Supplementary Online Content

Caunca MR, Odden MC, Glymour MM, et al. Association of racial residential segregation throughout young adulthood and cognitive performance in middle-aged participants in the CARDIA study. *JAMA Neurol*. Published online May 4, 2020. doi:10.1001/jamaneurol.2020.0860

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Comparison of Baseline Covariates Between Blacks Included and Excluded From the Analysis, CARDIA Study

	Included (n=1568)	Excluded* (n=1068)
Sociodemographics		
Age, mean (SD)	25 (4)	24 (4)
Years of education, mean (SD)	13 (2)	13 (2)
Income (per $1000), median (Q1, Q3)	30 (14, 42.5)	20.5 (14, 42.5)
Married, n (%)	329 (21)	174 (16)
Women, n (%)	936 (60)	544 (60)
Clinical Risk Factors		
Systolic blood pressure (mmHg), mean (SD)	111 (11)	112 (11)
Body mass index (kg/m^2), mean (SD)	25 (6)	25 (6)
Fasting glucose (mg/dL), mean (SD)	81 (10)	84 (28)
CES-D Score, median (Q1, Q3)	10 (6, 17)	12 (7, 18)
Health Behaviors		
Current smoker, n (%)	461 (29)	423 (40)
Total physical activity, median (Q1, Q3)	299 (151, 519)	344 (181, 576)
Mean alcohol consumption (mL), median (Q1, Q3)	2 (0, 11)	2 (0, 14)

*Black participants without cognitive data available were excluded from the analysis.

eTable 2. Summary Statistics for G_i* Statistic at Each Point, CARDIA Study (n = 1568)						
	T0 (1985)	**T1 (1992)**	**T2 (1995)**	**T3 (2000)**	**T4 (2005)**	**T5 (2010)**
Mean (SD)	4.76 (3)	3.98 (3.09)	3.02 (3.15)	2.93 (2.84)	2.50 (2.85)	2.45 (2.64)
Median (Q1, Q3)	4.65 (2.64, 6.38)	4.23 (1.72, 5.53)	2.86 (0.21, 5.19)	2.87 (0.48, 5.00)	2.23 (0.02, 4.76)	2.44 (0.29, 4.30)

eTable 3. Number (Percentage) of Participants Censored (Lost to Follow-Up) and Active at Each Point, CARDIA Study (n = 1568)

	T0 (1985)	**T1 (1992)**	**T2 (1995)**	**T3 (2000)**	**T4 (2005)**	**T5 (2010)**
Censored	0 (0)	202 (13)	195 (12)	239 (15)	218 (14)	0 (0)
Active	1568 (100)	1366 (87)	1373 (88)	1329 (85)	1350 (86)	1568 (100)

*Censored = did not attend follow-up visit.

eTable 4. Frequency (Percentage) of Missing Values in Covariates at Each Point, CARDIA Study (n = 1568)

	T0 (1985)	T1 (1992)	T2 (1995)	T3 (2000)	T4 (2005)	T5 (2010)
Age	0 (0)	202 (13)	195 (12)	239 (15)	218 (14)	0 (0)
BMI	3 (<1)	231 (15)	211 (13)	246 (16)	226 (14)	2 (<1)
Education	0 (0)	211 (13)	197 (13)	240 (15)	225 (14)	6 (<1)
Total Physical Activity Score	1 (<1)	223 (14)	209 (13)	241 (15)	226 (14)	1 (<1)
Income*	199 (13)	230 (15)	206 (13)	259 (17)	242 (15)	32 (2)
SBP	0 (0)	202 (13)	197 (13)	241 (15)	219 (14)	3 (<1)
Fasting glucose	32 (2)	235 (15)	227 (14)	263 (17)	233 (15)	8 (<1)
Marital Status	1 (<1)	212 (14)	197 (13)	240 (15)	223 (14)	7 (<1)
Smoking Status	9 (<1)	204 (13)	204 (13)	243 (16)	229 (15)	24 (2)
Alcohol Consumption	3 (<1)	208 (13)	203 (13)	240 (15)	259 (17)	3 (<1)
CES-D Score*^	189 (12)	189 (12)	228 (15)	258 (16)	263 (17)	12 (<1)

*Baseline measure was obtained from visit 3 because variable not measured at baseline.
^baseline measure carried forward to T1 because not measured at T1.

eMethods. Inverse Probability Weights

Based on previous literature[1,2]. we considered the following factors as time-varying confounders of the segregation-cognition relation: marital status, years of education, income, physical activity, smoking status, body mass index, systolic blood pressure, fasting blood glucose, depressive symptoms, and alcohol consumption. Given the longitudinal nature of the data and of the time-varying confounding structure, weights are constructed at each study visit for each study participant. First, we estimated the "numerator" of the weight per person-visit, which is the predicted probability of segregation status (low, medium, or high) at time T (i.e. current visit) conditional on segregation status at the previous visit (T-1) using pooled multinomial logistic regression. Second, we estimated the "denominator" of the weight per person-visit, which is the predicted probability of segregation status at time T conditional on segregation status at the previous visit (T-1) and the time-varying covariates mentioned above measured at T-1, using pooled multinomial logistic regression. Third, weights were computed by dividing numerator predicted probability by the denominator predicted probability. These weights were cumulatively multiplied per person across visits, and then weights were truncated at 1% (1^{st} and 99^{th} percentiles) to avoid extreme weights[3]. To address selection bias due to attrition, we used the same methodology and time-varying confounders and computed inverse probability of censoring weights (i.e. loss to follow-up) which were also cumulatively multiplied per person across visits. Then, for each participant, we multiplied their cumulative segregation weight with their cumulative censoring weight to generate their final inverse probability weight, which represents their cumulatively multiplied weight across time.

eReferences.

1. Pool LR, Carnethon MR, Goff DCJ, Gordon-Larsen P, Robinson WR, Kershaw KN. Longitudinal Associations of Neighborhood-level Racial Residential Segregation with Obesity Among Blacks. *Epidemiology*. 2018;29(2):207-214. doi:10.1097/EDE.0000000000000792
2. Kershaw KN, Osypuk TL, Do DP, De Chavez PJ, Diez Roux A V. Neighborhood-level racial/ethnic residential segregation and incident cardiovascular disease: the multi-ethnic study of atherosclerosis. *Circulation*. 2015;131(2):141-148. doi:10.1161/circulationaha.114.011345
3. Robins JM, Hernan MA, Brumback B. Marginal structural models and causal inference in epidemiology. *Epidemiology*. 2000;11(5):550-560.