total pain sites (p = 0.865) did not. The resilience index was negatively correlated and a significant predictor of BAG in all three models ($p < .05$). With the resilience index added in Block 3, both GCPS CPI (p = .067) and GCPS disability (p = .066) measures were no longer significant in their respective models. Additionally, higher education/income (p = 0.016) and study site (p = 0.031) were also significant predictors of BAG.
Conclusions: In this sample, higher reported chronic pain correlated with older appearing brains, and higher resilience attenuated this relationship. The biobehavioral and psychosocial resilience index was associated with younger appearing brains. While our data is cross-sectional, findings are encouraging that interventions targeting both chronic pain and biobehavioral and psychosocial factors (e.g., coping strategies, positive and negative affect, smoking, and social support) might buffer brain aging. Future directions include assessing if chronic pain and resilience factors can predict brain aging over time.

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