

developing measures of functional performance with increased ecological validity. While “home labs” are becoming more accessible at institutions around the world, the research design process in these spaces contains hidden challenges that can be a barrier to entry for the uninitiated. We identify and reflect on these challenges through the lens of a recent protocol built to assess upper-body performance among older adults during activities of daily living. The U-M HomeLab served as a proving ground for four example tasks: opening a water bottle, sorting pills, tying an apron, and hanging laundry. The evolution of each task is traced through ideation, testing, and refinement, culminating in a pilot among nine community-dwelling volunteers aged 61 to 72 with upper-body pain. Based on this experience, we recommend that designers of naturalistic tasks in homelike environments give special consideration to (1) feasibility, (2) scorability, and (3) safety while carefully balancing standardization against verisimilitude. In turn, each of these elements must be grounded not only in the context of the facility itself but also in the population using that facility. Among older adults with upper body pain, considerations included remaining cognizant of fall risk, anticipating and capturing compensatory behaviors, tailoring task difficulty for a wide range of physical ability, and accounting for the impact of historically gendered divisions of labor on task performance.

#### DIETARY INTAKE AND NUTRITIONAL RISK AMONG OLDER AMERICANS

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A suboptimal diet and nutritional deficiency are among the leading causes of chronic diseases (e.g., cardiovascular diseases, metabolic syndrome, cancer, and osteoporosis), morbidity, and mortality. The objective of this study is to assess dietary intake and nutritional risk among older Americans. The dietary intake of 15 food and nutrients that are closely associated with the risk of poor health was assessed based on the dietary guidelines and nutritional goals for older Americans using a nationally representative sample of older adults (N=7,737) in the Health and Retirement Study Health Care and Nutrition Survey. The average consumption of most food and nutrients was out of the optimal range. For example, older men and women consumed 1.32-1.35 cups of dairy products and 1.23-1.29 ounces of whole grains, which is less than half of the suggested amount. The average consumption of sodium, on the other hand, was over 12 times greater than suggested dietary recommendation for older men and about 10 times greater for older women. The nutritional risk index (range: 0–15) was created by summing the number of dietary risk factors (not meeting the dietary guidelines and nutritional goals), the index scores for older men and older women were 11.05 (SD=2.31) and 10.09 (SD=2.60) respectively, suggesting the high level of nutritional risk. A healthy diet should be encouraged to prevent chronic diseases and improve the health of older adults. Nutritional education may be an effective way to promote a healthy diet.

#### ALTERATIONS IN TARGETED METABOLOMICS PRIOR TO UNINTENTIONAL WEIGHT LOSS IN OLDER ADULTS

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In older adults, unintentional weight loss (UWL) is associated with poor outcomes, but its pathophysiology remains poorly understood. We sought to identify potential biomarkers of UWL using targeted metabolomics, including 8 conventional metabolites, 45 acylcarnitines, and 15 amino acids. We identified individuals from the Cardiovascular Health Study All Stars with UWL (n=40) or weight stability (WS; n=40) from Years 9 to 11. Participants had WS through Year 8. UWL was defined as experiencing >6% weight loss from Years 9 to 11 and self-reporting that loss as unintentional. Mean plasma metabolite concentrations measured in Year 9 were compared between individuals with UWL or WS between Years 9 and 11. The strongest signals in metabolomic differences between individuals going on to experience UWL versus WS were observed among the branched-chain amino acids, valine (236.54 ± 54.43 vs. 215.79 ± 32.69 μM, 95%CI: -40.81, -0.70) and isoleucine/leucine (159.09 ± 36.53 vs. 142.75 ± 23.78 μM, 95%CI: -30.10, -2.59); lactate (1.23 ± 0.44 vs. 1.00 ± 0.57 μM, 95%CI: -0.45, -0.001); histidine (35.69 ± 5.33 vs. 38.62 ± 4.86 μM, 95%CI: 0.65, 5.20); the medium-chain acylcarnitine octenoyl carnitine (C8:1) (0.23 ± 0.10 vs. 0.29 ± 0.14 μM, 95%CI: 0.01, 0.12); and long-chain acylcarnitine myristoyl carnitine (C14) (0.04 ± 0.01 vs. 0.03 ± 0.01 μM, 95%CI: -0.01, -0.002). These findings suggest altered branched-chain amino acid and fatty acid metabolism and increased oxidative stress and inflammation may be evident before individuals undergo UWL. Further investigation of these pathways may reveal novel preventive or treatment strategies for UWL.

#### SELF-ACCEPTANCE BUFFERS NEGATIVE SOLITUDE-PHYSICAL ACTIVITY LINKS IN OLD AGE

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Loneliness is positively associated with a number of negative psychological and health outcomes. Solitude, a related yet distinct phenomenon, can have positive or negative ramifications depending on the context. As older adults spend significant time in solitude, there is particular need to investigate the effects of solitude on the health of this specific segment of the population. This study investigated everyday life associations between solitude and obstacles to physical activity as well as resources for overcoming these obstacles in order to determine whether and for whom solitude is negatively or positively associated with physical activity. Multilevel modeling was used to analyze data from 138 community-dwelling adults aged 65 years and older. Participants completed three daily questionnaires over a period of ten days concerning

social context, activities and obstacles, as well as managing obstacles. Preliminary analyses using a subset of participants with complete data (N = 93) indicate that participants reported more physical activity obstacles when they were in solitude. This only applied to participants low in self-acceptance. Furthermore, self-acceptance was also positively associated with the extent to which individuals who had experienced an obstacle (N = 71) managed to overcome it. Further analyses will examine accelerometry-based movement information as well as the role of additional resources (e.g. living with others) and vulnerability factors (loneliness, anxiety).

#### MITOCHONDRIAL DNA VARIANT C2639T IS AN APOE4 RESILIENCE FACTOR

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The APOE4 allele is the greatest genetic risk factor for sporadic Alzheimer's disease, yet select APOE4 carriers remain cognitively intact and become centenarians due to unclear reasons. In order to identify resilience genes for APOE4 carriers, we (1) sequenced whole mitochondrial DNA in a centenarian cohort, (2) searched for differentially expressed genes in the temporal cortex of APOE4 carriers, and (3) experimentally simulated the effects of a novel mitochondrial DNA variant that confers APOE4 resilience. The mitochondrial DNA variant, C2639T, is highly enriched in centenarians and APOE4 carriers, which changes the third amino acid of the mitochondrial-derived peptide humanin from proline to serine (humanin P3S). In addition, APOE4 carriers differentially expressed 127 genes in the humanin genetic network that map back to mitochondrial function. Therefore, we experimentally characterized the relationship between humanin, centenarian-enriched humanin P3S, and APOE. We found that humanin is a novel APOE binding partner, humanin P3S binds APOE nearly 15 times greater than wild type humanin, and humanin P3S modifies the APOE4 metabolic profile.

#### USE IT TOO MUCH AND LOSE EVERYTHING? THE EFFECTS OF HOURS OF WORK ON HEALTH

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We examine the causal impact of working hours on various health outcomes of Australian men aged 40 and over. To capture the potential non-linear dependence of health status on working hours, the models for health outcomes include working hours and its square. We deal with the potential endogeneity of working hours by using the instrumental variable estimation technique using instruments based on the age for pension eligibility. A non-linear causal effect of working hours on health is confirmed. For males working relatively moderate hours (up to 20–24 hours for a week), an increase in working hours has a positive impact on health, but thereafter an increase in working hours has a negative impact on health. The results also indicate that there is a non-linear dependence of working hours on the pension

eligibility age, and also a non-linear dependence of health outcomes on the pension eligibility when this last relationship is treated as a "reduced form" relationship.

#### EXPOSURE TO FINE PARTICULATE MATTER, GLOBAL COGNITIVE PERFORMANCE, AND EMOTIONAL DISTRESS IN OLDER WOMEN

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Among older adults, exposure to ambient PM2.5 (particulate matter with aerodynamic diameter <2.5 μm) has been associated with more rapid decline in cognitive performance and greater emotional distress. However, the inter-relationship between PM2.5 exposure, emotional distress, and global cognitive decline is unexamined. We examined whether long-term PM2.5 exposure affects global cognitive ability and emotional distress in 5,982 older women (baseline age 70.6 ± 3.8 years) from the Women's Health Initiative Memory Study. PM2.5 exposure for the three-years prior to baseline was estimated at each participant's residence via a national kriging model. Using structural equation models (SEM), a z-score standardized latent factor consisting of items from the 6-item CESD and the SF-36 Emotional Well-Being scale was constructed to estimate emotional distress at baseline and one-year follow-up. Individual-specific trajectories of global cognitive performance (Modified-Mini Mental State Examination; 3MS) were also estimated. All effects reported were adjusted for multiple demographic, lifestyle, and clinical variables. Higher PM2.5 exposure was associated with lower baseline 3MS performance ( $\beta = -.159$  per IQR=3.38 μg/m<sup>3</sup>; 95% CI = -.276 to -.042), which was associated with increased emotional distress over the subsequent year ( $\beta = -.011$ ; 95% CI = -.017 to -.004). A statistically significant indirect association of PM2.5 on changes in emotional distress via worse baseline 3MS performance ( $\beta = .002$ ; 95% CI = .001 to .004) was present. In contrast, no statistically significant association between PM2.5 on baseline emotional distress occurring prior to declines in 3MS performance was present. PM2.5 neurotoxicity may contribute to global cognitive decline, which precedes increased emotional distress.

#### THE INFLUENCE OF HUMOR AND SPIRITUALITY ON THE RESILIENCY OF COMMUNITY-DWELLING OLDER ADULTS

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Older adults are confronted with many distinct challenges, which require the use of various coping mechanisms to maintain psychological balance, including humor and spirituality (Bonanno et al., 2012; Koenig, 2012). This study