

The Effects of High Quality Sleep on ABCA7-80 Risk Related Generalization Deficits in Older African Americans and Yoruba Nigerians

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Background

- African Americans bear a disproportionate burden of sleep deficiencies and Alzheimer's disease (AD), with ABCA7 rs115550680 (ABCA7-80) being a key genetic risk factor for the latter.
- Prior research suggests that high quality sleep can be neuroprotective against ABCA7-80 related generalization deficits among older African-Americans (Sinha et al., 2023).
- The current study explored whether this interaction remains the same in a genetically similar population with shared ancestry: Yoruba Nigerians.

Objectives

- Objective #1:** To explore differences in sleep patterns, habits, and self-reported sleep quality measures between African-Americans and Yoruba Nigerians
- Objective #2:** To examine whether sleep quality can be neuroprotective against ABCA7-80 related generalization deficits

Methods

Participants (N = 409)	Newark, African Americans Cohort (N=285)		Ibadan, Nigeria Yoruba Cohort (N=124)	
Variable	Mean (N)	SD (%)	Mean (N)	SD (%)
Age (years)	70.89	6.51	70.06	7.17
Sex (female)	(186)	(69.7%)	(73)	(58.9%)
ABCA7-80 Risk Genotype	(25)	(10.3%)	(25)	(20.5%)
Global PSQI	7.79	3.33	6.22	2.87
Generalization Errors	12.81	15.99	24.13	19.22

Note. PSQI = Pittsburgh Sleep Quality Index

Methods (continued)

Measures

Questionnaire

Image 1: Pittsburgh Sleep Quality Index (PSQI) testing form

PSQI is a standardized, self-report questionnaire that measures seven different components of sleep quality over a month-long period. The measures include sleep quality, sleep latency, sleep efficiency, daytime dysfunction, sleep medication usage, sleep duration, and sleep disturbances. Responses are coded into values between 1 and 3, with higher scores indicating worse sleep quality. A global PSQI score is computed by summing the coded scores across all seven components (range: 0 and 21 points), with a higher score indicating worse sleep quality.

Cognitive Assessment

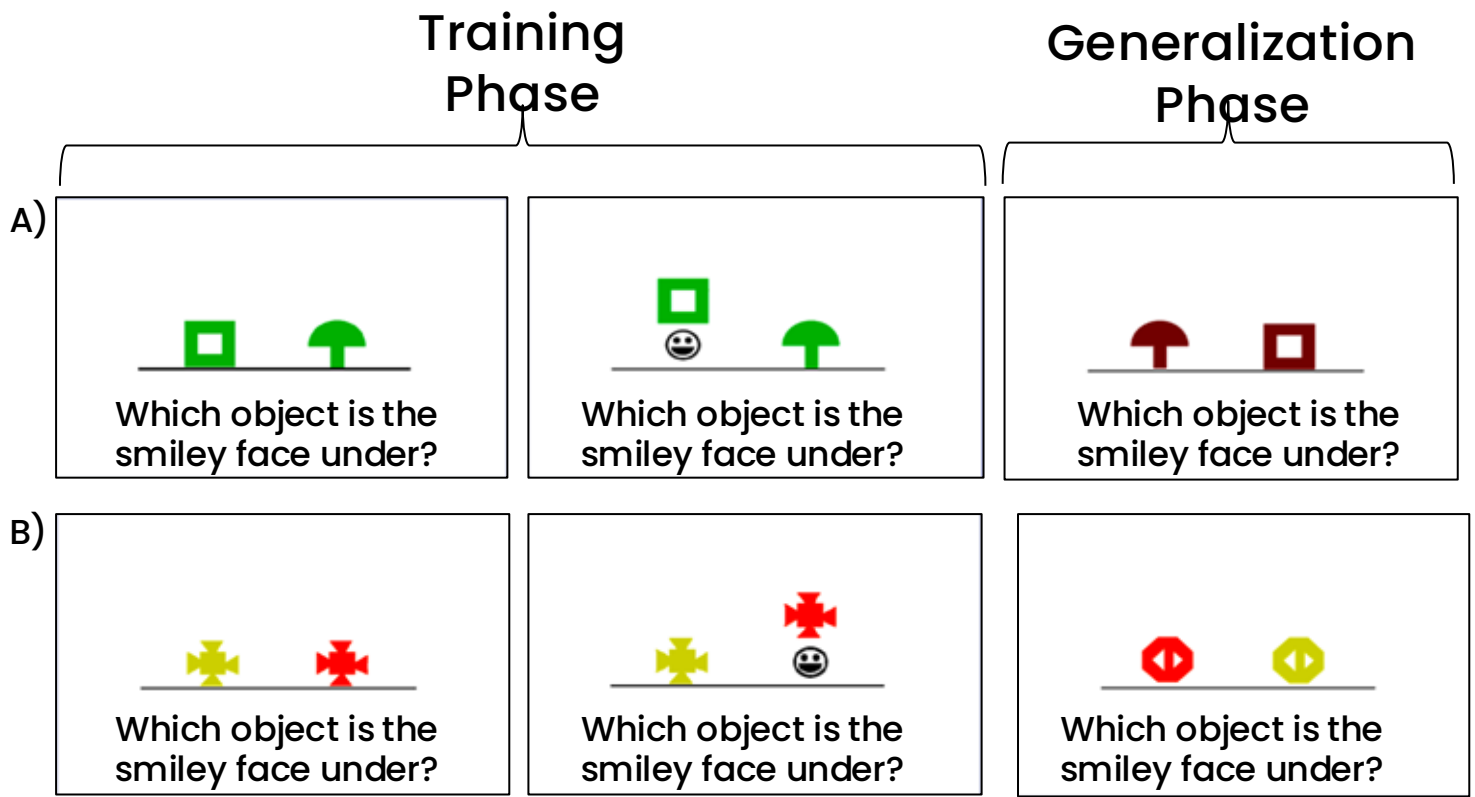


Image 2: Computerized Generalization task

Analyses

- Moderated regression analyses were used to test for the main effects of ABCA7-80 genotype and sleep quality (measured by PSQI) as well as the interaction of these factors on generalization task performance.

Results

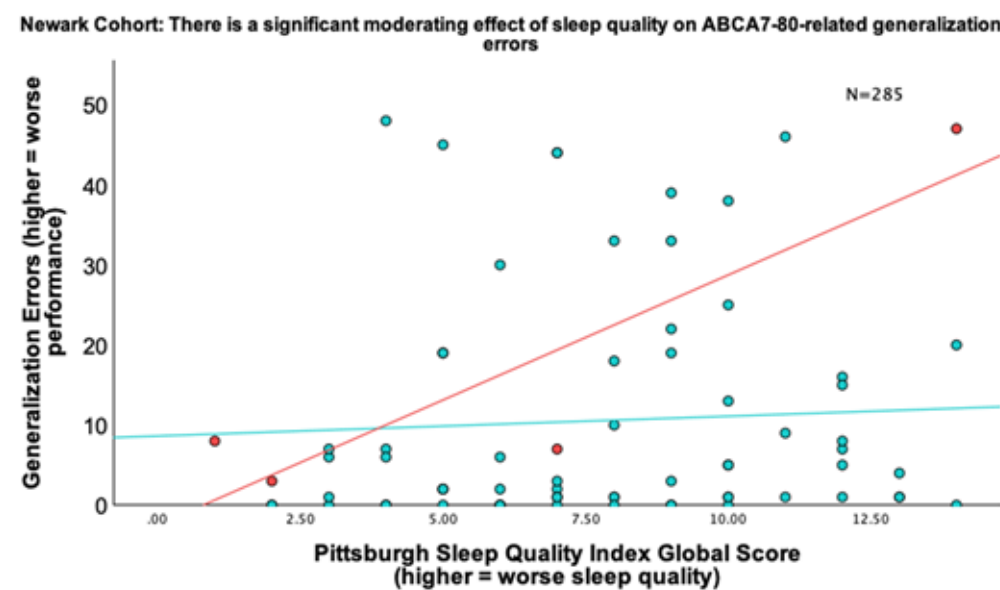


Figure 3

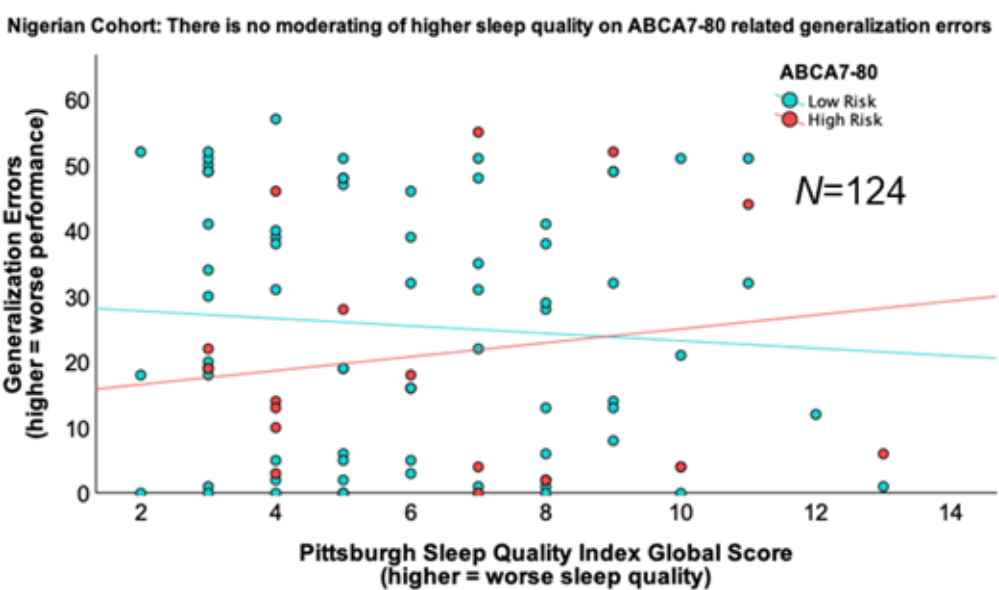


Figure 4

- Among African-Americans, high quality sleep mitigated the effects of ABCA7-80 related generalization deficits. Worse global sleep quality predicted worse generalization errors in the high risk group ($\beta=2.58$, $p=.03$), but not in the low risk group (See Figure 4).
- Among Yoruba Nigerians in Ibadan, moderation analyses revealed that the ABCA7-80 $\times$ sleep quality interactions were not significant ($\beta=1.63$, $p=.74$), and neither sleep quality nor ABCA7-80 risk significantly predicted generalization errors (See Figure 3).

Discussion

- Despite shared ancestry, the relationship between sleep quality and ABCA7-80 risk on Alzheimer's-related cognitive performance differed between populations.
- Current findings replicated the ABCA7-80 $\times$ sleep quality interaction on generalization performance among African-Americans, though this relationship was not significant among Yoruba Nigerians.
- Future research should explore these interactions among other West African and African Diasporic communities to better understand how genetic, environmental, and lifestyle factors can influence cognitive aging in populations with shared ancestry.

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