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Title
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Permalink
https://escholarship.org/uc/item/5gp485vh

Journal
Alzheimer's & Dementia, 19(S4)

ISSN
1552-5260

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Publication Date
2023-06-01

DOI
10.1002/alz.067571

Peer reviewed

CLINICAL MANIFESTATIONS

POSTER PRESENTATION

Alzheimer's & Dementia®
THE JOURNAL OF THE ALZHEIMER'S ASSOCIATION

NEUROPSYCHIATRY AND BEHAVIORAL NEUROLOGY

Characterizing oldest-old SuperAgers based on cognitive domains and demographic factors: The Life After 90 study

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Abstract

Background: SuperAgers are individuals who maintain superior cognitive performance despite advanced age. Most studies define SuperAgers as superior performers only in episodic memory. Our aim was to assess in a diverse oldest-old cohort if superior performance in one domain indicates superior performance in other domains and explore demographic characteristics.
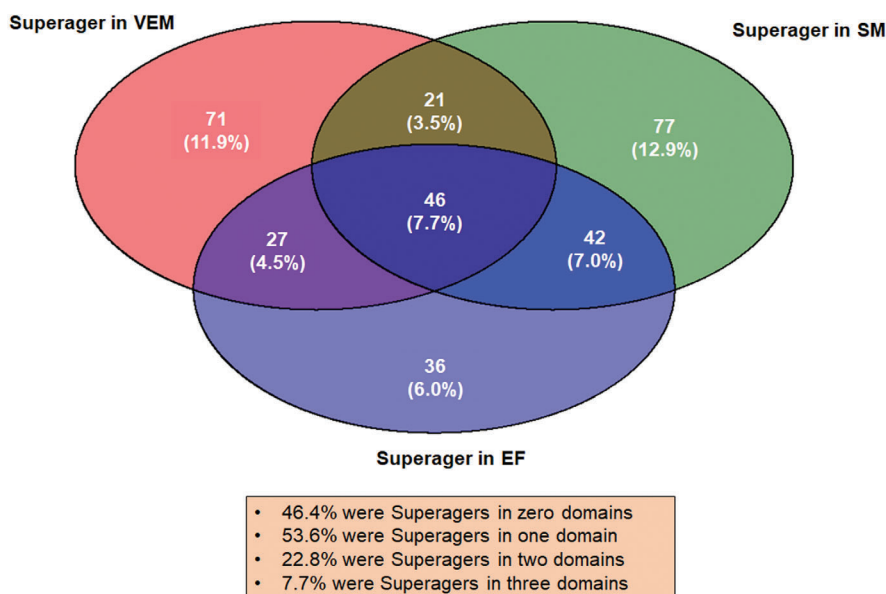
Methods: The LifeAfter90 study is a multi-ethnic cohort of members of Kaiser Permanente Northern California aged 90 or older. Baseline verbal episodic memory (VEM), semantic memory (SM), and executive function (EF) were evaluated using the Spanish and English Neuropsychological Assessment Scale (SENAS). SuperAgers were individuals who scored above the mean of domain and race-specific SENAS scores from a reference cohort aged 65-70 years. The reference group were similar participants from the Kaiser Healthy Aging and Diverse Life Experiences (KHANDLE) study. To assess the association between age, sex, education, and being a SuperAger, odds ratios (OR) and 95% confidence interval (CI) were calculated using multiple logistic regression.

Results: The 617 study participants (236 men and 381 women) had a mean age of 92.9 years (Table1). 53.6% of individuals were SuperAgers in one domain, 22.8% in any two domains, and 7.7% in all three domains. 7.0% of individuals were SuperAgers in SM and EF, 4.5% in VEM and EF, and 3.5% in VEM and SM (Figure1). SuperAgers were younger than non-SuperAgers. Women were more likely to be SuperAgers in VEM (OR = 2.13; 95%CI: 1.43,3.18) and EF (OR = 2.18; 95%CI: 1.44,3.30) and less likely in SM (OR = 0.49; 95%CI: 0.34,0.71) compared to men. Higher education was related to being a SuperAger in SM (OR = 1.85; 95%CI: 1.28,2.67) and EF (OR = 2.56; 95%CI: 1.74,3.78) but not VEM (Table2).

Conclusion: In this diverse cohort of oldest-old SuperAgers we found that exceptional episodic memory performance does not indicate exceptional performance in other cognitive domains. Education was not a predictor of exceptional performance in all domains. Future work should investigate predictors of exceptional cognitive aging after age 90.

Table 1. Sample characteristics

Demographic characteristics	Total (N = 617)
Sex	
Men, N (%)	236 (38.2)
Women, N (%)	381 (61.8)
Age at visit (Mean ±SD)	92.9 ±2.5
Race	
Latino, N (%)	115 (18.6)
White, N (%)	210 (34.0)
Black, N (%)	146 (23.7)
Asian, N (%)	146 (23.7)
Education	
Less than college, N (%)	399 (64.9)
College and higher, N (%)	216 (35.1)
Missing	2

- 46.4% were Superagers in zero domains
- 53.6% were Superagers in one domain
- 22.8% were Superagers in two domains
- 7.7% were Superagers in three domains

Figure 1. Overlap of SuperAgers for each domain

(EF=Executive function; SM=Semantic memory; VEM=Verbal episodic memory)

Table 2. Odds ratios and 95% confidence intervals for SuperAgers versus non-SuperAgers for any and each of the cognitive domains by demographic characteristics

Demographic characteristics	Domain	OR (95% CI)*
Age (continuous)	Any	**0.84 (0.78, 0.90)**
	Superior verbal memory	**0.86 (0.79, 0.93)**
	Superior semantic memory	**0.84 (0.77, 0.91)**
	Superior executive function	**0.88 (0.81, 0.96)**
Sex (Women vs men)	Any	1.14 (0.81, 1.61)
	Superior verbal memory	**2.13 (1.43, 3.18)**
	Superior semantic memory	**0.49 (0.34, 0.71)**
	Superior executive function	**2.18 (1.44, 3.30)**
Education (College+ vs <College)	Any	**1.97 (1.39, 2.80)**
	Superior verbal memory	1.42 (0.97, 2.08)
	Superior semantic memory	**1.85 (1.28, 2.67)**
	Superior executive function	**2.56 (1.74, 3.78)**

*Logistic regression models included age, sex, and education as independent variables. Statistically significant ORs and 95% CI are in bold.