

Financial Exploitation in Older Age: A Revisionary Model

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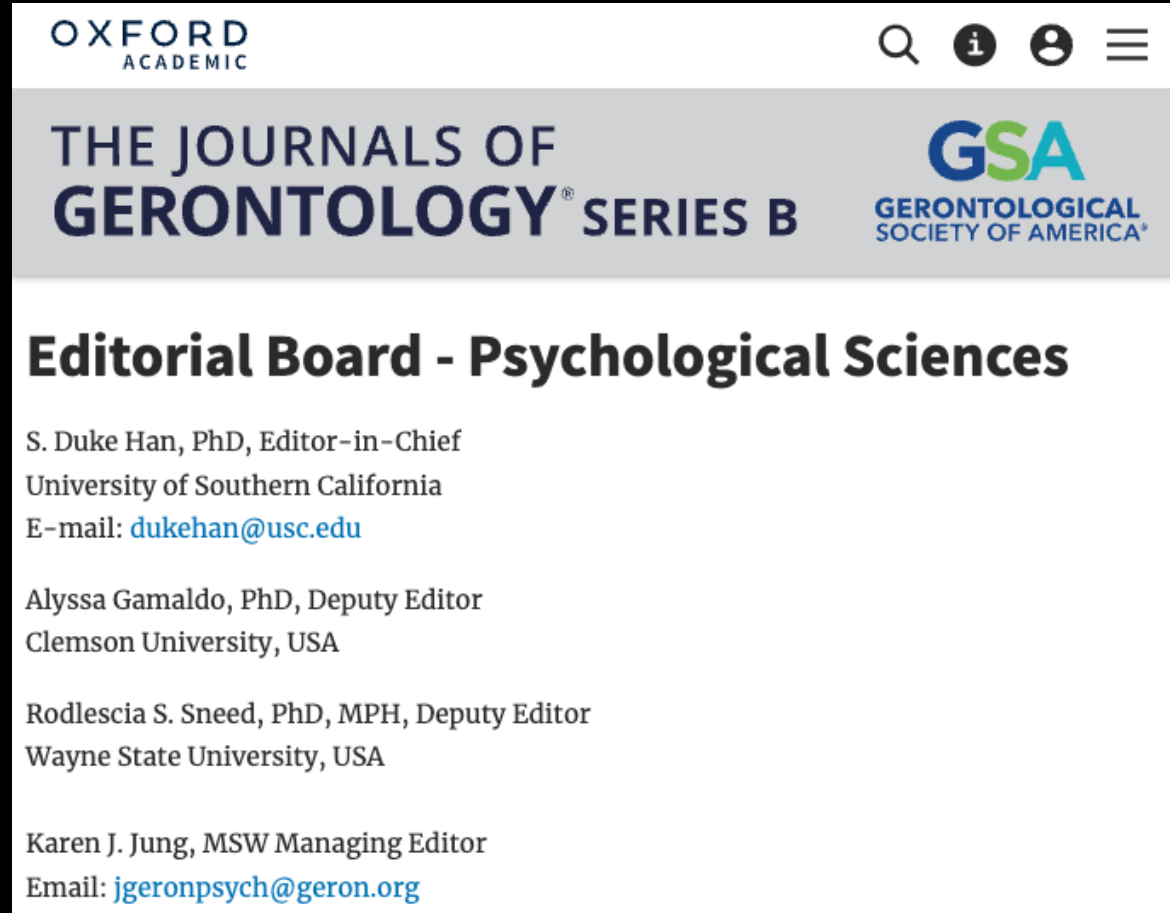
Judith Tamkin Symposium
February 23, 2024



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Disclosures



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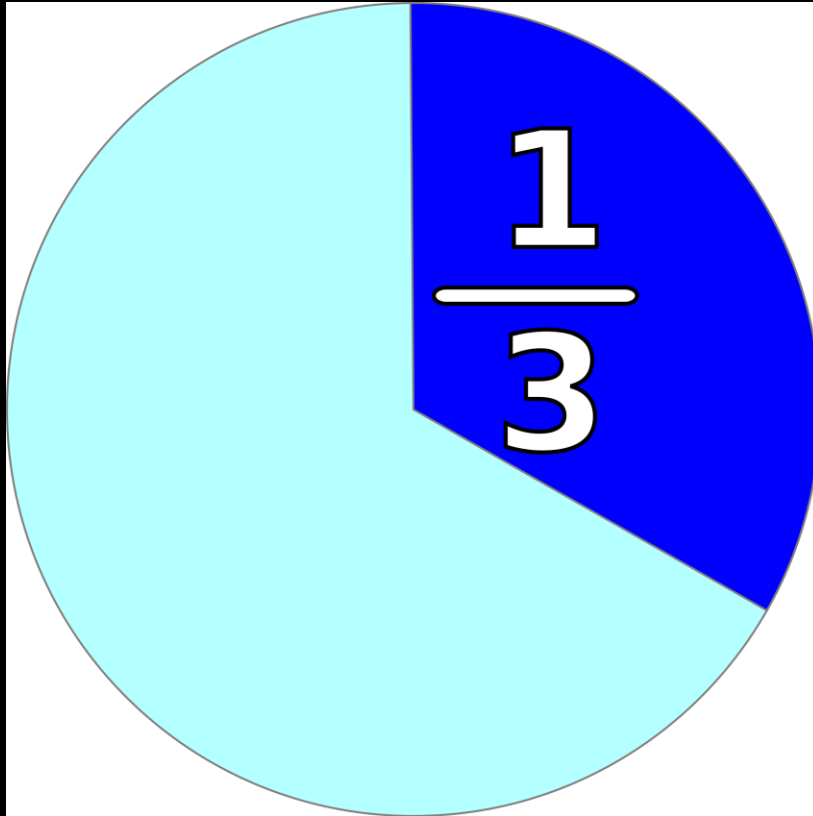
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Background



The screenshot shows the AARP website interface. At the top, there is a red header with the AARP logo and a search icon. Below the header, the breadcrumb trail reads "AARP » AARP States » Colorado". The main headline is "AARP Report: \$28.3 Billion a Year Stolen from Adults 60+". Below the headline are social media sharing icons for Facebook, Twitter, Email, and Print. The article text begins with a photograph of an elderly man and states: "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." The text continues with a quote: "While strangers often rely on quick and



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Laibson, 2011; Metlife, Inc., 2011; True Link Financial, Inc., 2015; Gunther, 2023

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Brain Structure Changes As We Age

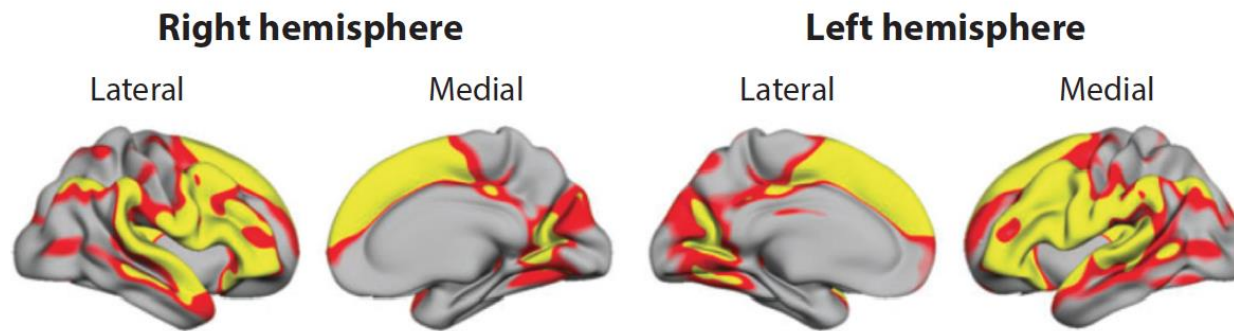
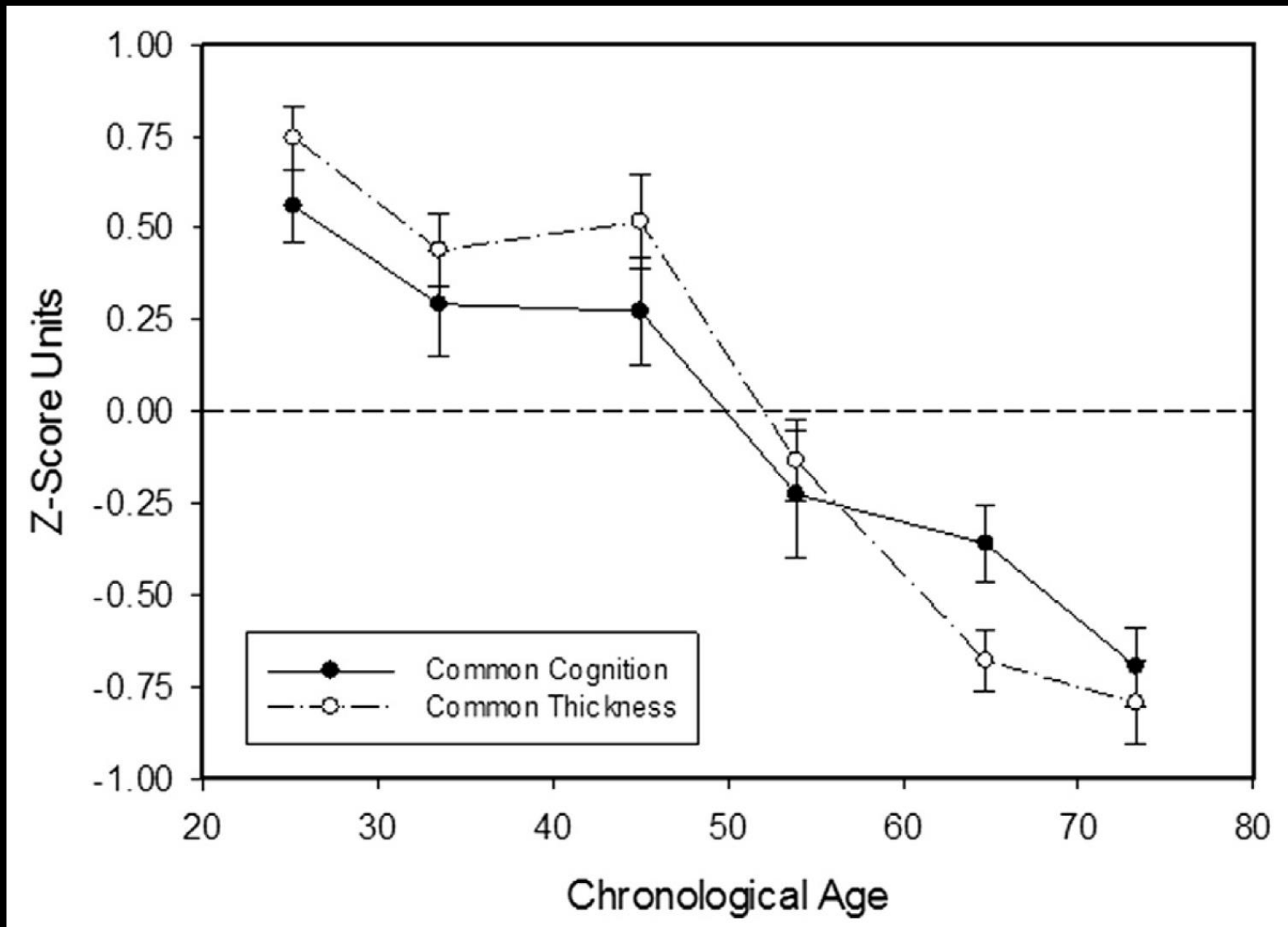


Figure 2

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).





Rationale

If an older adult shows impaired financial decision making or becomes a victim of a scam, the burden is not only experienced by the older adult, but is often displaced upon family members, caregivers, or society.

Reduced scam awareness and poor financial decision making may be early signs of Alzheimer's Disease (Boyle et al., 2019; Stewart et al., 2019; Nicholas et al., 2021), even ahead of cognitive impairment.

➤ *How can we understand this?*



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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. Resnick¹

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Importance of considering age-associated neuropathology

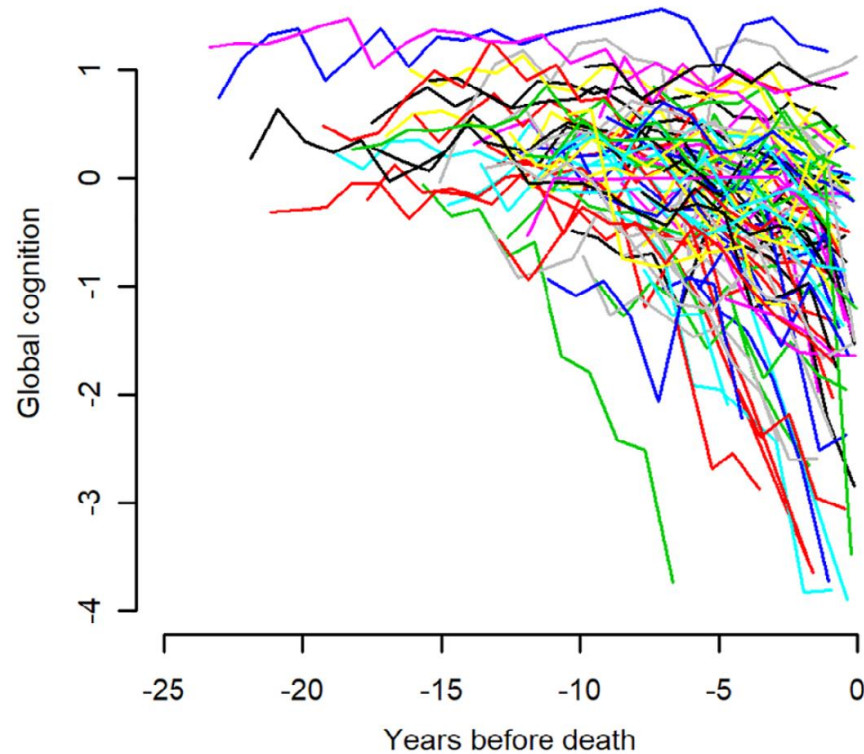
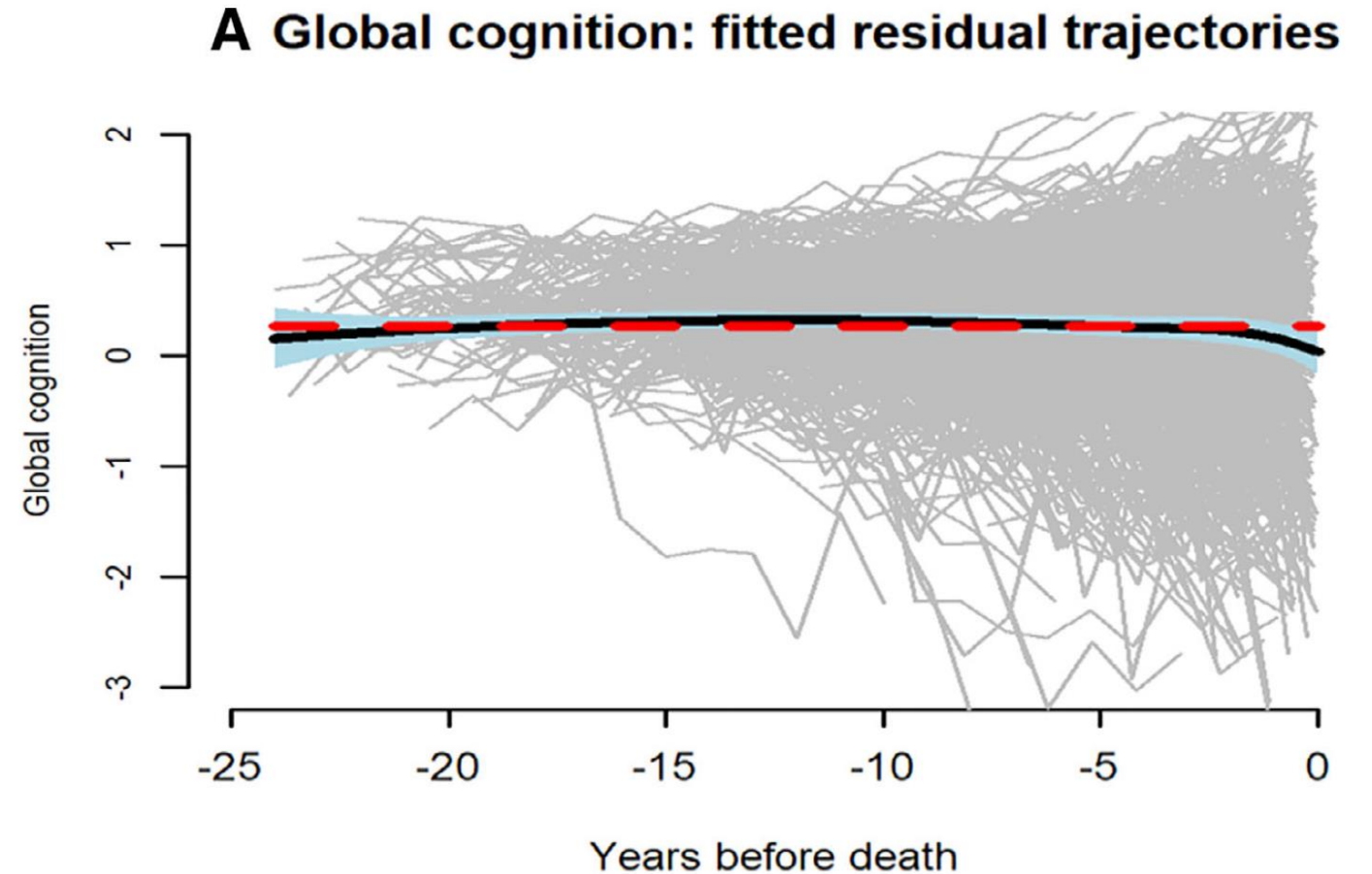
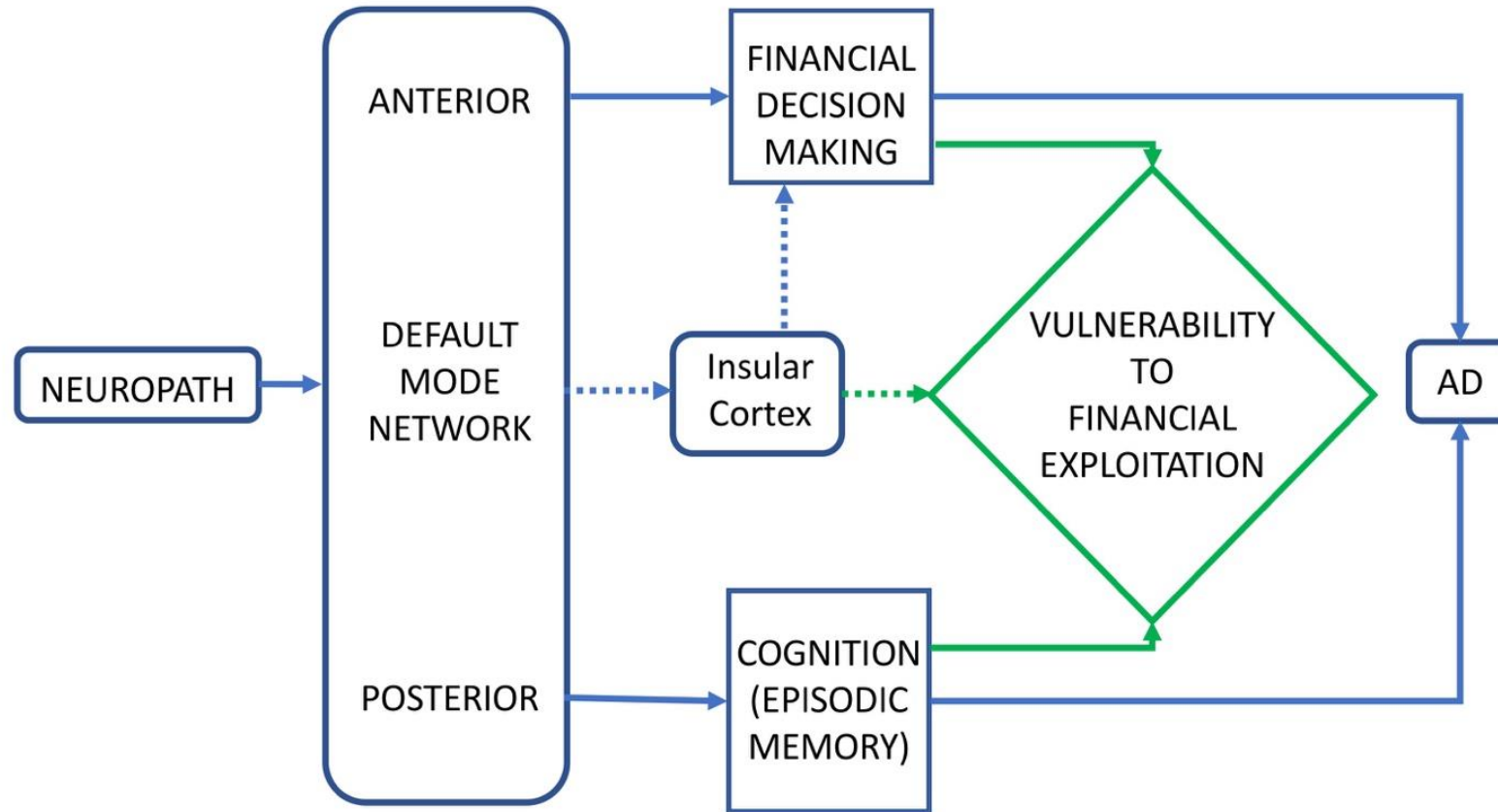


FIGURE 1: Crude trajectories of change in global cognition in 100 randomly selected participants.



Current Working Model



Neuroimaging Work to Date

Archives of Gerontology and Geriatrics 59 (2014) 429–433

Contents lists available at ScienceDirect

Archives of Gerontology and Geriatrics

journal homepage: www.elsevier.com/locate/archger

Financial literacy is associated with medial brain region functional connectivity in old age

S. Duke Han^{a,b,f,*}, Patricia A. Boyle^{a,b}, Lei Yu^{b,c}, Debra A. Fleischman^{a,b,c}, Konstantinos Arfanakis^{b,d,e}, Sue Leurgans^{b,c}, David A. Bennett^{b,c}

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Experimental Gerontology 48 (2013) 1489–1498

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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}

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Brain Imaging and Behavior (2016) 10:524–532
 DOI 10.1007/s11682-015-9422-4

ORIGINAL RESEARCH

Grey matter correlates of susceptibility to scams in community-dwelling older adults

S. Duke Han^{1,2,3,4} · Patricia A. Boyle^{1,2} · Lei Yu^{1,3} · Konstantinos Arfanakis^{6,7} · Bryan D. James^{1,5} · Debra A. Fleischman^{1,2,3} · David A. Bennett^{1,3}

Behavioural Brain Research 227 (2012) 233–240

Contents lists available at SciVerse ScienceDirect

Behavioural Brain Research

journal homepage: www.elsevier.com/locate/bbr

Research report

Neural intrinsic connectivity networks associated with risk aversion in old age

S. Duke Han^{a,*}, Patricia A. Boyle^{a,c}, Konstantinos Arfanakis^{b,c,e}, Debra A. Fleischman^{a,c}, Lei Yu^{c,d}, Emily C. Edmonds^a, David A. Bennett^{c,d}

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NeuroImage 130 (2016) 223–229

Contents lists available at ScienceDirect

NeuroImage

journal homepage: www.elsevier.com/locate/ynimg

Financial literacy is associated with white matter integrity in old age

S. Duke Han^{a,b,c,*}, Patricia A. Boyle^{d,e}, Konstantinos Arfanakis^{d,h,i}, Debra Fleischman^{d,e,f}, Lei Yu^{d,f}, Bryan D. James^{d,g}, David A. Bennett^{d,f}

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ORIGINAL ARTICLE

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}

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ORIGINAL RESEARCH

White matter correlates of scam susceptibility in community-dwelling older adults

Melissa Lamar^{1,2} · Konstantinos Arfanakis^{1,3,4} · Lei Yu^{1,5} · Shengwei Zhang¹ · S. Duke Han^{1,2,5,6,7,8,9} · Debra A. Fleischman^{1,2,5} · David A. Bennett^{1,5} · Patricia A. Boyle^{1,2}

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 in Aging Neuroscience

ORIGINAL RESEARCH
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Functional Connectivity Correlates of Perceived Financial Exploitation in Older Adults

Gali H. Weissberger^{1,2}, Laura Mosqueda^{1,3}, Annie L. Nguyen¹, Jenna Axelrod¹, Caroline P. Nguyen¹, Patricia A. Boyle^{4,5}, Nathan Spreng^{6,7,8} and S. Duke Han^{1,3,4,5,9,10*}



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Susceptibility to Scams

Brain Imaging and Behavior
DOI 10.1007/s11682-015-9422-4

ORIGINAL RESEARCH

Grey matter correlates of susceptibility to scams in community-dwelling older adults

S. Duke Han^{1,2,3,4} • Patricia A. Boyle^{1,2} • Lei Yu^{1,3} • Konstantinos Arfanakis^{6,7} •
Bryan D. James^{1,5} • Debra Fleischman^{1,2,3} • David A. Bennett^{1,3}

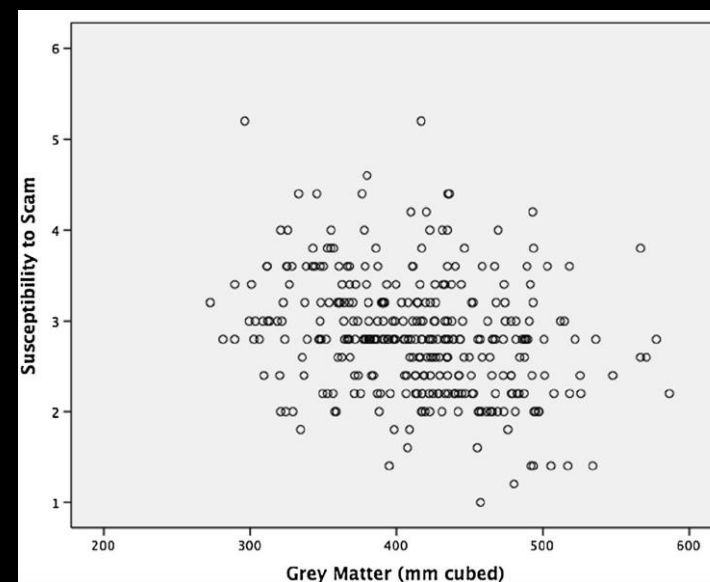
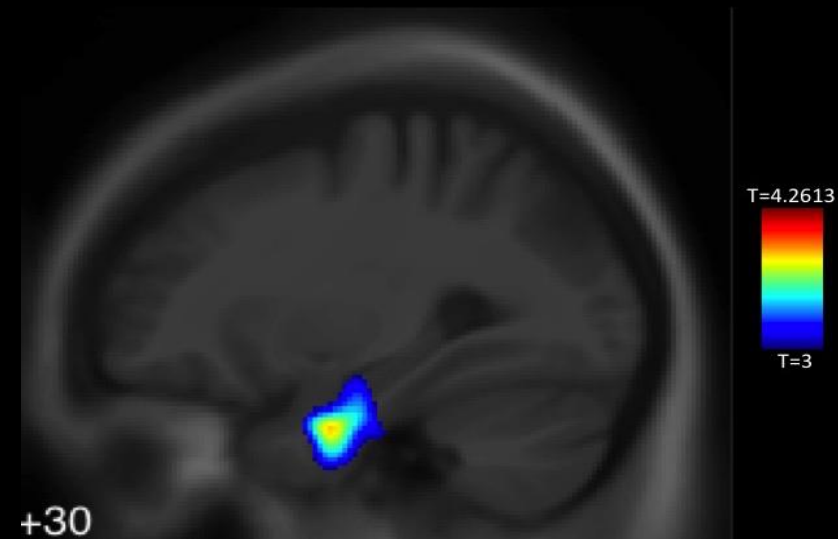
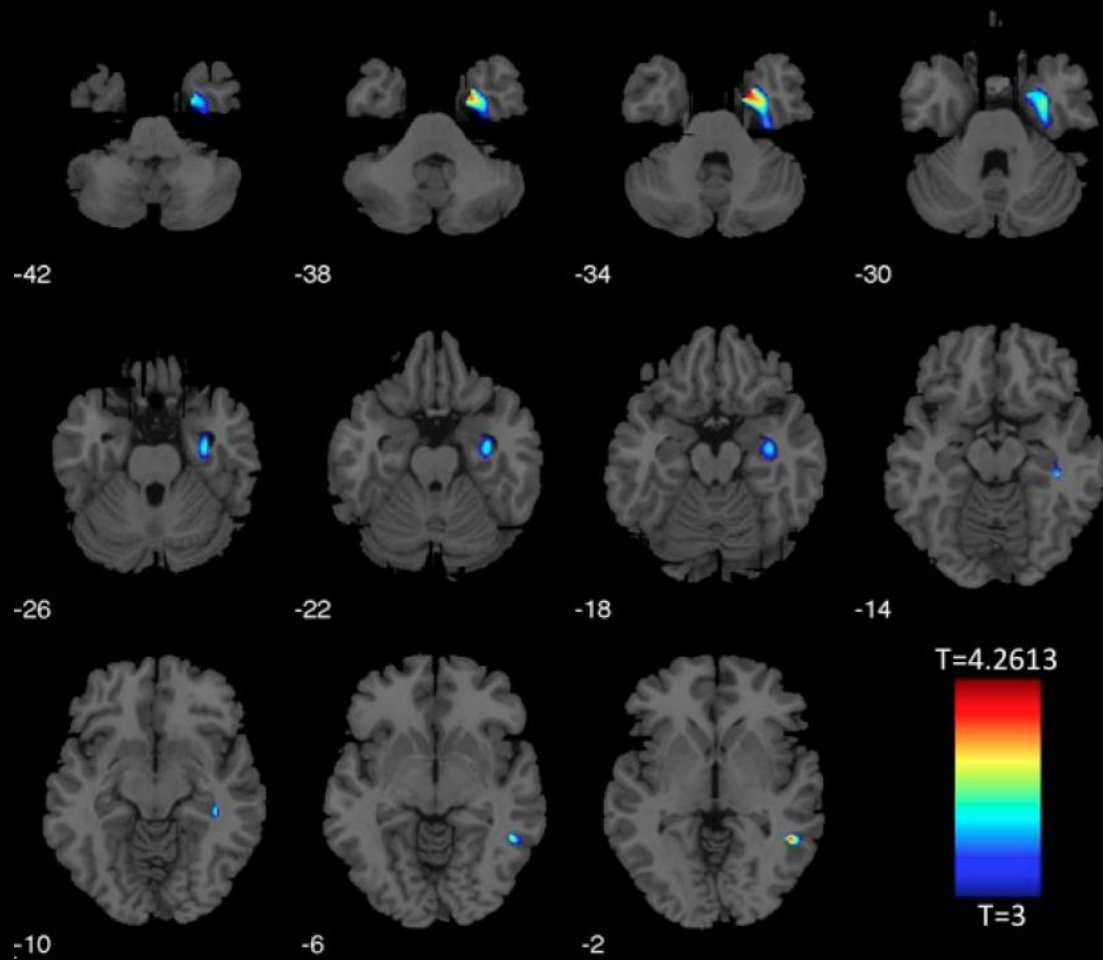
- Voxel-based morphometry (VBM) to assess grey matter density at the voxel level
- N=348 nondemented older adults
- Mean age=81.55, s.d.=7.25; mean number of years of education=15.30, s.d.=2.91; 74.10% female



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Susceptibility to Scams – Grey Matter Density



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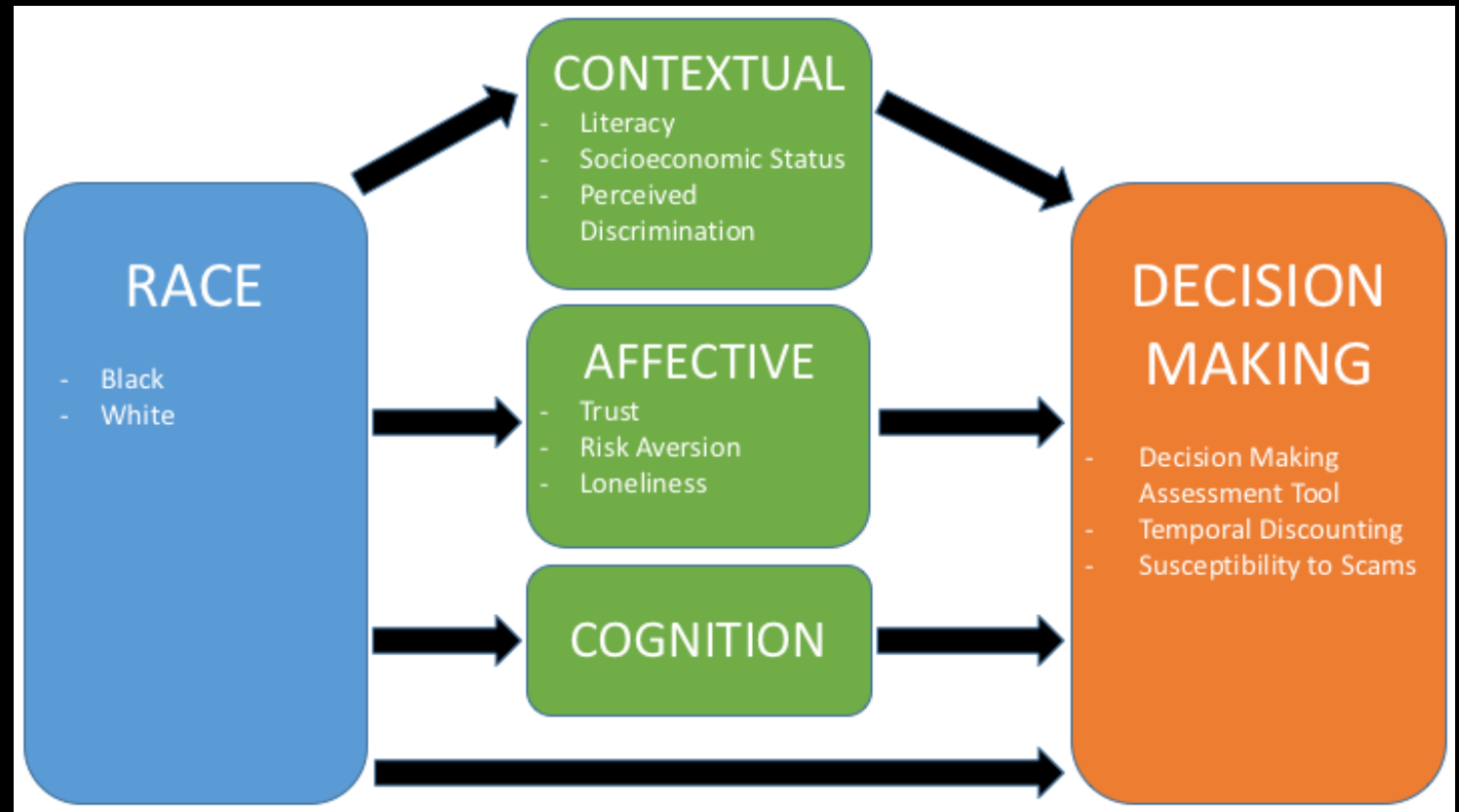
Some Thoughts and Observations...

- Very few behavioral economic or neuroimaging decision making studies have a diverse representation of participants.
 - Racial differences in cognitive and affective factors have been suggested.
 - Racial differences in decision making are suggested by a limited number of studies in financial planning and healthcare treatment options.
- However, whether (or the extent to which) decision making abilities, specifically, may vary by race is largely unknown.
- Contextual factors (e.g., literacy, socioeconomic status) may explain a significant portion of any racial differences observed due to historically documented institutionalized racism and unequal access to supportive resources.



Racial Differences in Decision Making among Older Adults

(R01AG055430; PI: Han along with Co-I: Barnes)



Literacy Mediates Racial Differences in Financial and Healthcare Decision Making in Older Adults


S. Duke Han, PhD,^{*†‡§¶||**}  Lisa L. Barnes, PhD,^{¶||**} Sue Leurgans, PhD,^{||**} Lei Yu, PhD,^{||**} David A. Bennett, MD,^{||**} and Patricia A. Boyle, PhD^{¶||}

Table 3. Associations of Race and Literacy With Total Decision Making

	Model 1	Model 2	Model 3
Adjusted R ²	.4409	.4666	.4715
Age	-.08 (.02 [-.12 to -.04], <.01)	-.06 (.02 [-.10 to -.03], <.01)	-.07 (.02 [-.10 to -.03], <.01)
Education	.21 (.04 [.13 to .29], <.01)	.16 (.04 [.08 to .24], <.01)	.12 (.04 [.09 to .25], <.01)
Sex (male = 1, female = 0)	1.16 (.30 [.58 to 1.74], <.01)	.89 (.29 [.32 to 1.47], <.01)	.93 (.29 [.35 to 1.50], <.01)
Global cognition	2.29 (.26 [1.78 to 2.79], <.01)	1.73 (.28 [1.19 to 2.27], <.01)	1.79 (.28 [1.25 to 2.33], <.01)
Race (Black = 1, White = 0)	-.80 (.23 [-1.25 to -.34], <.01)		-.45 (.24 [-.93 to .02], .06)
Literacy		.05 (.01 [.03 to .07], <.01)	.04 (.01 [.02 to .06], <.01)

Note. Data are given as estimate (SE [95% confidence interval], P value), unless otherwise indicated. The dependent variable is financial and healthcare decision making total score. Age and education are presented in years. Global cognition is a mean of z-scores of 18 cognitive tests. Literacy is the average of the two domain (financial and health) percentages correct.

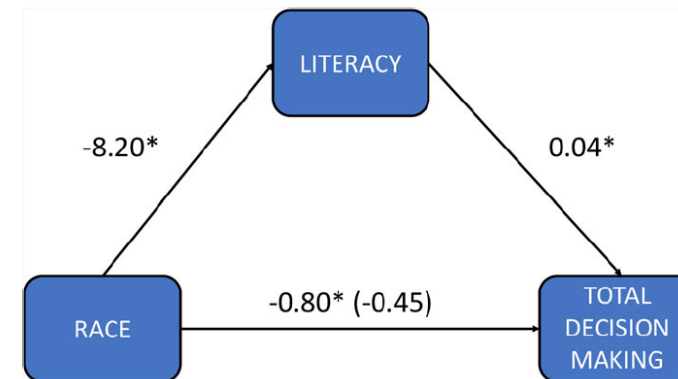


Figure 1. Mediation of race association with total decision making by literacy. Standardized regression coefficients for the association between race and literacy (−8.20) and literacy and total decision making (0.04), after multiplication, estimate the indirect effect of race on total decision making through literacy. The direct effect of race on total decision making is estimated by standardized regression coefficient for the association between race and total decision making after controlling for literacy (−0.45). Regression models were adjusted for age, education, sex, and global cognition. *P < .05.



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Susceptibility to Scams in Older Black and White Adults

S. Duke Han^{1,2,3,4,5,6,7*}, Lisa L. Barnes^{5,6,7}, Sue Leurgans^{6,7}, Lei Yu^{6,7}, Christopher C. Stewart⁸, Melissa Lamar^{5,6}, Crystal M. Glover^{5,6,7}, David A. Bennett^{6,7} and Patricia A. Boyle^{5,6}

TABLE 2 | Association of race with susceptibility to scams.

	Model 1	Model 2	Model 3
Estimate (standard error, p-value)			
Age	0.0263 (0.0051, <0.0001)	0.0164 (0.0053, 0.0020)	0.0155 (0.0052, 0.0031)
Sex (male = 1, female = 0)	0.1462 (0.0877, 0.0959)	0.0901 (0.0865, 0.2976)	0.0878 (0.0855, 0.3045)
Education	-0.0363 (0.0107, 0.0007)	-0.0158 (0.0112, 0.1560)	-0.0149 (0.0110, 0.1783)
Global cognition		-0.3698 (0.0705, <0.0001)	-0.3891 (0.0699, <0.0001)
Race (Black = 1, White = 0)			-0.2496 (0.0649, 0.0001)

Dependent variable is susceptibility to scams total score. For sex, male is coded as 1 and female is coded as 0. For race, Black is coded as 1 and White is coded as 0.

TABLE 3 | Susceptibility to scams item response by race.

	Black (N = 296)		White (N = 296)		Z	p
	Mean	SD	Mean	SD		
Item 1: I feel I have to answer the phone whenever it rings, even if I do not know who is calling.	3.490	2.055	4.676	2.062	6.8043	<0.0001
Item 2: I have difficulty ending a phone call, even if the caller is a telemarketer, someone I do not know, or someone I did not wish to call me.	2.135	1.455	2.182	1.438	0.5724	0.5670
Item 3: If something sounds too good to be true, it usually is.	2.000	1.083	1.882	0.885	-1.0539	0.2919
Item 4: Persons over the age of 65 are often targeted by con-artists.	1.747	0.689	1.909	0.695	3.3736	0.0007
Item 5: If a telemarketer calls me, I usually listen to what they have to say.	2.557	1.672	2.432	1.512	-0.3073	0.7586

Wilcoxon Z-values are reported. Items 1, 2, and 5 are flipped scoring statements, meaning that higher scores indicate higher agreement. Items 3 and 4 are non-flipped scoring statements, meaning that lower scores indicate higher agreement.





**“Of course we’ll make a decision ...
once we have considered the 5243 factors.”**



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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-



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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



Letter to the Editor | [Free Access](#)

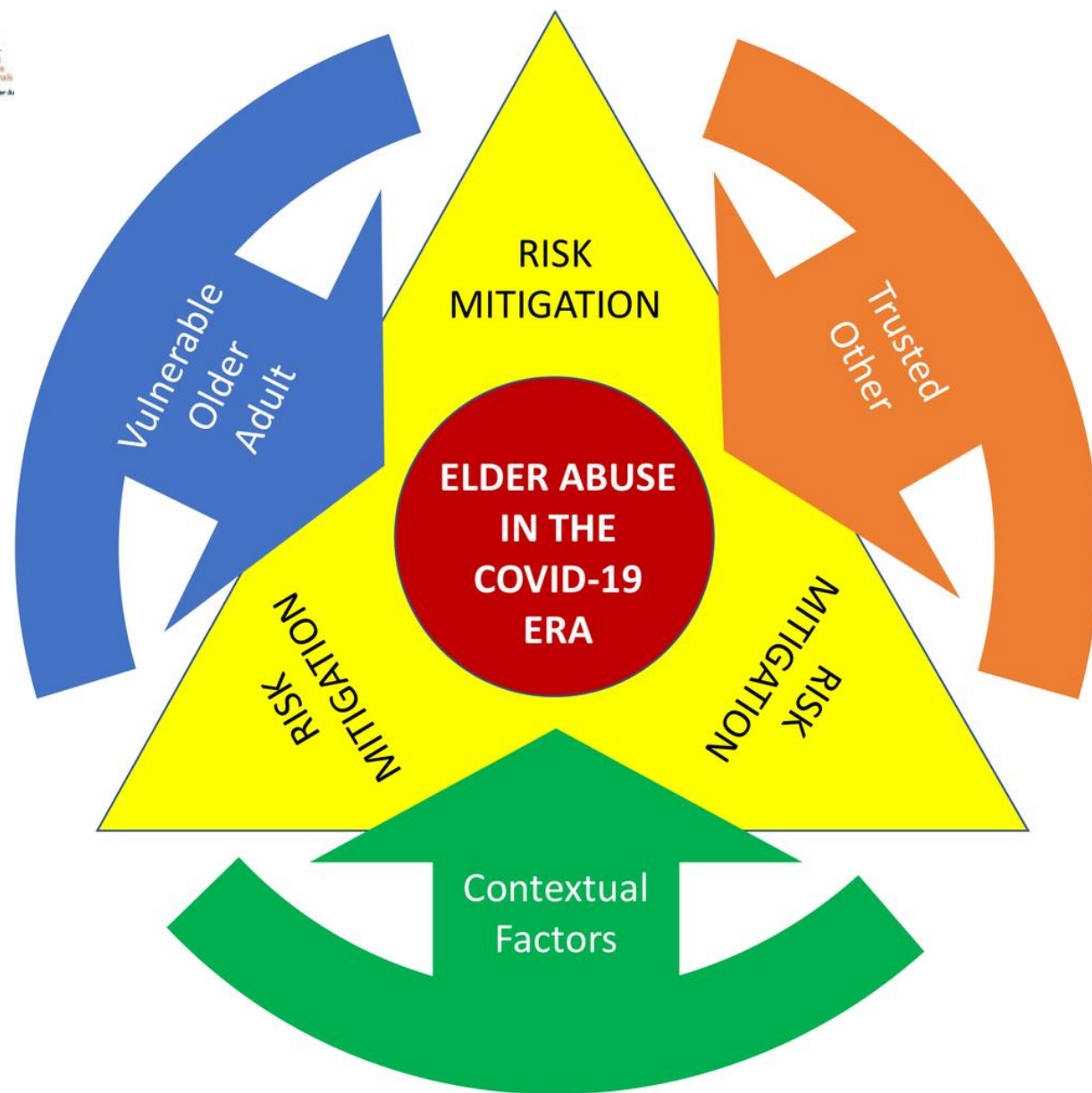
Elder Abuse in the COVID-19 Era

S. Duke Han PhD ✉ Laura Mosqueda MD

First published: 20 April 2020 | <https://doi.org/10.1111/jgs.16496> | Citations: 34



Abuse Invention/Prevention Model (AIM). AIM describes three core intersecting considerations in elder abuse: (1) the vulnerable older adult, (2) the trusted other, and (3) the context in which the abuse occurs. Tailored approaches that consider each of these can be developed to mitigate risks for elder abuse in the coronavirus disease 2019 (COVID-19) era.



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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



Health in Elders Study (FINCHES) being carried out through USC's Department of Family Medicine.

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

Blogs Series:

- > NCEA Blog
- > WEADD Blogs
- > Victim Services (Spanish)
- > Diversity and Inclusion (Spanish)
- > USC Davis School of Gerontology



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With grateful initial funding from the Elder Justice Foundation; now funded by RF1AG068166; PI: Han, Co-I: Mosqueda

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USC Work to Date

Neuroscience and Biobehavioral Reviews 140 (2022) 104773

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Neuroscience and Biobehavioral Reviews

journal homepage: www.elsevier.com/locate/neubiorev

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,e}, Hussein N. Yazine^a, Annie L. Nguyen^f, Aaron C. Lim^d, S. Duke Han^{a,c,d,e,f,g}

Journal of Alzheimer's Disease xx (2022) x-xx
DOI: 10.3233/JAD-220187
IOS Press

Increased Financial Altruism is Associated with Alzheimer's Disease Neurocognitive Profile in Older Adults

Gali H. Weissberger^{a,*}, Anya Samek^b, Laura Mosqueda^{c,f}, Annie L. Nguyen^f, Aaron C. Lim^f, Laura Fenton^e and S. Duke Han^{c,d,e,f,g,h}

AGING & MENTAL HEALTH
2023, VOL. 27, NO. 5, 983-991
<https://doi.org/10.1080/13607863.2022.2076210>

Routledge
Taylor & Francis Group

Check for updates

Interpersonal dysfunction predicts subsequent financial exploitation vulnerability in a sample of adults over 50: a prospective observational study

Aaron C. Lim^a, Laura Mosqueda^a, Annie L. Nguyen^a, Tyler B. Mason^b, Gali H. Weissberger^c, Laura Fenton^d, Peter Lichtenberg^e and S. Duke Han^{a,d,f,g}

THE GERONTOLOGICAL SOCIETY OF AMERICA

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OXFORD

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, PhD¹

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in Aging Neuroscience

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Functional Connectivity Correlates of Perceived Financial Exploitation in Older Adults

Gali H. Weissberger^{1,2}, Laura Mosqueda^{1,3}, Annie L. Nguyen¹, Jenna Axelrod¹, Caroline P. Nguyen¹, Patricia A. Boyle^{4,5}, Nathan Spreng^{6,7} and S. Duke Han^{1,4,5,8,9}

Brief Report

Frailty and Perceived Financial Exploitation: Findings from the Finance, Cognition, and Health in Elders Study

Jenna Axelrod, PhD¹, Laura Mosqueda, MD^{1,4}, Gali H. Weissberger, PhD¹, Annie L. Nguyen, PhD¹, Patricia A. Boyle, PhD², Emanuil Parunakian, BS¹, and S. Duke Han, PhD^{1,2,3,4}

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Article

SGS SOUTHERN GERONTOLOGICAL SOCIETY

Elder Abuse Characteristics Based on Calls to the National Center on Elder Abuse Resource Line

Gali H. Weissberger¹, Morgan C. Goodman², Laura Mosqueda^{2,3}, Julie Schoen^{1,3}, Annie L. Nguyen¹, Kathleen H. Wilber⁴, Zachary D. Gassoumis⁴, Caroline P. Nguyen¹, and S. Duke Han^{1,2,4,5,6}

AGING & MENTAL HEALTH
2020, VOL. 24, NO. 5, 740-746
<https://doi.org/10.1080/13607863.2019.1571020>

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

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Weissberger et al. *BMC Geriatrics* (2022) 22:689
<https://doi.org/10.1186/s12877-022-03385-w>

BMC Geriatrics

RESEARCH Open Access

Elder abuse in the COVID-19 era based on calls to the National Center on Elder Abuse resource line

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CLINICAL GERONTOLOGIST
<https://doi.org/10.1080/07317115.2023.2217190>

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The Cognitive Correlates of Financial Literacy in Older Adults

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Entorhinal Cortex Associated With Perceived Financial Vulnerability in Cognitively Intact Older Adults

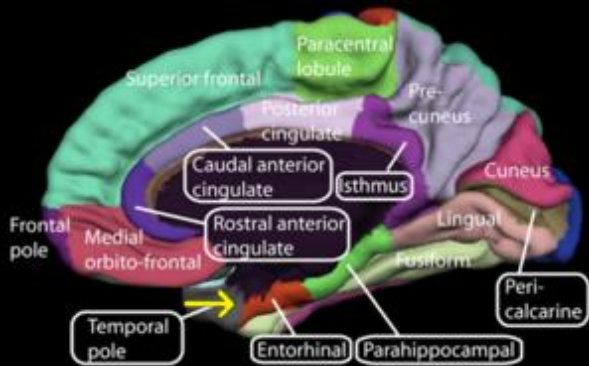


Image courtesy of wikipedia

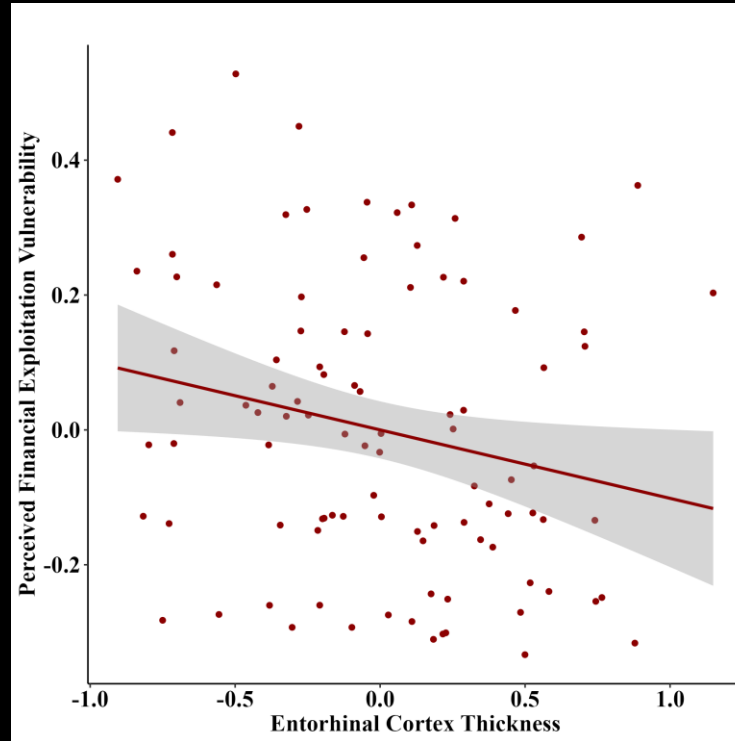


Figure 1: smaller entorhinal cortex thickness is associated with higher perceived financial exploitation vulnerability ($b = -0.83$, $SE = 0.40$, $p < 0.05$). Plot adjusted for age, sex, education, and MMSE.

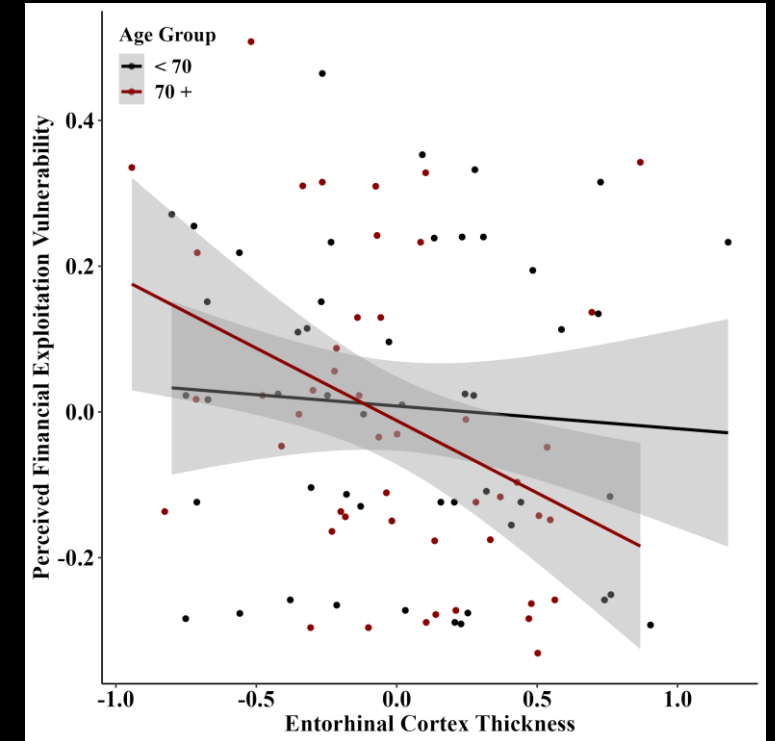


Figure 2: smaller entorhinal cortex thickness is associated with higher perceived financial exploitation vulnerability in older adults aged 70 or above ($b = -1.81$, $SE = 0.62$, $p < 0.01$). Plot adjusted for sex, education, and MMSE.



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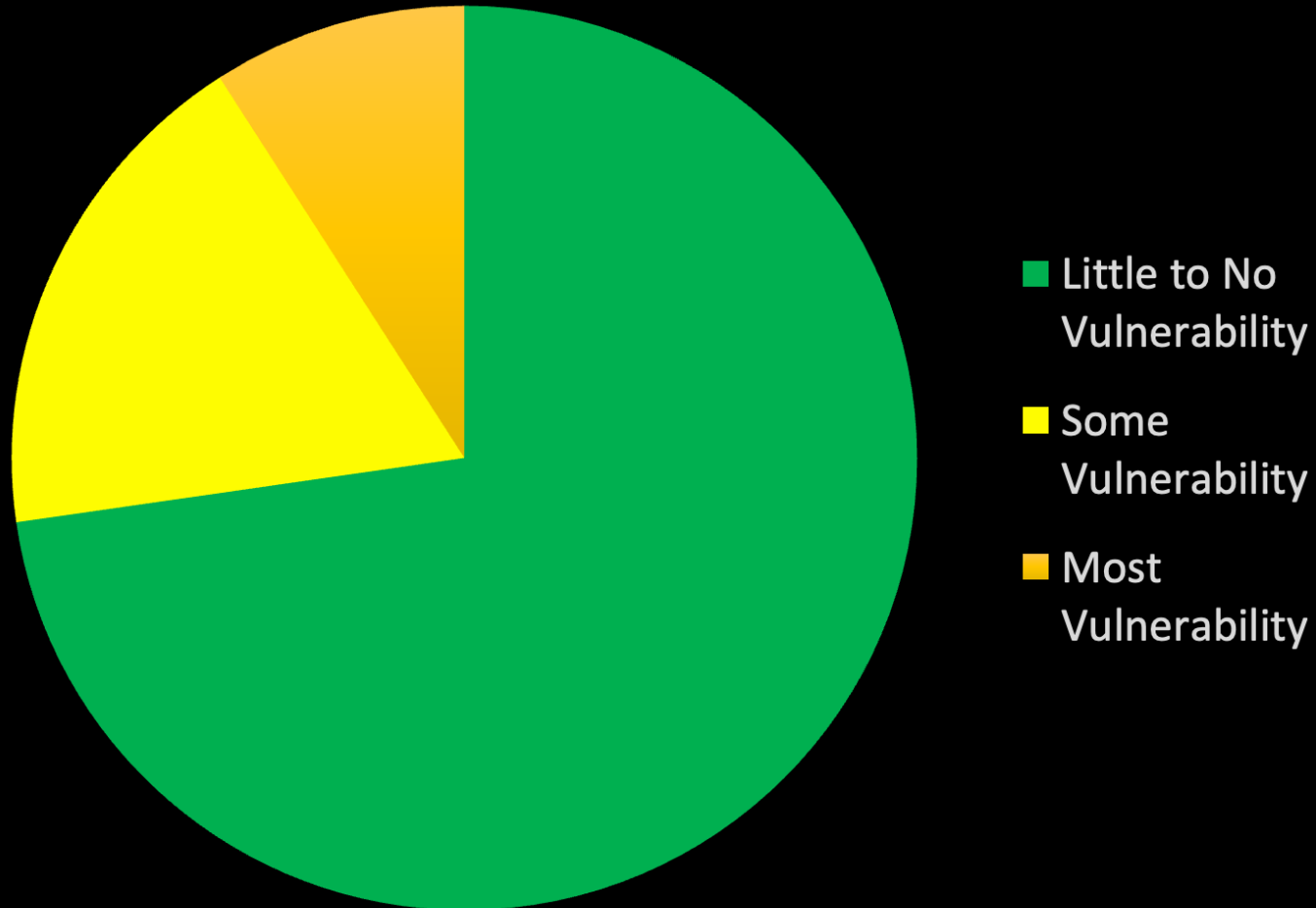
PRELIMINARY DATA

Presented at INS 2024 Poster Session 4; Thursday Feb 15 at 12pm-1:15pm Abstract #35

@sdukehan

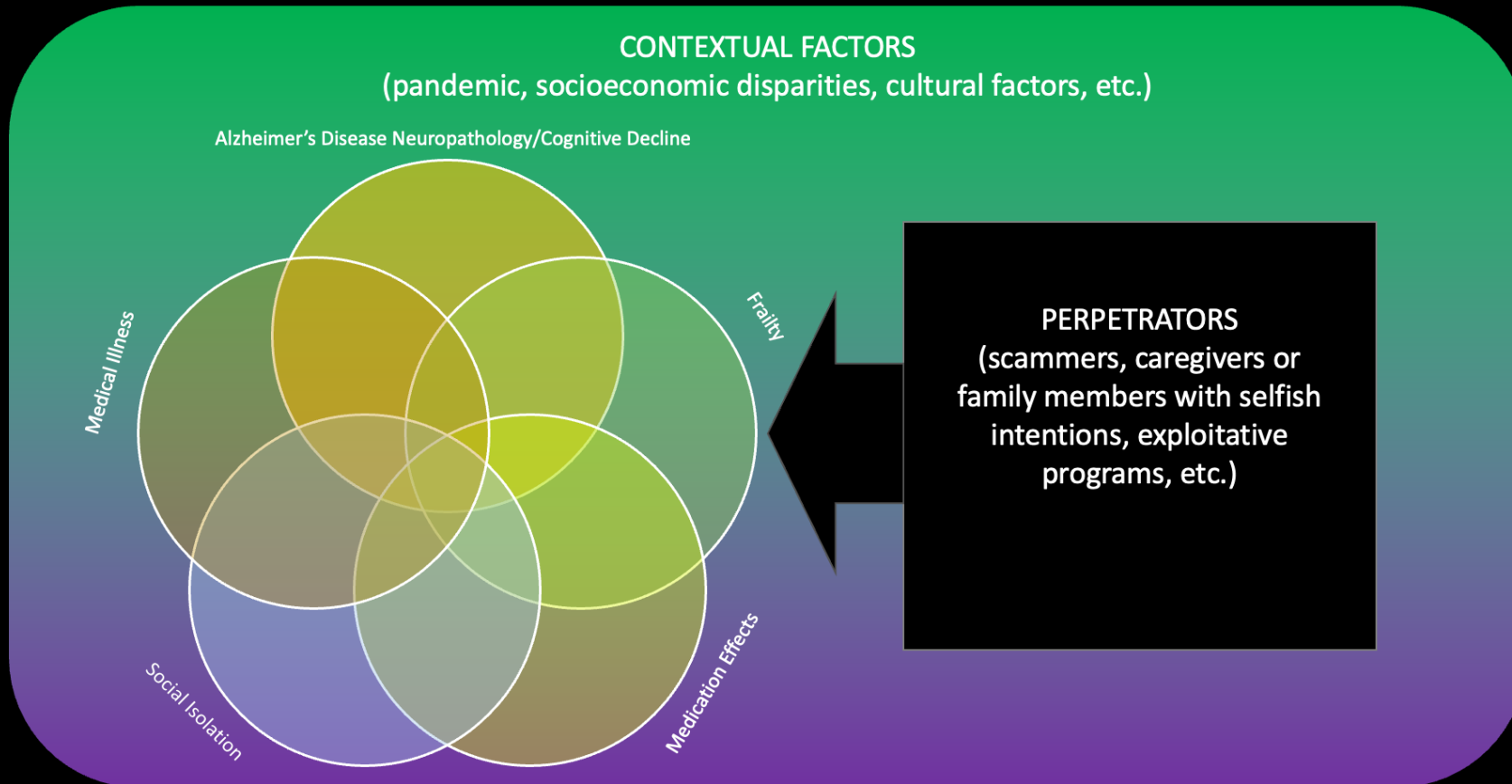
Some Final Thoughts

VULNERABILITY AS A SPECTRUM



Some Final Thoughts

INTERSECTIONAL MODEL



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