Application Number / Title: 23773 - Modeling the determinants of age-related declines in cognitive abilities
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Keywords provided by the Applicant PI to describe the research project: cognition, change, brain, interactions, multivariate, longitudinal

Application Lay Summary:

1a: One of the biggest challenges in aging research is to understand how, and why, cognitive abilities tend to worsen as we age. Recently, theories have proposed that various cognitive abilities, such as memory, reasoning, speed and language, have a mutually beneficial effect on each other. In other words, if, for example, your memory keeps working well, that will benefit other skills such as language (remembering words, phrases, names) or reasoning (remembering a problem you’re trying to solve). Additionally, we will examine whether brain health and lifestyle factors help combat age-related decline in mental abilities.

1b: This project offers new avenues for diagnosis (groups of individuals defined by both current scores and developmental trajectories), prevention (what lifestyle factors determine the shape of age-related decline) and the promotion of health (identifying which cognitive abilities are most promising targets to slow down decline). We will focus on answering three key questions in healthy cognitive aging:
- Is there any evidence that cognitive abilities interact positively, such that they together help slow decline?
- Does brain health play an important role in these interactions?
- Are there lifestyle factors that set apart individuals who age more slowly, or not at all?

1c: We will use statistical methods called growth curve models and latent change models to study how people change across their lifespan. To study this topic, we need a dataset that is large (many people), broad (many cognitive domains) and longitudinal (people measured multiple times). Specifically, we will quantify decline and improvement over time on multiple cognitive abilities to see if changes across domains influence each other, and how these changes are related to brain health.
The richness and size of the Biobank sample offers a unique avenue to investigate these questions.

1d: Full cohort