Financial Decision Making in Older Age

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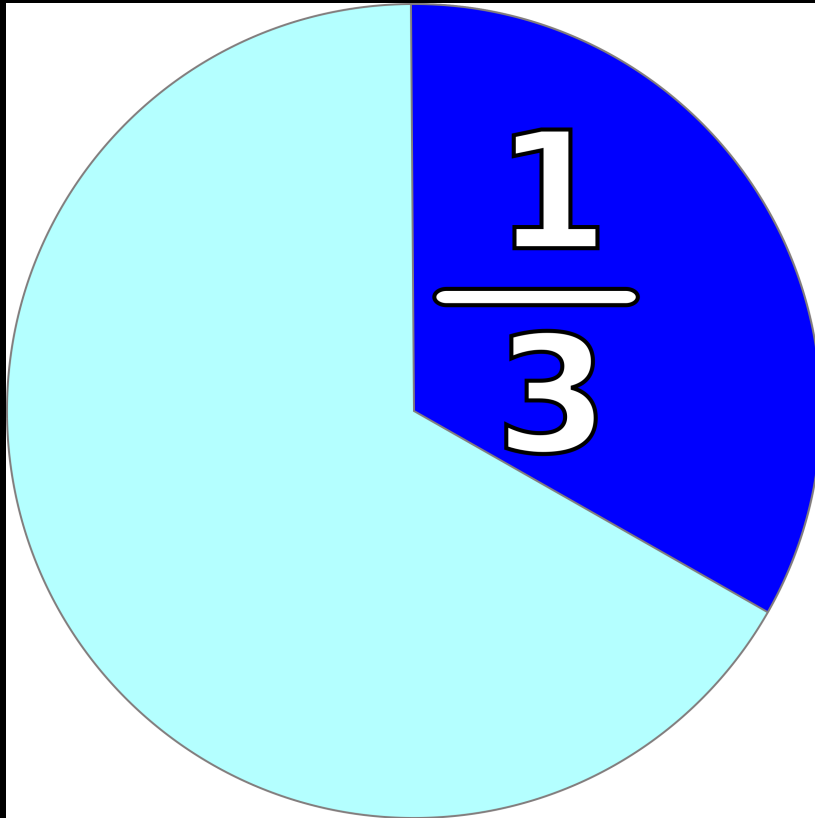Rush Alzheimer's Disease Center
Rush University Medical Center

ARC CEPAR International Conference
July 3, 2023

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Background

$$\frac{1}{3}$$

AARP › AARP States › Colorado

## AARP Report: $28.3 Billion a Year Stolen from Adults 60+

Older Americans lose an estimated $28.3 billion annually to elder financial exploitation (EFE), according to a new report from AARP. The report also shows that 87.5% of adults age 60 and older who are victimized by someone they know never report these incidents to authorities. In contrast, just one-third of victims of stranger-perpetrated EFE do not report it.

"While strangers often rely on quick and

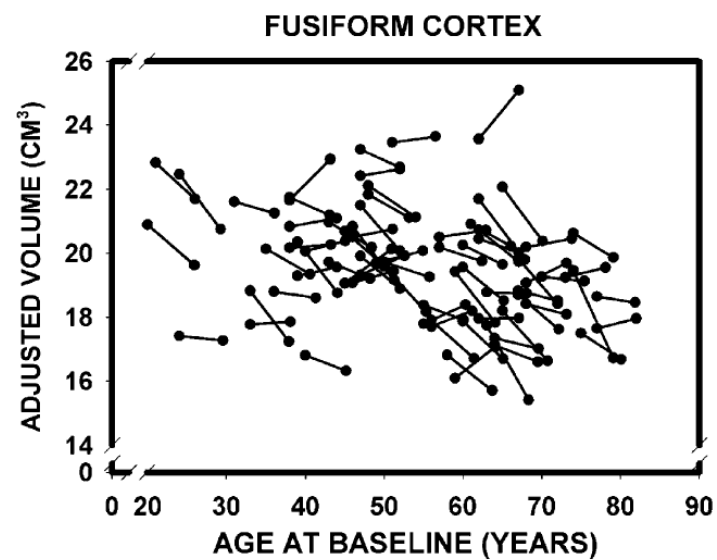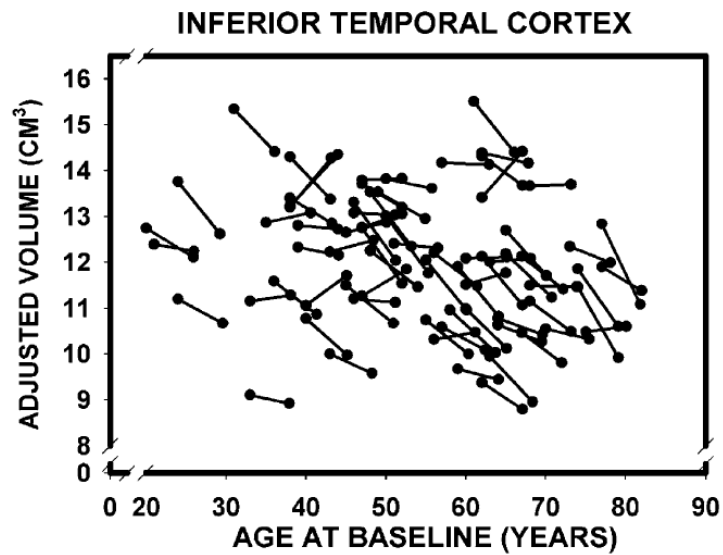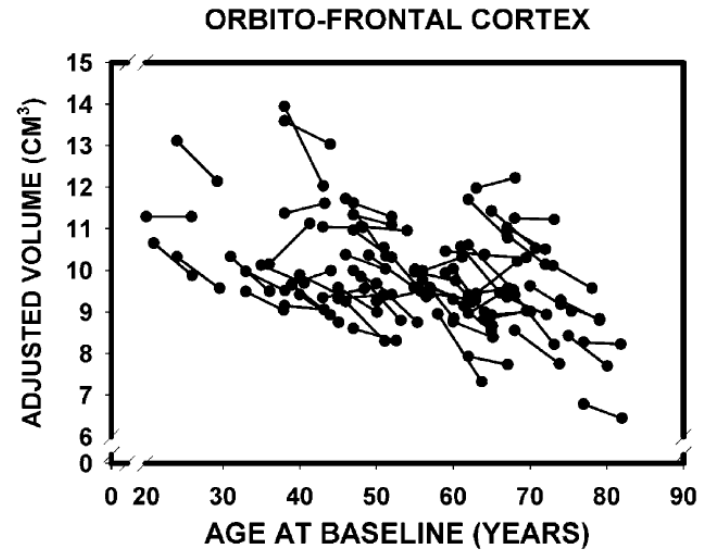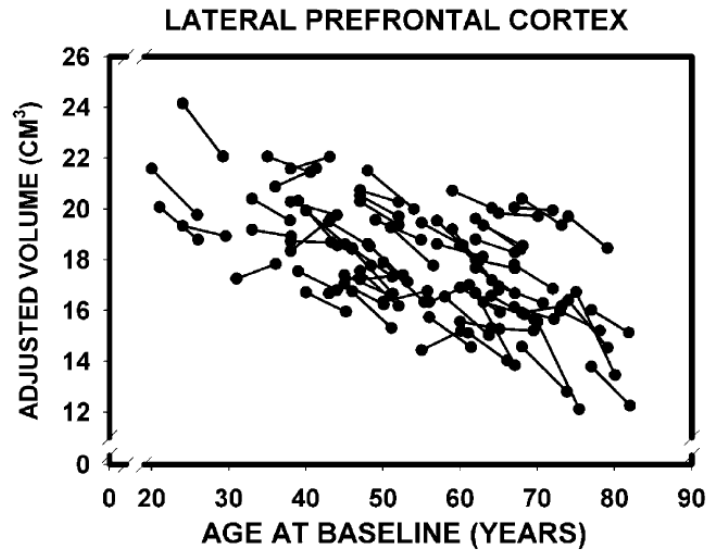@sdukehan

Laibson, 2011; Gunther, 2023

Brain Structure Changes As We Age
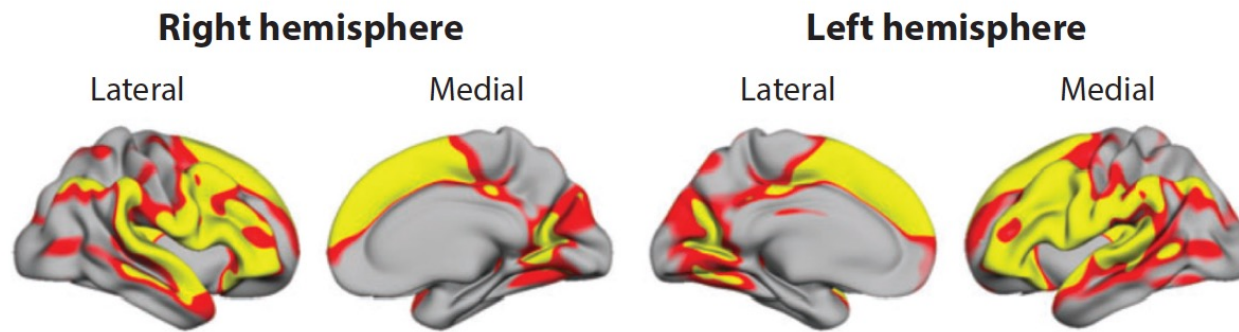
Figure 2

Brain regions shown in yellow are those that exhibited the largest decline in cortical thickness with age across a sample of 883 participants ranging in age from 18 to 94 (Fjell et al. 2009b).

Raz et al., 2005

Renee Packel used to have a typical suburban life. Her husband, Arthur, was a lawyer and also sold insurance. They lived in a town house just outside Philadelphia, and Mrs. Packel took care of their home and family.

The Vanishing Mind

Dollars and Dementia

Articles in this series are examining the worldwide struggle to find answers about Alzheimer's disease.

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Room for Debate: When Boomers Get Dementia (June 2, 2010)

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Béatrice de Géa for The New York Times

Dr. Max Gomez, left, with his son, does not understand why he needs Medicaid: "I have money."

One day, it all came crashing down. The homeowners' association called asking for their fees. To Mrs. Packel's surprise, her husband had simply stopped paying them. Then she learned he had stopped writing checks to his creditors, too.

It turned out that Mr. Packel was developing Alzheimer's disease and had forgotten how to handle money. When she tried to pay their bills, Mrs. Packel, who enlisted the help of a forensic accountant, could not find most of the couple's money.

"It just disappeared," she said.

What happened to the Packels is all too common, Alzheimer's experts say. New research shows that one of the first signs of impending dementia is an inability to understand money and credit, contracts and agreements.

The New York Times

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THE VANISHING MIND

Money Woes Can Be Early Clue to Alzheimer's

As Arthur Packel's dementia grew worse, he forgot how to handle money, and his wife, Renee, could not find where it all went.

Ryan Collerd for The New York Times

By GINA KOLATA
Published: October 30, 2010

Renee Packel used to have a typical suburban life. Her husband, Arthur, was a lawyer and also sold insurance. They lived in a town house just outside Philadelphia, and Mrs. Packel took care of their home and family.

The Vanishing Mind

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Financial Presentation of Alzheimer Disease and Related Dementias

Lauren Hersch Nicholas, PhD, MPP; Kenneth M. Langa, MD, PhD; Julie P. W. Bynum, MD, MPH; Joanne W. Hsu, PhD

IMPORTANCE Alzheimer disease and related dementias (ADRD), currently incurable neurodegenerative diseases, can threaten patients' financial status owing to memory deficits and changes in risk perception. Deteriorating financial capabilities are among the earliest signs of cognitive decline, but the frequency and extent of adverse financial events before and after diagnosis have not been characterized.

OBJECTIVES To describe the financial presentation of ADRD using administrative credit data.

DESIGN, SETTING, AND PARTICIPANTS This retrospective secondary data analysis of consumer credit report outcomes from 1999 to 2018 linked to Medicare claims data included 81 364 Medicare beneficiaries living in single-person households.

EXPOSURES Occurrence of adverse financial events in those with vs without ADRD diagnosis and time of adverse financial event from ADRD diagnosis.

MAIN OUTCOMES AND MEASURES Missed payments on credit accounts (30 or more days late) and subprime credit scores.

RESULTS Overall, 54 062 (17 890 [33.1%] men; mean [SD] age, 74 [7.3] years) were never diagnosed with ADRD during the sample period and 27 302 had ADRD for at least 1 quarter of observation (8573 [31.4%] men; mean [SD] age, 79.4 [7.5] years). Single Medicare beneficiaries diagnosed with ADRD were more likely to miss payments on credit accounts as early as 6 years prior to diagnosis compared with demographically similar beneficiaries without ADRD (7.7% vs 7.3%; absolute difference, 0.4 percentage points [pp]; 95% CI, 0.07-0.70:) and to develop subprime credit scores 2.5 years prior to diagnosis (8.5% vs 8.1%; absolute difference, 0.38 pp; 95% CI, 0.04-0.72). By the quarter after diagnosis, patients with ADRD remained more likely to miss payments than similar beneficiaries who did not develop ADRD (7.9% vs 6.9%; absolute difference, 1.0 pp; 95% CI, 0.67-1.40) and more likely to have subprime credit scores than those without ADRD (8.2% vs 7.5%; absolute difference, 0.70 pp; 95% CI, 0.34-1.1). Adverse financial events were more common among patients with ADRD in lower-education census tracts. The patterns of adverse events associated with ADRD were unique compared with other medical conditions (eg, glaucoma, hip fracture).

CONCLUSIONS AND RELEVANCE Alzheimer disease and related dementias were associated with adverse financial events years prior to clinical diagnosis that become more prevalent after diagnosis and were most common in lower-education census tracts.

Author Affiliations: Johns Hopkins School of Public Health & School of Medicine, Institute for Social Research, Baltimore, Maryland (Nicholas); University of Colorado School of Public Health (Nicholas);

Figure 1. Change in Proportion With Missed Credit Payments Before and After Alzheimer Disease and Related Dementias (ADRD) Diagnosis Relative to Never Diagnosed, 1999 to 2018
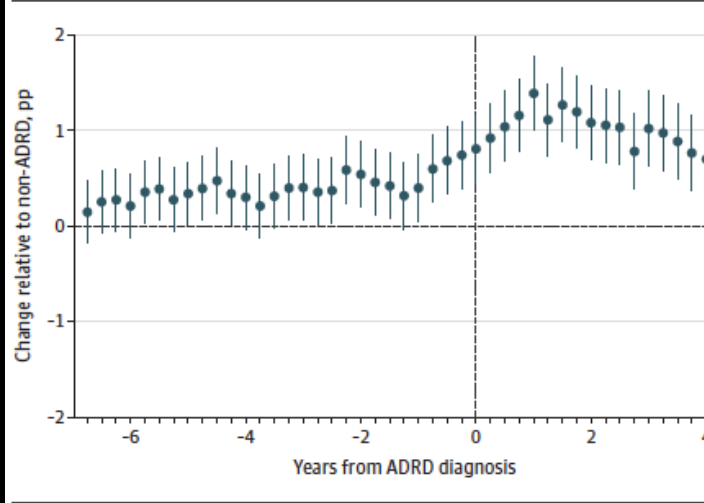
Medicare beneficiaries who eventually developed ADRD experienced higher rates of delinquency than those who never developed ADRD, and these elevated rates were detectable years before diagnosis. Circles are regression coefficients representing the percentage point (pp) increase in payment delinquency at each time point in comparison to payment delinquency rates among Medicare beneficiaries who were never diagnosed with ADRD. The mean rate of missed payment (payment delinquency) was 7.8%. Vertical lines represent 95% CIs. Data sources: Federal Reserve Bank of New York Consumer Credit Panel/Equifax, and Medicare Beneficiary Summary File.

Figure 2. Change in Proportion With Subprime Credit Scores Before and After Alzheimer Disease and Related Dementias (ADRD) Diagnosis Relative to Never Diagnosed, 1999 to 2018
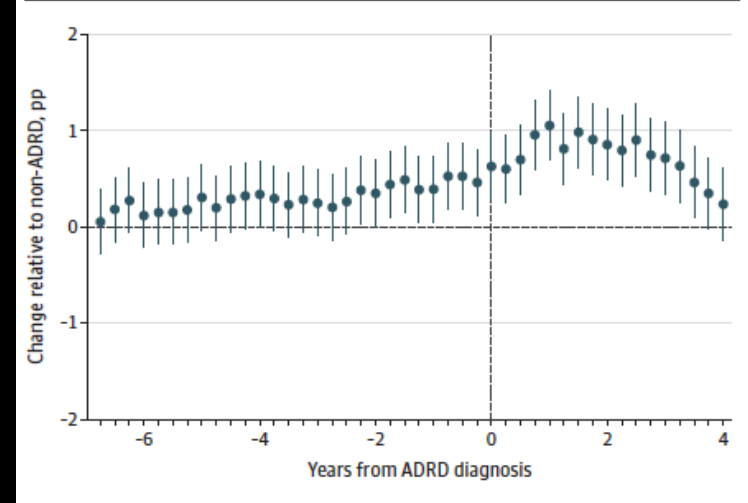
Medicare beneficiaries who eventually developed ADRD experienced higher rates of subprime credit scores (Equifax risk scores) than those who never developed ADRD, and these elevated rates were detectable roughly 2 years before diagnosis. Circles are regression coefficients representing the percentage point (pp) increase in subprime credit scores associated with each time point relative to no ADRD. The mean rate of subprime credit scores in our sample was 9.1%. Vertical lines represent 95% CIs. Data sources: Federal Reserve Bank of New York Consumer Credit Panel/Equifax, and Medicare Beneficiary Summary File.

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Nicholas, L. H., Langa, K. M., Bynum, J. P. W., & Hsu, J. W. (2021). Financial Presentation of Alzheimer Disease and Related Dementias. *JAMA internal medicine, 181*(2), 220–227.

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Mild Cognitive Impairment and Susceptibility to Scams in Old Age

S. Duke Han[a,b,c,e,*], Patricia A. Boyle[a,b], Bryan D. James[a,d], Lei Yu[a,c] and David A. Bennett[a,c]
[a]Rush Alzheimer's Disease Center, Rush University Medical Center, Chicago, IL, USA
[b]Department of Behavioral Sciences, Rush University Medical Center, Chicago, IL, USA
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[d]Department of Internal Medicine, Rush University Medical Center, Chicago, IL, USA
[e]Mental Health Care Group, VA Long Beach Healthcare System, Long Beach, CA, USA

N=730; MCI=144

Table 2
Relation of MCI to susceptibility to scams

Variable	Model Term	Estimate (Standard Error, p Value)	
		Model 1	Model 2
Susceptibility to scams	age	0.027 (0.003,<0.001)	0.026 (0.003,<0.001)
	education	−0.022 (0.008, 0.007)	−0.023 (0.008, 0.005)
	male	0.067 (0.059, 0.249)	0.061 (0.059, 0.300)
	MCI		0.125 (0.063, 0.047)

Model 1 indicates a linear regression model of the terms age in years, years of education, and gender (male coded as 1, female coded as 0) with the outcome of susceptibility to scams. Model indicates a linear regression model of the terms age in years, years of education, gender (male coded as 1, female coded as 0), and MCI status (MCI coded as 1 and non-cognitive impaired coded as 0).

Table 3
Relation of specific cognitive function measures to susceptibility to scams among individuals with MCI

Factor	Cognitive System	Estimate	Standard Error	p Value	R^2 Change
	Global cognition	−0.341	0.152	0.026	0.020
Susceptibility to scams	Episodic memory	−0.199	0.093	0.034	0.017
	Semantic memory	−0.173	0.107	0.107	–
	Working memory	0.022	0.091	0.812	–
	Perceptual speed	−0.163	0.081	0.047	0.013
	Visuospatial ability	−0.002	0.077	0.985	–

Estimated from separate linear regression models adjusted for age, gender, and education.

Mild Cognitive Impairment is Associated with Poorer Everyday Decision Making

Laura Fenton, MA[a], S. Duke Han, PhD, ABPP-CN[a,b,c,d,e,f,g], Carolyn G. DiGuiseppi, MD, PhD[h], Nicole R. Fowler, PhD, MHSA[i], Linda Hill, MD, MPH[j], Rachel L. Johnson, MS[k], Ryan A. Peterson, PhD[k], Christopher E Knoepke, PhD, MSW, LCSW,[l,m], Daniel D. Matlock, MD, MPH[l,n,o], Ryan Moran, MD, MPH[j], Jason Karlawish, MD[p], & Marian E. Betz, MD, MPH[q,r]
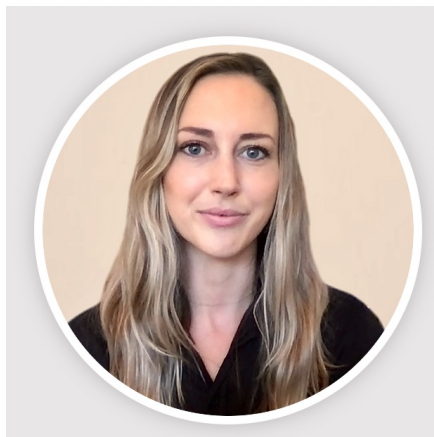
Predictor variable	Points missed on SPACED score	
	Mean ratio (95% CI)	p value
Age (z-score)	1.34 (1.04, 1.73)	**0.025**
Education (ref: high school or less)		**0.034***
Some college/vocational/tech	0.67 (0.27, 1.64)	0.379
College graduate	0.97 (0.40, 2.35)	0.952
Any post-graduate work	0.38 (0.16, 0.93)	**0.034**
Gender (ref: female)		
Male	1.34 (0.79, 2.29)	0.277
Randomization group (ref: control)		
DDA	0.70 (0.41, 1.18)	0.18
MCI type (ref: BTACT)		
RBANS	1.02 (0.53, 1.98)	0.956
Site (ref: CU)		**0.003***
IU	2.92 (1.52, 5.60)	**0.001**
UCSD	1.35 (0.65, 2.79)	0.416
Cognitive status (ref: CN)		
MCI	2.17 (1.02, 4.61)	**0.044**

Fenton et al., in press

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Not Just About "Cognitive Ability"

ORIGINAL ARTICLE

Discrepancies between cognition and decision making in older adults

S. Duke Han[1,2,3,5] · Patricia A. Boyle[1,2] · Bryan D. James[2,3,4] · Lei Yu[2,3] · Lisa L. Barnes[1,2,3] · David A. Bennett[2,3]

- N=648 older adults without dementia

- Mean age=81.8, s.d.=7.6; mean number of years of education=15.2, s.d=3.1; 76.8% female

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Global Cognition and Decision Making Z-scores by Discrepancy Group

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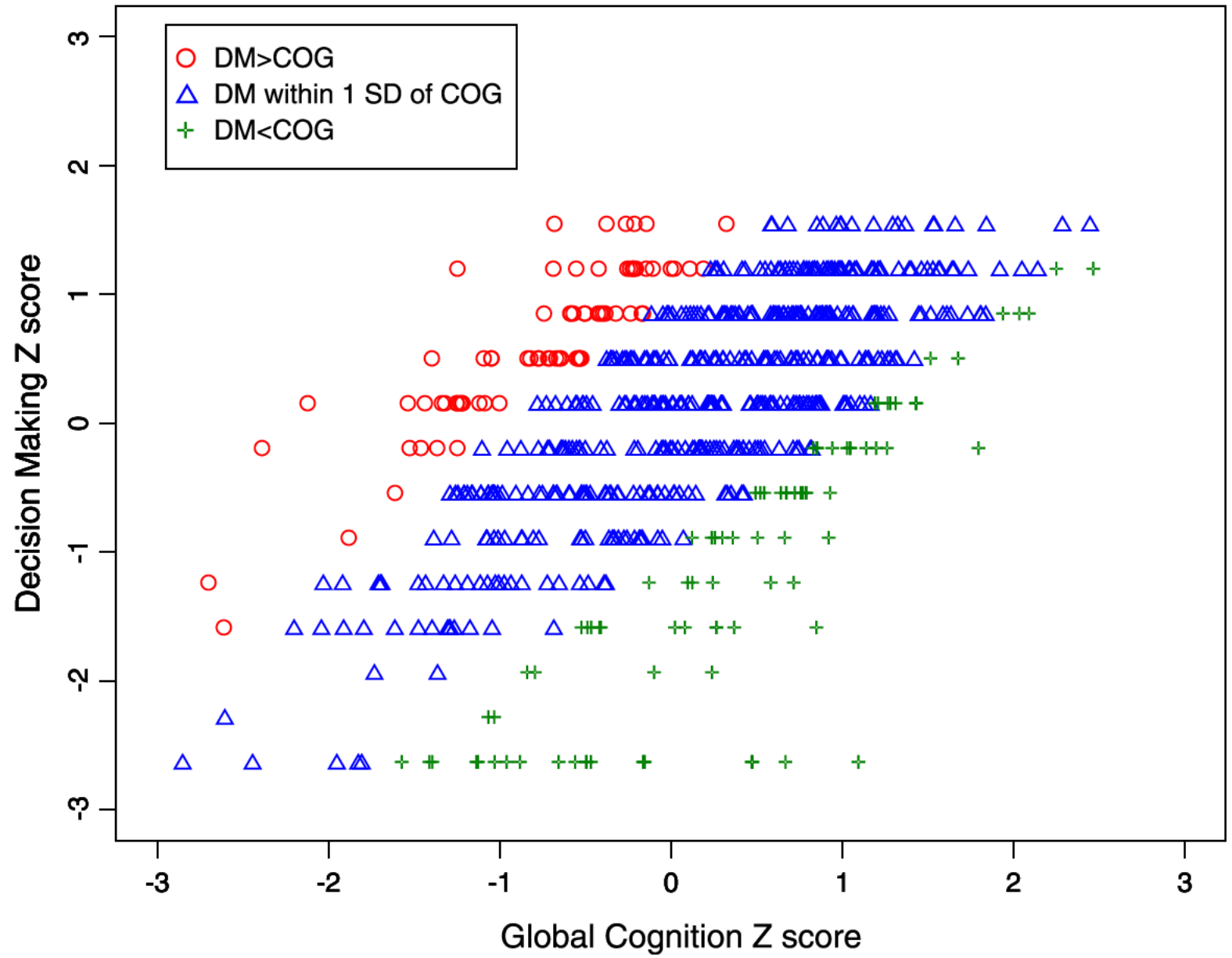
Neurobiology of Disease

Changes in Brain Function Occur Years before the Onset of Cognitive Impairment

Lori L. Beason-Held,[1] Joshua O. Goh,[1,2] Yang An,[1] Michael A. Kraut,[3] Richard J. O'Brien,[4] Luigi Ferrucci,[1] and Susan M. Resnick[1]

[1]Intramural Research Program, National Institute on Aging, National Institutes of Health, Baltimore, Maryland 21224, [2]Graduate Institute of Brain and Mind Sciences, National Taiwan University College of Medicine, Taipei 100, Taiwan, [3]Department of Radiology, Johns Hopkins Hospital, Baltimore, Maryland 21287, and [4]Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, Maryland 21224

Multidisciplinary Approach

- ## Decision Making
  - Cognitive processing
  - Affective processing
  - Personality styles
  - Behavioral Economics

$$GP_{ij} = \frac{0.5 \times \text{Gain}_j^{1-\gamma_i}}{1-\gamma_i} \qquad SP_{ij} = \frac{\text{Safe}_j^{1-\gamma_i}}{1-\gamma_i}$$

$$\text{logit}(P(Y_{ij} = 1)) = GP_{ij} - SP_{ij}$$

$$\text{logit}(P(Y_{ij} = 1)) = \frac{0.5 \times \text{Gain}^{1-\gamma_i} - \text{Safe}^{1-\gamma_i}}{1-\gamma_i}$$

R01AG033678; PI: Patricia Boyle
R01AG017917; PI: David Bennett

- ## Neuroimaging and Diversity Considerations
  - Volumetry
  - Diffusion Tensor Imaging
  - Functional connectivity
  - Racial Differences
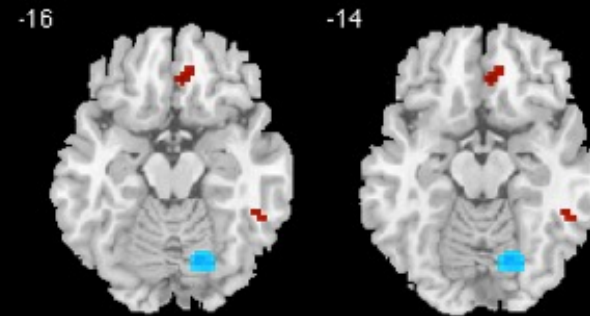
K23AG040625; PI: Duke Han
RF1AG022018; PI: Lisa Barnes
R01AG055430; PI: Duke Han

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Importance of considering age-associated neuropathology
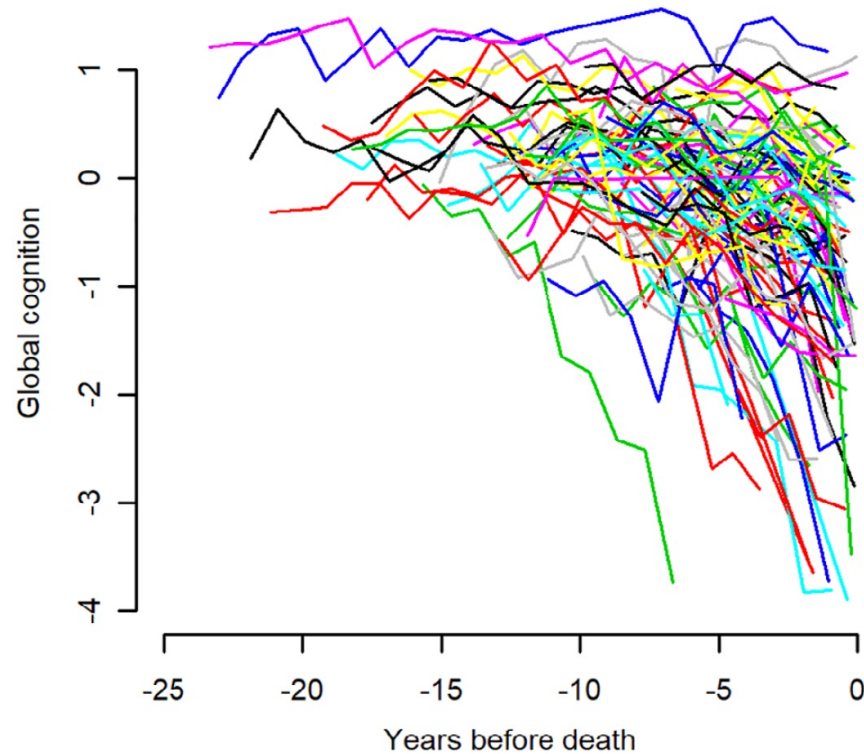
FIGURE 1: Crude trajectories of change in global cognition in 100 randomly selected participants.

A Global cognition: fitted residual trajectories

Wilson et al., 2020

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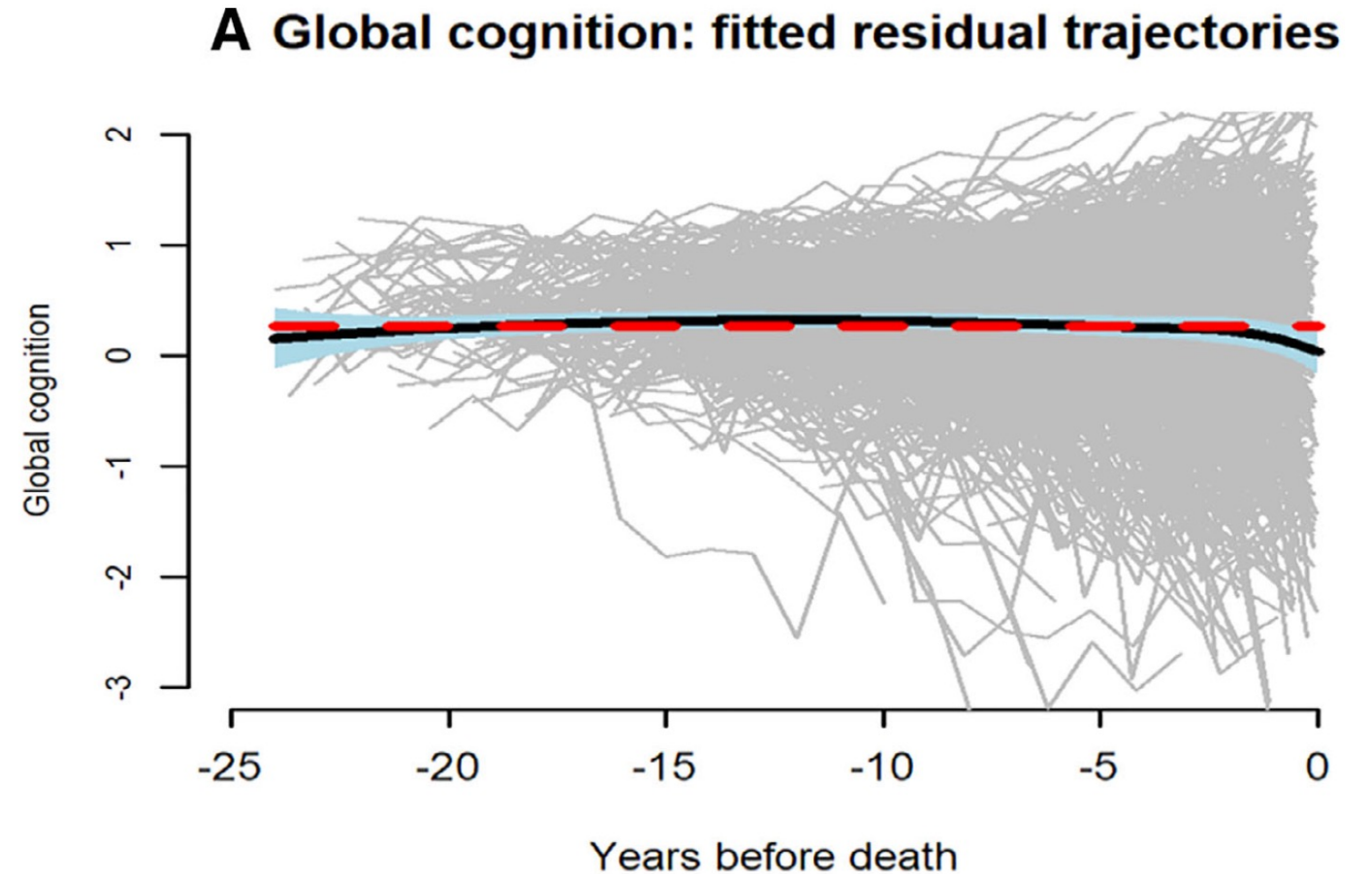
Peters and Buchel, 2011
+ Age-Associated Alzheimer's Neuropathology
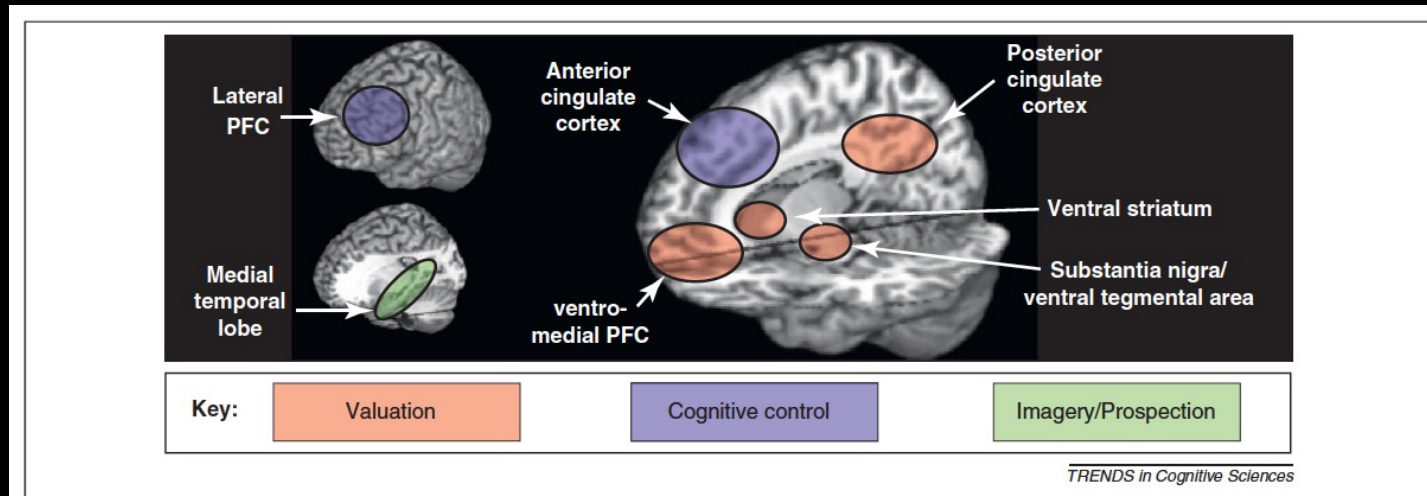
Figure 2. Networks implicated in different component processes of temporal discounting: cognitive control (blue), reward valuation (red) and imagery or prospection (green). Ventromedial PFC and posterior cingulate cortex are involved in both prospection and valuation.
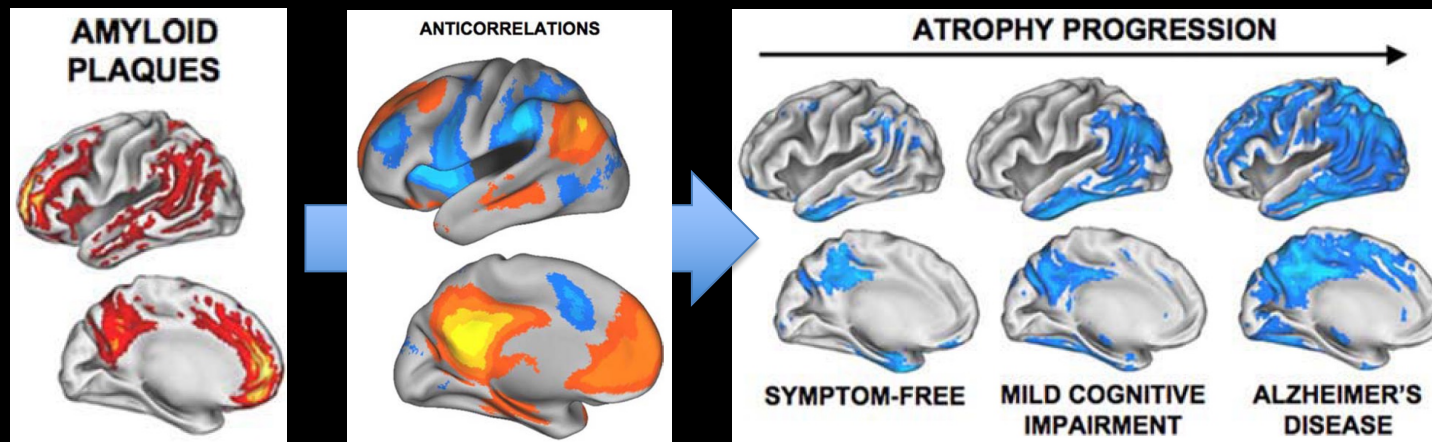
Buckner et al., 2008; Buckner et al., 2005; Lustig et al., 2003

Current Working Model

Han, S.D. Vulnerability to financial exploitation in older age: A neuropsychology perspective. *A Fresh Look at Fraud: Theoretical and Applied Perspectives.* Routledge Taylor & Francis Group, United Kingdom, 2022.

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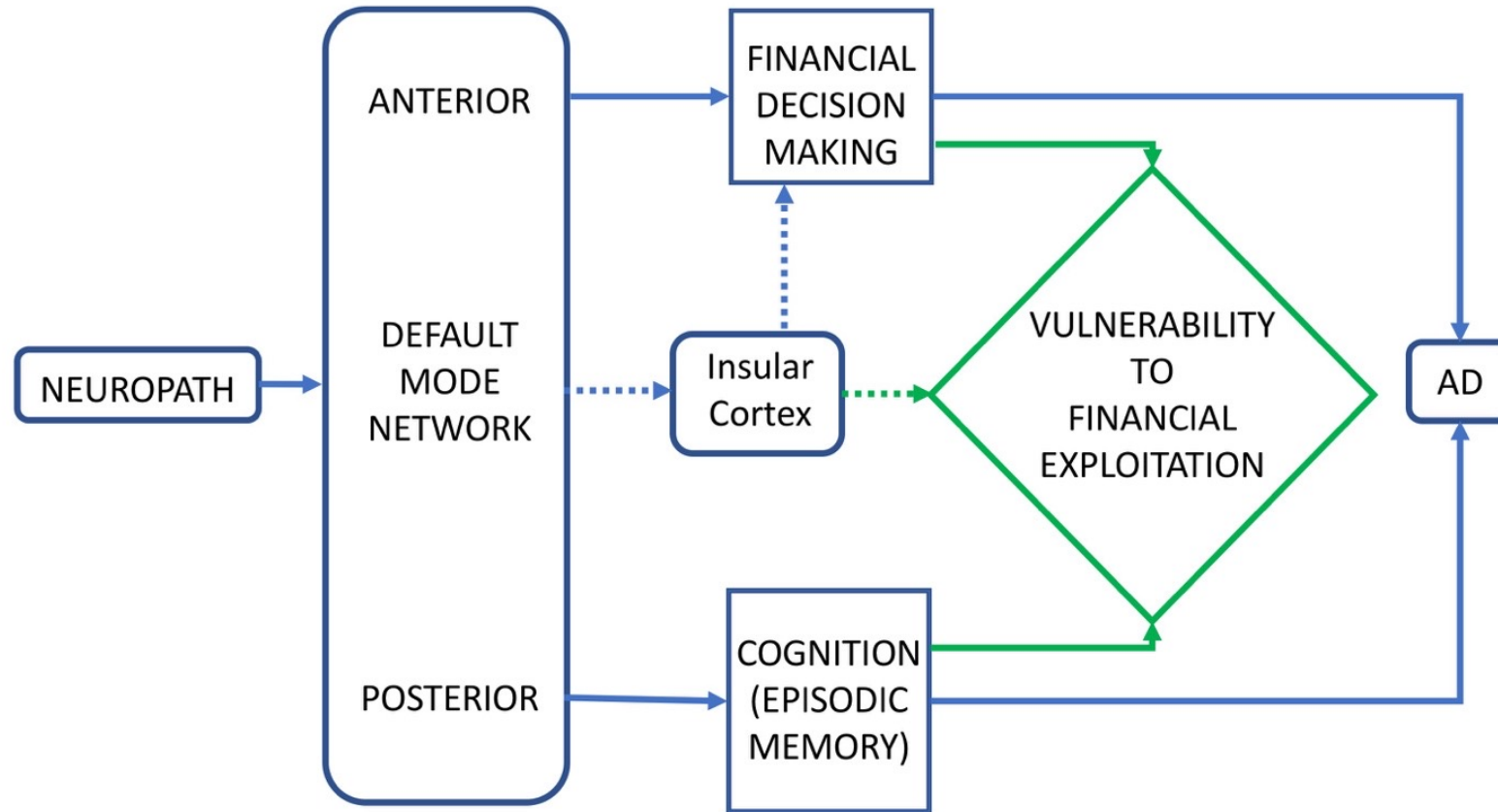
Neuroimaging Work to Date

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Temporal Discounting

Temporal Discounting

Ventromedial PFC, parahippocampal, and cerebellar connectivity are associated with temporal discounting in old age

S. Duke Han [a,b,c,f,*], Patricia A. Boyle [a,b], Lei Yu [b,c], Debra A. Fleischman [a,b,c], Konstantinos Arfanakis [b,d,e], David A. Bennett [b,c]

[a] Department of Behavioral Sciences, Rush University Medical Center, Chicago, IL 60612, United States
[b] Rush Alzheimer's Disease Center, Rush University Medical Center, Chicago, IL 60612, United States
[c] Department of Neurological Sciences, Rush University Medical Center, Chicago, IL 60612, United States
[d] Department of Biomedical Engineering, Illinois Institute of Technology, Chicago, IL 60616, United States
[e] Department of Radiology, Rush University Medical Center, Chicago, IL 60612, United States
[f] Mental Health Care Group, VA Long Beach Healthcare System, Long Beach, CA 90822, United States

- Temporal discounting refers to the discounting of greater delayed rewards for smaller immediate rewards and is associated with a number of real-world outcomes.

- Using a seed region of interest (ROI) in the left and right fronto-insular cortex (FI); we investigated whether there were rs-fMRI correlations with temporal discounting, accounting for age, education, gender, and global cognition.

- N=123 older adults without dementia; Mean age=82.95, s.d.=6.64; mean number of years of education=15.67, s.d=3.20; 82.1% female

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Temporal Discounting
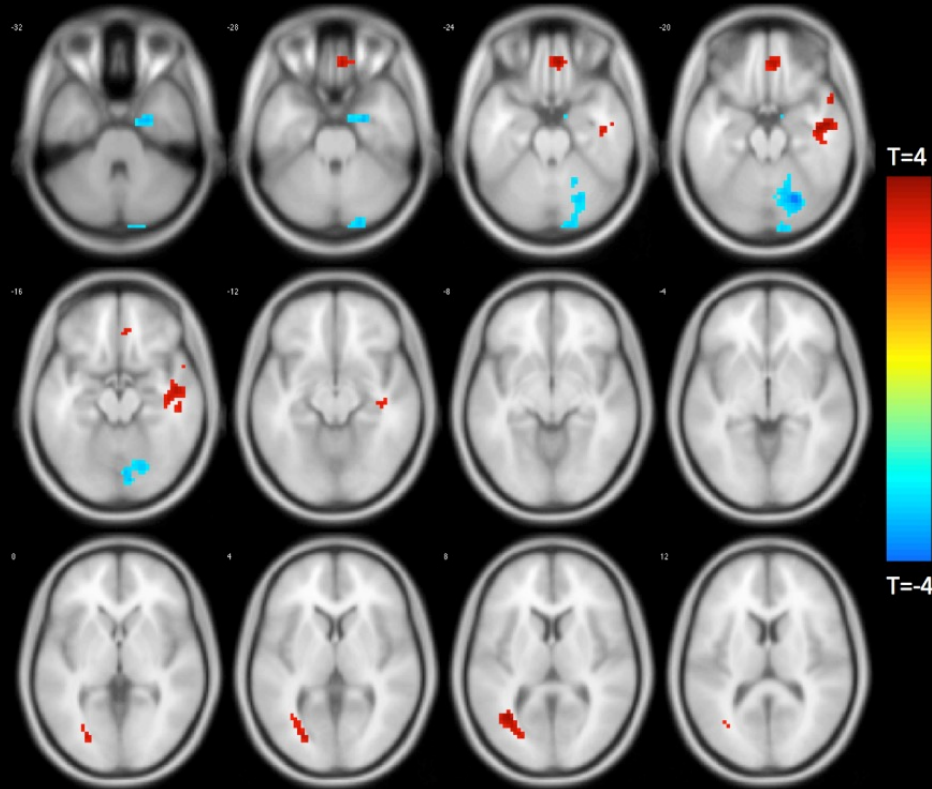
HIGH->LOW Temporal Discounting
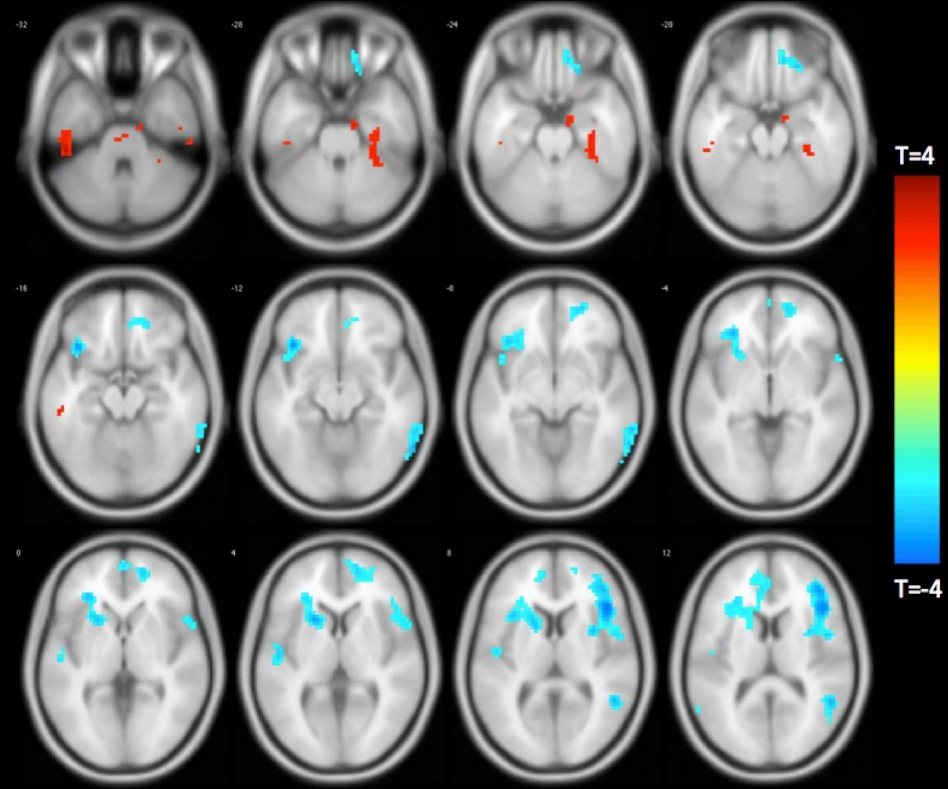
FC of R Parahippocampal Seed ROI

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Temporal Discounting

ORIGINAL ARTICLE

CrossMark

White matter correlates of temporal discounting in older adults

S. Duke Han[1,2,3,4,10] · Konstantinos Arfanakis[5,6,7] · Debra A. Fleischman[6,8,9] · Lei Yu[6,9] · David A. Bennett[6,9] ·
Patricia A. Boyle[6,8]

- Diffusion Tensor Imaging (DTI) to investigate white matter integrity

- N=302 older adults without dementia

- Mean age=81.38, s.d.=7.57; mean number of years of education=15.75, s.d.2.90; 75.5% female

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Temporal Discounting

FA
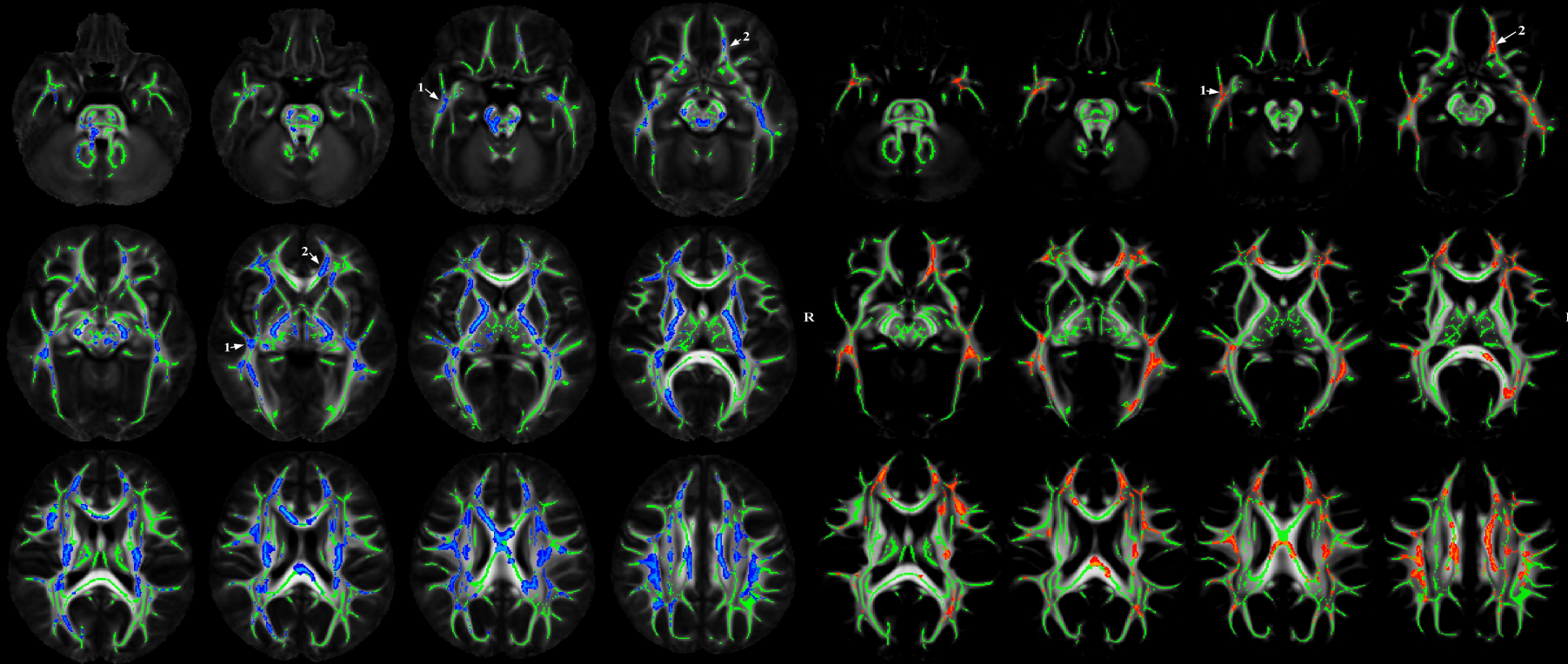
Trace

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Diffusion Tensor Imaging (DTI)

"Of course we'll make a decision ...
once we have considered the 5243 factors."

Age-Associated Financial Vulnerability: An Emerging Public Health Issue

Mark S. Lachs, MD, MPH, and S. Duke Han, PhD

Various processes common in the aging brain may affect an older adult's ability to manage personal finances, the most recognized of which are dementing illnesses (1). These conditions can affect cognitive abilities, which may jeopardize an older adult's financial well-being over their longitudinal course. However, recent studies suggest that even cognitively intact older adults can have "functional" changes that may render them financially vulnerable. Social isolation also increases dramatically with age, which places older persons at risk for exploitation from predators. Furthermore, capitalistic enterprises can threaten the financial security of this group, which is perceived to be a large untapped market and, in an era of information overload, is often presented with a dizzying array of products and services.

We propose the concept of age-associated financial vulnerability (AAFV) and discuss aspects of its epidemiology from the vantage of a neuropsychologist (S.D.H) and geriatrician–epidemiologist (M.S.L) who are both researchers and clinicians working in the field of elder abuse. We believe that considering AAFV a clinical syndrome may be advantageous to further critical research, promote public policy work, and encourage physicians to recognize it.

need not be associated with cognitive impairment differentiates research on this condition from previous work that has focused on cognitive impairment as the driving force for financial vulnerability (3).

Age-associated financial vulnerability and financial exploitation (4, 5) can be linked—AAFV may predispose an older adult to financial exploitation—however, we perceive them as conceptually different. Age-associated financial vulnerability focuses on a potential condition that may have multiple causes and ultimately may or may not lead to exploitation. We view financial exploitation as focusing on specific mechanisms that drive a particular outcome, often consisting of intentional or forceful methods of exploitation. In this sense, persons who do not show AAFV can be victims of financial exploitation. More is known about the effects of financial exploitation; less is known about AAFV because we believe that this concept is new.

EPIDEMIOLOGY OF AAFV: PREVALENCE AND RISK FACTORS

Although a precise determination of the prevalence of AAFV would require assessment of a large population-based sample of older adults, community-

Table. Possible Factors Contributing to Age-Associated Financial Vulnerability

Domain Factor	Mechanism
Cognitive/emotional	
Executive dysfunction	Reduced ability to multitask, organize by time, and abstractly comprehend future ramifications of current financial actions
Acalculia	Inability to quickly calculate figures mentally to verify numbers or to perform numerical calculations
Frontal disinhibition	Reduced ability not to commit to financial courses of action with potentially negative consequences
Anxiety	May increase pressure to take bad financial risks or not pursue appropriate financial safeguards
Reduced ability to discern trustworthy persons	Results in having less information by which to discern good financial opportunities from bad financial risks
Medical and functional	
Serious progressive illness	Serious underlying medical illness unresponsive to traditional therapy may motivate patients to seek expensive and unproven treatments, creating susceptibility to fraud
Impaired mobility	Reduced ability to extricate themselves from an environment in which they are being pressured to make financial decisions
Vision and hearing loss	Decreased likelihood that complex financial transactions and/or documents are fully comprehended before execution
Polypharmacy	May contribute to delirium, directly influencing vulnerability; expense of medication may also lead to inadvisable risk-taking
Psychosocial	
Depression	Associated with executive dysfunction (7); shame and guilt may also preclude older persons from revealing their predicament to trusted friends and family who could extricate them from exploited role
Social isolation	No beneficent person within the older person's social network to recognize, mitigate, or report financial exploitation
Loneliness	Patients may engage potential exploiters as a mechanism of fostering social connectedness
Environmental/societal	
Wealth concentration	High concentration of wealth in older populations makes them targets of potential exploiters
Information overload	Complex offering of products and services may paradoxically reduce sound decision making in the aging brain
Sophisticated marketing	The aging brain may be more susceptible to increasing use of behavioral economics and cognitive neuroscience to sway consumers

The Finance, Cognition, and Health in Elders Study: Toward Preventing Financial Exploitation of Older Adults

by Gali H. Weissberger and S. Duke Han

February 28, 2018

Blogs Series:

> NCEA Blog

> WEADD Blogs

> Victim Services (Spanish)

> Diversity and Inclusion (Spanish)

> USC Davis School of Gerontology

Why is financial exploitation so common in the elderly population? Why do some older adults fare better than others when making financial decisions? What factors protect or place one at greater risk of being financially exploited? These are just some of the questions that a multidisciplinary team of investigators hope to answer through the Finance, Cognition, and Health in Elders Study (FINCHES) being carried out through USC's Department of Family Medicine.

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Check for updates

Physical and mental health correlates of perceived financial exploitation in older adults: Preliminary findings from the Finance, Cognition, and Health in Elders Study (FINCHES)

Gali H. Weissberger[a], Laura Mosqueda[a], Annie L. Nguyen[a], Anya Samek[b], Patricia A. Boyle[c,d], Caroline P. Nguyen[a] and S. Duke Han[a,c,e,f,g]

[a]Department of Family Medicine, USC Keck School of Medicine, Alhambra, CA, USA; [b]Center for Economic and Social Research, University of Southern California, Los Angeles, CA, USA; [c]Rush Alzheimer's Disease Center, Rush University Medical Center, Chicago, IL, USA; [d]Department of Behavioral Sciences, Rush University Medical Center, Chicago, IL, USA; [e]Department of Psychology, USC Dornsife College of Letters, Arts, and Sciences, Los Angeles, CA, USA; [f]USC School of Gerontology, Los Angeles, CA, USA; [g]Department of Neurology, USC Keck School of Medicine, Los Angeles, CA, USA

ABSTRACT

Objectives: Financial exploitation (FE) in old age is poorly understood, particularly among those without significant cognitive impairment. The Finance, Cognition, and Health in Elders Study (FINCHES) aims to identify factors associated with FE among cognitively-healthy older adults. Preliminary findings regarding physical and mental health correlates in the pilot phase of FINCHES are reported.

Method: Sixteen older adults who self-reported FE were demographically-matched on age, education, sex, and race/ethnicity to eighteen older adults who did not report past FE.

Results: Those who believed they were exploited endorsed significantly greater symptoms of depression ($p = 0.014$) and marginally greater symptoms of anxiety ($p = 0.062$). Participants trended towards lower perceived successful aging ($p = 0.094$). Perceived FE participants also endorsed greater medical conditions ($p = 0.047$), but follow-up individual item analyses suggest that this was driven by problems with sleep ($p = 0.030$).

Conclusions: These preliminary findings from the pilot phase of FINCHES highlight negative mental health factors associated with perceived FE among cognitively-intact older adults.

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Brain Connectivity and Reported Financial Exploitation in Older Adults

Weissberger, G.H., Mosqueda, L., Nguyen, A.L., Axelrod, J., Nguyen, C.P., Boyle, P.A., Spreng, N., & Han, S.D. Functional connectivity correlates of perceived financial exploitation in older adults. Frontiers in Aging Neuroscience, 2020. 12:583433.

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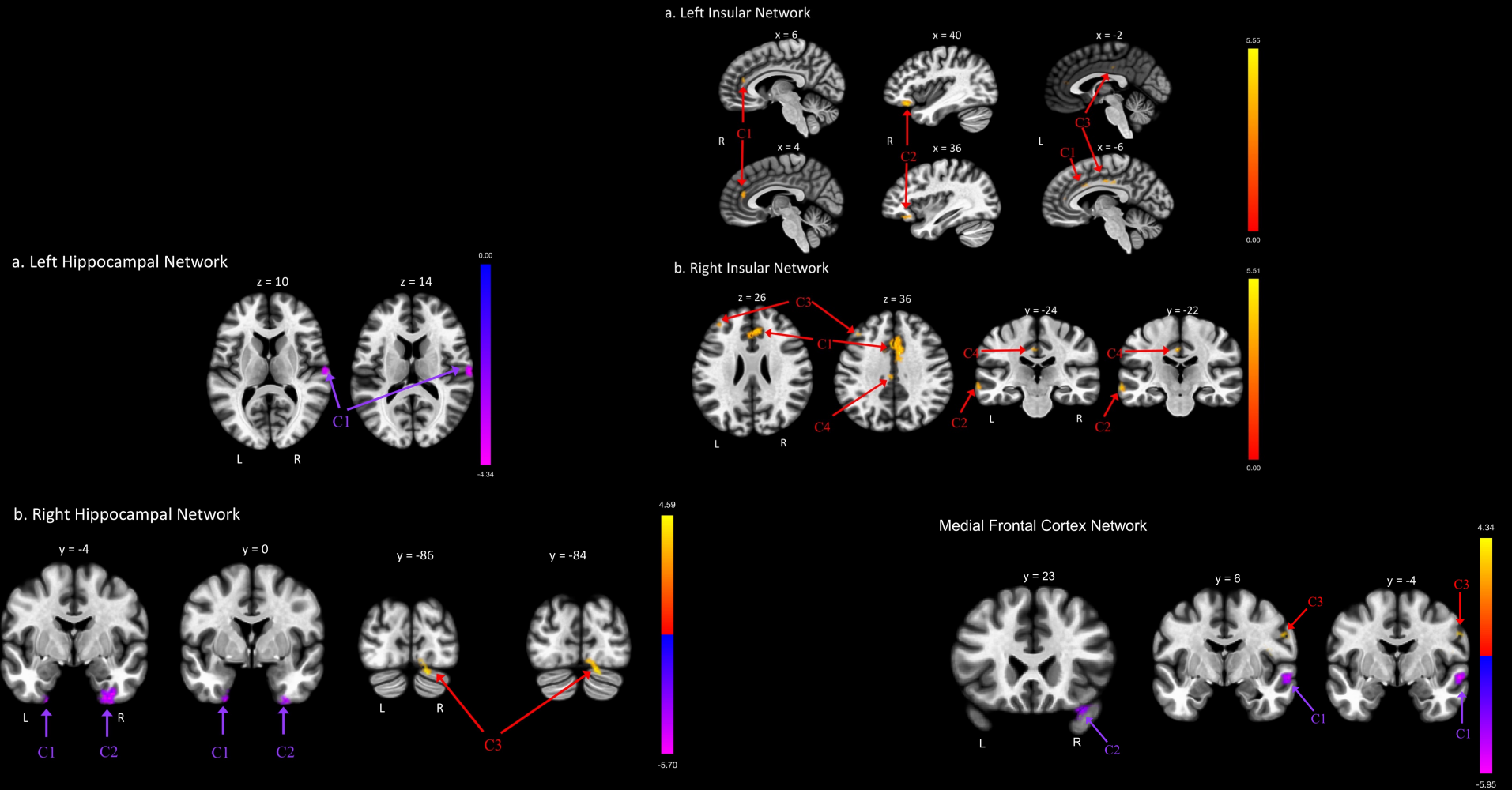
Physical Frailty and Reported Financial Exploitation in Older Adults
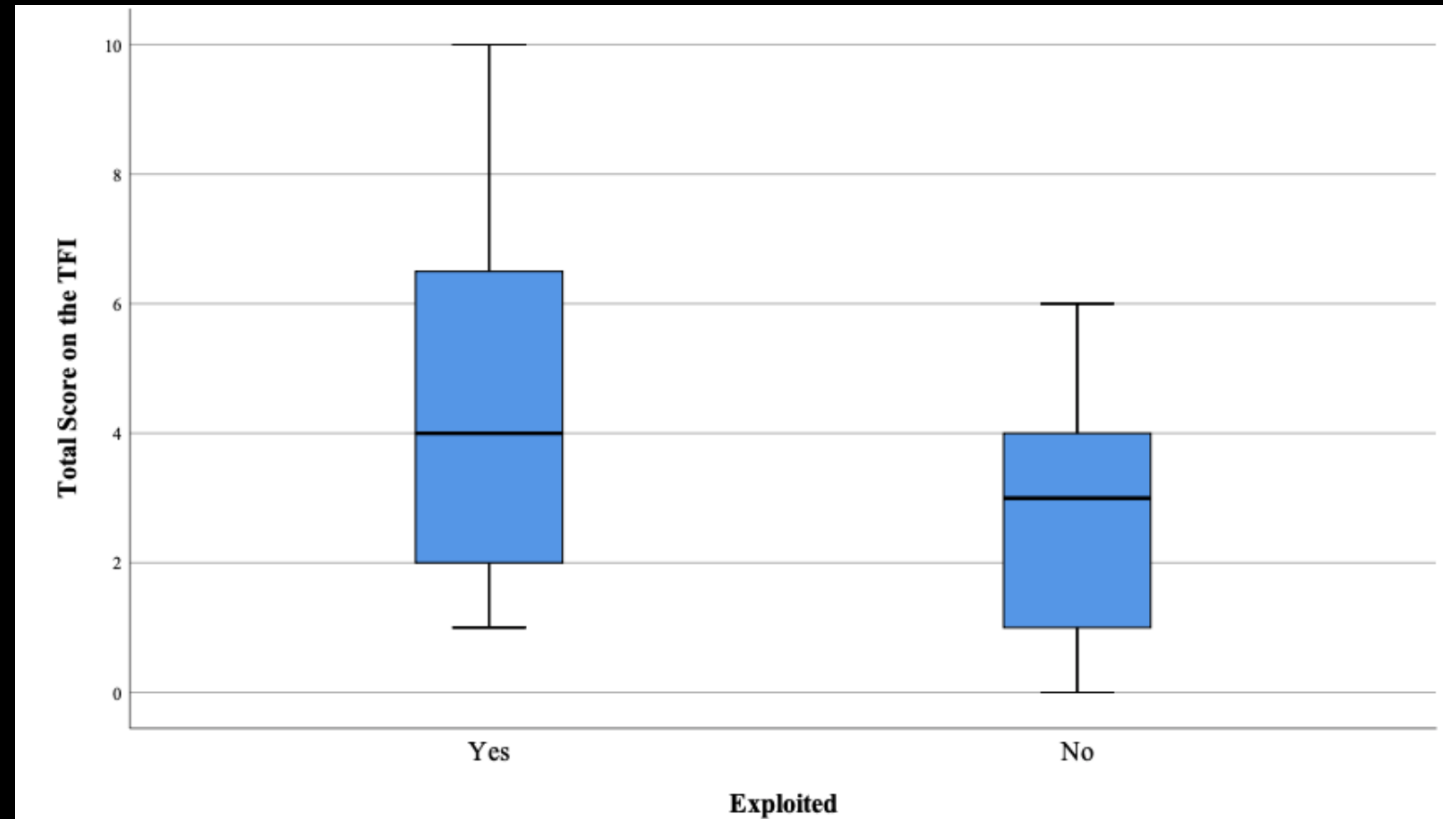
Figure 1. Boxplot display of total scores on the 15-item Tilburg Frailty Inventory (TFI) for perceived financially exploited ($n = 24$) and non-exploited ($n = 13$) older adults.

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Axelrod, J., Mosqueda, L., Weissberger, G.H., Nguyen, A.L., Boyle, P.A., Parunakian, E., & Han, S.D. Frailty and perceived financial exploitation: Findings from the Finance, Cognition, and Health in Elders Study. Gerontology and Geriatric Medicine, 2020. 6:1-5.

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Qualitative Interviews of Older Adults Who Reported Financial Exploitation

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Research Article

Perceived Types, Causes, and Consequences of Financial Exploitation: Narratives From Older Adults

Annie L. Nguyen, PhD, MPH,[1,*] Laura Mosqueda, MD,[1] Nikki Windisch, MSG,[1] Gali Weissberger, PhD,[2] Jenna Axelrod, PhD,[1] and S. Duke Han, PhD[1]

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*Selected as Editor's Choice

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Nguyen, A.L., Mosqueda, L., Windisch, N., Weissberger, G., Axelrod, J., Han, S.D. Perceived causes, context, and consequences of financial exploitation: Narratives from older adults. Journal of Gerontology: Social Sciences, 2021. 76(5):996-1004

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Interpersonal Relationships Predict Financial Exploitation Vulnerability in Older Age
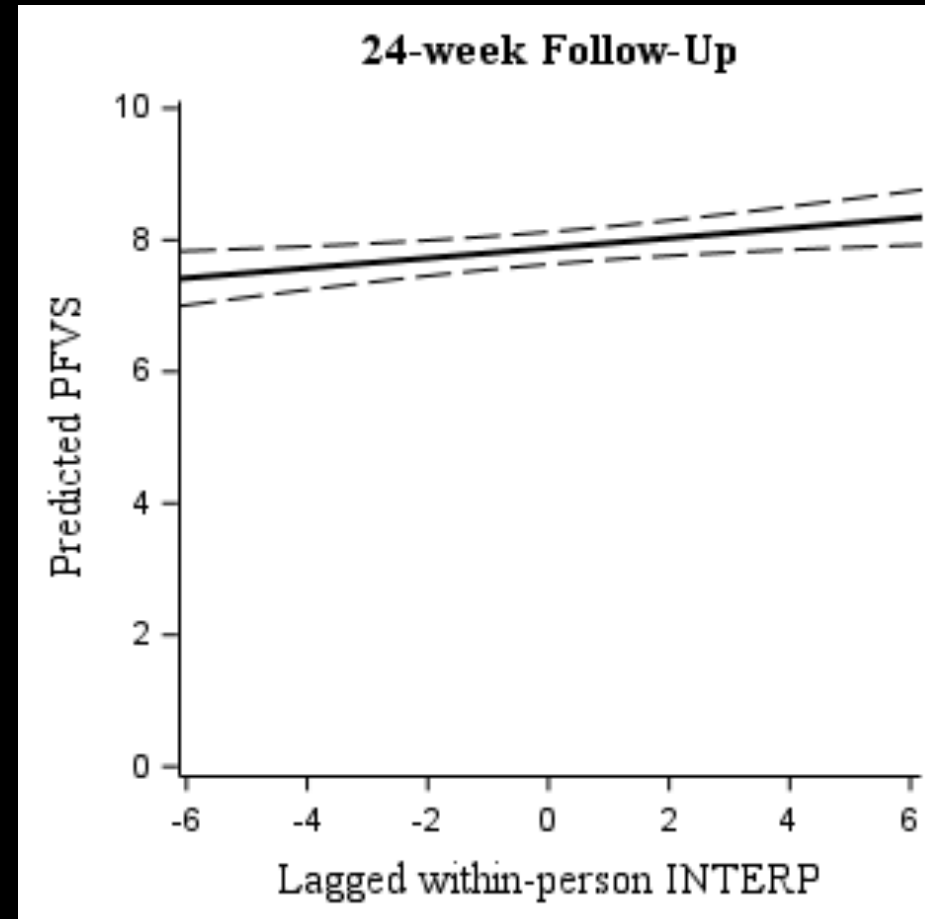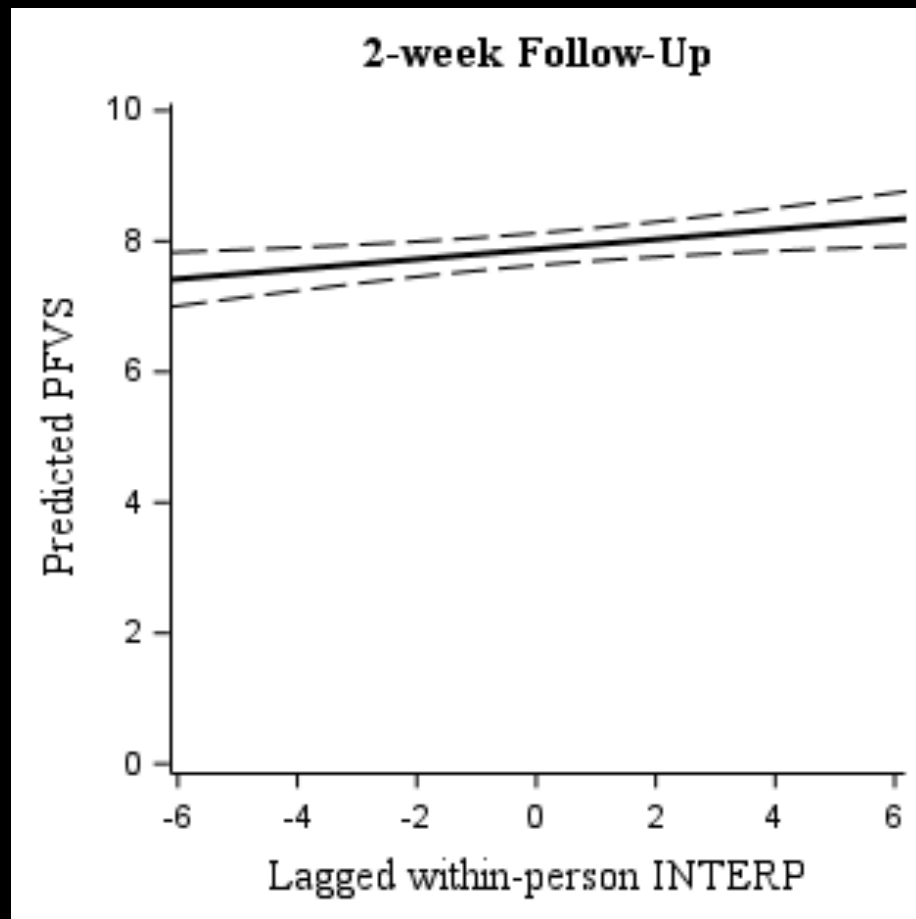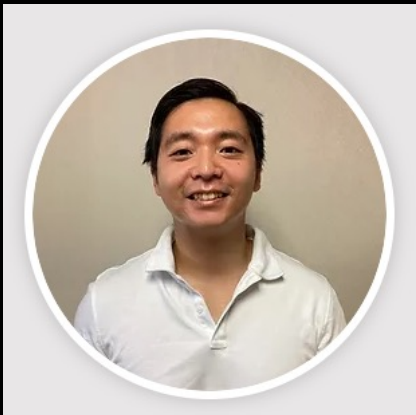
Lim, A.C., Mosqueda, L., Nguyen, A.L., Mason, T.B., Weissberger, G.H., Fenton, L., Lichtenberg, P., Han, S.D. (2023). Interpersonal dysfunction predicts subsequent financial exploitation vulnerability in a sample of adults over 50: A prospective observational study. *Aging and Mental Health,* 27:5, 983-991.

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Summary

- Age-related cognitive decline could make an older adult more susceptible to scams and impact decision making.

- Although poor cognition is associated with poor decision making, poor decision making may not be solely due to poor cognition.

- A complex network of brain regions susceptible to age-related neuropathology (medial temporal, medial prefrontal, insula) may be involved in poor decision making in older age.

- More research needs to be done with diverse samples and to better understand the contextual factors surrounding decisions.

- If declines in financial decision making are both a predictor and a consequence of Alzheimer's dementia, then the implications are significant.

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Future Directions

Check for updates
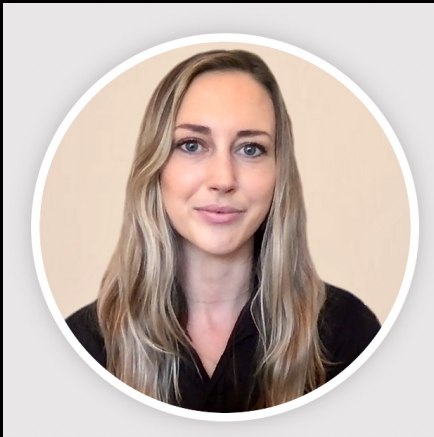
Cognitive and neuroimaging correlates of financial exploitation vulnerability in older adults without dementia: Implications for early detection of Alzheimer's disease

Laura Fenton [a], Gali H. Weissberger [b], Patricia A. Boyle [c], Laura Mosqueda [d,g], Hussein N. Yassine [e], Annie L. Nguyen [d], Aaron C. Lim [d], S. Duke Han [a,c,d,e,f,g,*]

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