Center for Demography of Health and Aging
UNIVERSITY OF WISCONSIN–MADISON

Sibling Disconnectedness in Midlife and Cognitive Functioning in Later Life: Is Loneliness an Explanatory Factor?

Gina Lee[1], Jooyoung Kong[1], Michal Engelman[1] & Deborah Carr[2]
University of Wisconsin-Madison[1], Boston University[2]

Background

- Sibling relationships are often the longest lasting ties one maintains over the life course
- High-quality sibling relationships are health-enhancing for older adults, in part because siblings can provide instrumental, emotional, and informational help
- Active social and intellectual activities stimulate brain functions, whereas lack of such engagement may lead to brain disuse and subsequently cognitive decline
- Loneliness is an established risk factor for poor cognition in later life
- Research Gap 1: Only a few studies have explicitly examined sibling disconnectedness, which comprises both the objective dimension of lack of contact and/or the subjective dimension of perceived emotional distance (Gilligan et al., 2020; Hank & Steinbach, 2023)
- Research Gap 2: We are only aware of a few studies linking sibling relationships to cognitive health

Aim 1	• Identify prevalence of midlife sibling disconnectedness
Aim 2	• Assess the association between sibling disconnectedness and cognition
Aim 3	• Evaluate the extent to which the association between sibling disconnectedness and cognition is accounted for by loneliness

Methods

- Data are from Wisconsin Longitudinal Study, a prospective cohort study tracking 10,317 individuals who graduated from Wisconsin high schools in 1957, along with their randomly selected siblings (Herd et al., 2014)
- Respondents were asked questions about one randomly selected sibling at multiple follow-ups

- Our sample includes 6,468 graduates whose selected siblings were alive from W1 to W3 when sibling relationships and loneliness measures were collected.

Sibling Disconnectedness W1 – W2
- No contact in the last 365 days and/or
- Not close at all toward the sibling

Loneliness W3
- Feel lonely because you have few close friends with whom to share your concerns

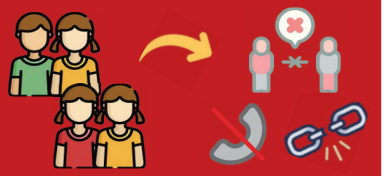
Cognitive Functioning W4
- Letter fluency
- Digit ordering
- Immediate word recall
- Delayed word recall

- Mediation models using a structural equation modeling approach (lavaan package in R studio)
- 1,000 bootstrapping procedures with Full Information Maximum Likelihood estimation to handle missing data
- Covariates: Gender, sibling's gender, # of siblings, education, adolescent IQ, marital status, self-rated health, living alone status, parental living status, having close friends, having no children

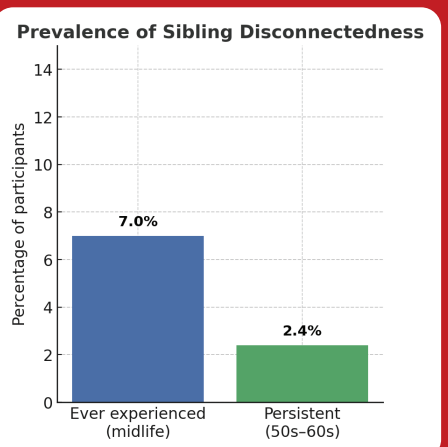
Being persistently disconnected from siblings during midlife (age 50s-60s) is linked to heightened levels of loneliness (around age 70s), which then can lead to lower cognitive functioning (around age 80).

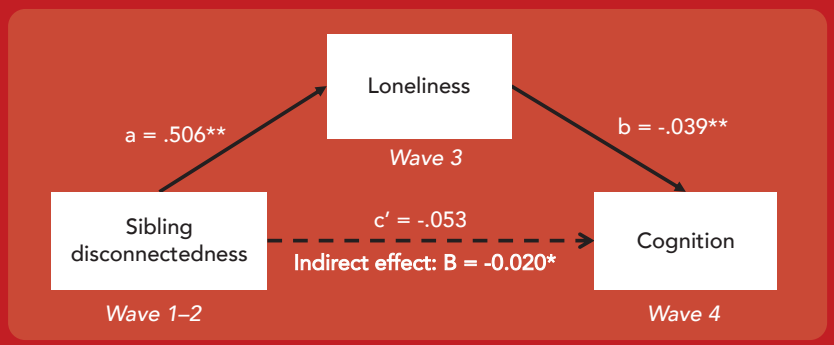
Finding 1

-About 7% of the participants had ever experienced sibling disconnectedness during midlife.
-Only about 2.4% had persistent sibling disconnectedness from the age 50s to 60s.

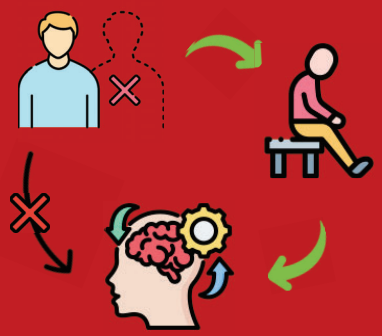


SIBLING DISCONNECTEDNESS





Notes. Significant pathways are shown in solid lines, Nonsignificant pathways are shown in dashed lines.
*p < .05. ** p < .01.



Finding 2

-Sibling disconnectedness significantly influenced increased loneliness (ages 70s)
-Heightened loneliness was significantly related to worse cognition (ages 80s)

Finding 3

-Sibling disconnectedness was not directly related to cognition
-Loneliness was a significant mechanism that explains the association between persistent sibling disconnectedness and cognition.

Table 1. Descriptive Statistics for Sociodemographics by Sibling Disconnectedness (N = 6,468)

	N	*M (SD)* or %	*Min / Max*
Age W1	5600	53.21 (.62)	52/56
Age W2	4894	64.40 (.70)	63/67
Age W3	4074	71.27 (.92)	70/74
Age W4	2368	80.85 (.77)	79/83
Male	3092	47.8%	-
Sibling male	3084	47.7%	-
Number of siblings	6468	3.2 (2.19)	1/10
Educational attainment	5600	13.65 (2.28)	12/20
Adolescent IQ	6468	100.92 (14.86)	
Married W1	4647	83.0%	-
Married W2	4075	78.8%	-
Married W3	3056	73.1%	-
No child W3	255	6.09%	
Close friends W3	2196	63.2%	-
Living alone W1	534	9.5%	-
Living alone W2	806	16.5%	-
Living alone W3	852	20.9%	-
Self-rated health W1	4627	4.16 (.67)	1/5
Self-rated health W2	4238	4.05 (.67)	1/5
Self-rated health W3	3655	3.98 (.68)	1/5
Mother alive W1	3321	59.34%	-
Mother alive W2	1164	23.78%	-
Mother alive W3	355	8.71%	-
Father alive W1	1523	23.5%	-
Father alive W2	266	4.1%	-
Father alive W3	37	0.6%	-
Key Measures			
Sibling Disconnectedness W1	377	6.90%	-
Sibling Disconnectedness W2	352	7.30%	-
Persistent Sibling Disconnectedness W1-W2	138	2.42%	-
Loneliness W3	3521	2.19 (1.37)	1/6
Letter fluency W4	2258	11.23 (4.35)	0/28
Immediate recall W4	2368	3.71 (1.67)	0/10
Delayed recall W4	2368	2.37 (1.68)	0/10
Digit ordering W4	2345	5.45 (3.19)	0/12
Standardized composite cognition score W4	2368	0 (0.71)	-2.06/3.05

Table 2. Structural Equation Model Estimating Fully Adjusted Predictors of Loneliness and Composite Measure of Cognition

	Loneliness B (S.E.)	Cognition B (S.E.)
Direct Effect		
Sibling Disconnectedness	.506** (.160)	-.053 (.118)
Loneliness	-	-.039** (.014)
IQ	.003 (.002)	.011 (.001)
Married	-.075 (.115)	-.094 (.063)
		-.282**
Male	-.013 (.043)	* (.034)
Education	-.018* (.008)	.032*** (.008)
Lived alone	.198 (.115)	-.100 (.072)
Mom alive	.034 (.075)	.100 (.053)
Dad alive	-.109 (.226)	.019 (.134)
Sibling male	-.031 (.045)	-.020 (.031)
Sibling number	.003 (.009)	.011 (.007)
Self-rated health	-.387*** (.039)	.066** (.023)
Close friends	-.583*** (.045)	.025 (.035)
No child	.105 (.111)	-.064 (.055)

	B (S.E.)	C.I.
Indirect Effect	-.020* (.008)	[-0.039, -0.004]

Discussion

- If individuals compensate for sibling disconnectedness with other social ties that prevent loneliness, the severed sibling relationships on its on may be less detrimental to subsequent cognitive health
- Future studies should explore the patterns and health effects of sibling disconnectedness, considering early-life sibling dynamics, family relationships, ripple effects within family subsystems, and individual factors (e.g., personality traits)
- Family therapists or health professionals should pay attention to adult sibling relationships as a potential source of heightened loneliness, which may, in turn, lead to cognitive decline

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