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Estimating the association between parity and mid- to later-life cognitive function in rural South Africa: Evidence from "Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa" (HAALSI)

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Abstract

Background: The burden of cognitive decline is projected to rise over the next decades, particularly in low- and middle-income countries, contributing to economic hardship, morbidity, and mortality. Reproductive life-history, including parity, may be associated with later-life cognitive ability. Using data from the population-representative "Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa" (HAALSI) cohort, we estimated the association between parity and mid- to later-life global cognitive function.

Method: Data were from in-person interviews with 2242 men and 2604 women aged ≥40 in the rural Agincourt sub-district, Mpumalanga province, South Africa in 2014/15. Cognitive function was assessed as time orientation and immediate and delayed recall of a 10-word list. Number of living children was self-reported. We used multivariable linear regression with parity (number of children: 0, 1-2, 3-4, 5-9, 10+) as the categorical predictor and z-standardized cognitive function as the outcome. Analyses were stratified by sex/gender, controlling for age, education, and literacy.

Result: Among men, there was a U-shaped relationship between parity and cognitive function ($p<0.001$), whereby men with 3-4 children had the highest mean z-standardized cognitive scores (mean: 0.244, SD: 0.984, Table 1, Figure 1). Women also had a U-shaped relationship between parity and cognitive function ($p = 0.0254$), whereby women with 5-9 children had the highest mean z-standardized cognitive scores (mean: -0.017, SD: 0.935, Table 2, Figure 1). Among men, adjusted regression models showed that parity was associated with higher cognitive function, across all categories compared to no children (Estimates [95% CI]: 1-2: 0.32 [0.17-0.48], 3-4: 0.50 [0.35-0.65], 5-9: 0.50 [0.36-0.74], 10+: 0.55 [0.36-0.74]; Table 3). Among women, only the 5-9 children group (Estimate [95% CI]: 0.16 [0.00-0.31]) had cognitive scores that were significantly different from having no children (Table 3).

Conclusion: Data from this representative sample in rural South Africa indicate that the relationship between parity and later life cognition varies by sex/gender, with having children being associated with greater cognitive performance in men, compared to women. This sex/gender difference may be due to sex and gender differences in biological and social roles involved in childbearing and rearing.

Table 1: Descriptive Statistics by Parity: Men

	0 Children (N= 187)	1 to 2 Children (N= 387)	3 to 4 Children (N= 560)	5 to 9 Children (N=1017)	10 or more Children (N= 174)	P-value
Standardized Cognition						
Mean (SD)	-0.347 (1.108)	0.043 (1.042)	0.244 (0.984)	0.084 (0.940)	0.035 (0.876)	<0.001
Missing (n(%))	24 (12.8%)	15 (3.9%)	15 (2.7%)	23 (2.3%)	2 (1.1%)	
Age						
Mean (SD)	55.251 (13.026)	57.742 (13.080)	59.739 (12.895)	64.384 (11.573)	67.828 (11.469)	<0.001
Education						
No formal education	87 (46.5%)	152 (39.3%)	191 (34.1%)	417 (41.0%)	98 (56.3%)	<0.001
1 to 7 years	56 (29.9%)	127 (32.8%)	186 (33.2%)	397 (39.0%)	60 (34.5%)	
8 to 11 years	27 (14.4%)	52 (13.4%)	99 (17.7%)	124 (12.2%)	12 (6.9%)	
12 or more years	16 (8.6%)	55 (14.2%)	84 (15.0%)	75 (7.4%)	3 (1.7%)	
Missing (n(%))	1 (0.5%)	1 (0.3%)	0 (0%)	4 (0.4%)	1 (0.6%)	
Literacy						
Illiterate	95 (50.8%)	132 (34.1%)	149 (26.6%)	321 (31.6%)	56 (32.2%)	<0.001
Literate	92 (49.2%)	255 (65.9%)	410 (73.2%)	696 (68.4%)	118 (67.8%)	
Missing (n(%))	0 (0%)	0 (0%)	1 (0.2%)	0 (0%)	0 (0%)	

Table 2: Descriptive Statistics by Parity: Women

	0 Children (N= 124)	1 to 2 Children (N= 476)	3 to 4 Children (N= 819)	5 to 9 Children (N=1237)	10 or more Children (N= 28)	P-value
Standardized Cognition						
Mean (SD)	-0.232 (1.078)	-0.140 (1.120)	-0.025 (1.018)	-0.017 (0.935)	-0.252 (0.770)	0.0254
Missing (n(%))	7 (5.6%)	19 (4.0%)	21 (2.6%)	27 (2.2%)	0 (0%)	
Age						
Mean (SD)	62.992 (13.652)	63.676 (14.914)	60.731 (14.378)	61.263 (11.732)	64.357 (7.450)	<0.001
Education						
No formal education	74 (59.7%)	250 (52.5%)	370 (45.2%)	618 (50.0%)	16 (57.1%)	<0.001
1 to 7 years	32 (25.8%)	128 (26.9%)	233 (28.4%)	473 (38.2%)	10 (35.7%)	
8 to 11 years	8 (6.5%)	46 (9.7%)	112 (13.7%)	92 (7.4%)	2 (7.1%)	
12 or more years	9 (7.3%)	49 (10.3%)	102 (12.5%)	52 (4.2%)	0 (0%)	
Missing (n(%))	1 (0.8%)	3 (0.6%)	2 (0.2%)	2 (0.2%)	0 (0%)	
Literacy						
Illiterate	67 (54.0%)	257 (54.0%)	366 (44.7%)	619 (50.0%)	16 (57.1%)	0.00574
Literate	57 (46.0%)	219 (46.0%)	453 (55.3%)	618 (50.0%)	12 (42.9%)	

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Table 3: Comparison of adjusted regression models: Men and Women

	Men		Women	
Predictors	*Estimates*	*p*	*Estimates*	*p*
Intercept	0.07 (-0.17 – 0.31)	0.59	0.88 (0.64 – 1.13)	**<0.001**
Parity: 1 to 2	0.32 (0.17 – 0.48)	**<0.001**	0.08 (-0.09 – 0.24)	0.372
Parity: 3 to 4	0.5 (0.35 – 0.65)	**<0.001**	0.06 (-0.10 – 0.21)	0.485
Parity: 5 to 9	0.5 (0.36 – 0.65)	**<0.001**	0.16 (0.00 – 0.31)	**0.044**
Parity: 10 or more	0.55 (0.36 – 0.74)	**<0.001**	0.07 (-0.26 – 0.41)	0.66
Age	-0.02 (-0.02 – -0.01)	**<0.001**	-0.02 (-0.03 – -0.02)	**<0.001**
Education: 1 to 7 years	0.03 (-0.06 – 0.13)	0.514	0.17 (0.08 – 0.27)	**0.001**
Education: 8 to 11 years	0.2 (0.07 – 0.33)	**0.003**	0.29 (0.15 – 0.43)	**<0.001**
Education: 12 or more years	0.55 (0.41 – 0.70)	**<0.001**	0.59 (0.44 – 0.74)	**<0.001**
Literacy: Literate	0.61 (0.51 – 0.70)	**<0.001**	0.5 (0.40 – 0.59)	**<0.001**
Observations	2242		2604	
R^2 / R^2 adjusted	0.255 / 0.252		0.353 / 0.351	

Figure 1. Mean z-standardized cognitive score by parity group and sex

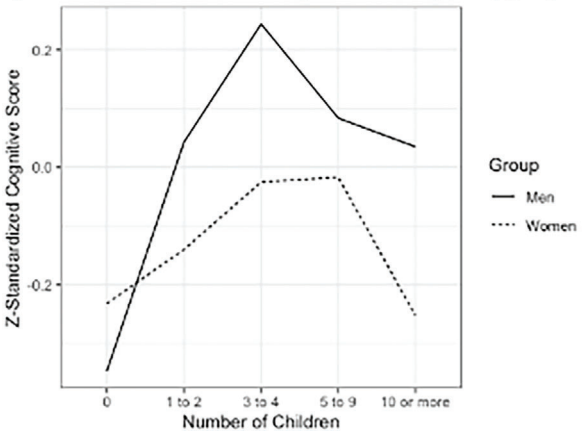

Figure 2. Regression Coefficients from the linear model for men and women