

Breadth of Leisure Activity Engagement and *Cognitive Resilience* Among Older Chinese Adults: A 10-Year Longitudinal Study

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1 BACKGROUND

Cognitive resilience (CR) — the capacity to maintain better-than-expected cognitive performance despite aging-related risk burden — offers a framework for identifying **modifiable upstream factors** that support cognitive health.

While leisure activity engagement is linked to cognition, most evidence relies on undifferentiated **composite metrics** that obscure domain-specific dose-response patterns. Whether activity–resilience associations persist alongside **depressive symptoms** also remains unclear.

We examined the **breadth** of engagement across **social** and **cognitive** domains and CR, including dose-response shape and potential moderation by depressive symptoms.

2 METHODS

DATA
CHARLS, 5 waves
(2011–2020)

SAMPLE
n = 3,834 observations
19,170 person-waves

CR OUTCOME
Residual-variance approach:
global cognition regressed on age, sex, education, residence, chronic disease

EXPOSURES
Social participation (0–5) & cognitive activities (0–2), as breadth counts

MODELS
Generalized estimating equations (GEE); quadratic terms for non-linearity

ROBUSTNESS
Lagged exposure, IPW, alternative CR, decliner exclusion

Depression was tested as an effect modifier
Physical activity was examined in an exploratory subsample

3 KEY RESULTS

SOCIAL PARTICIPATION

0.088

β per activity · $P<0.001$

COGNITIVE ACTIVITIES

0.172

β per activity · $P<0.001$

Primary GEE model · 7,130 observations · 3,293 individuals

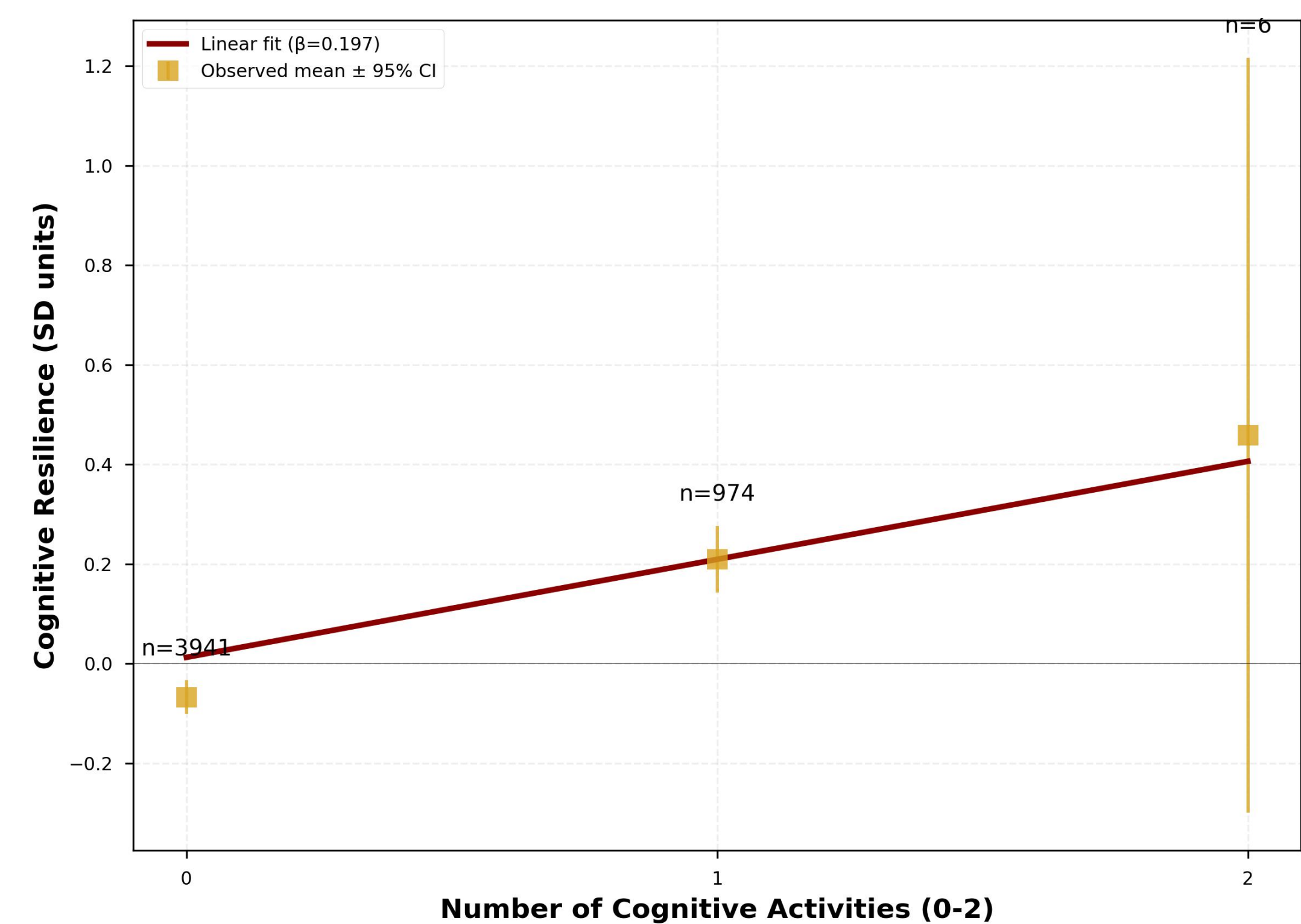
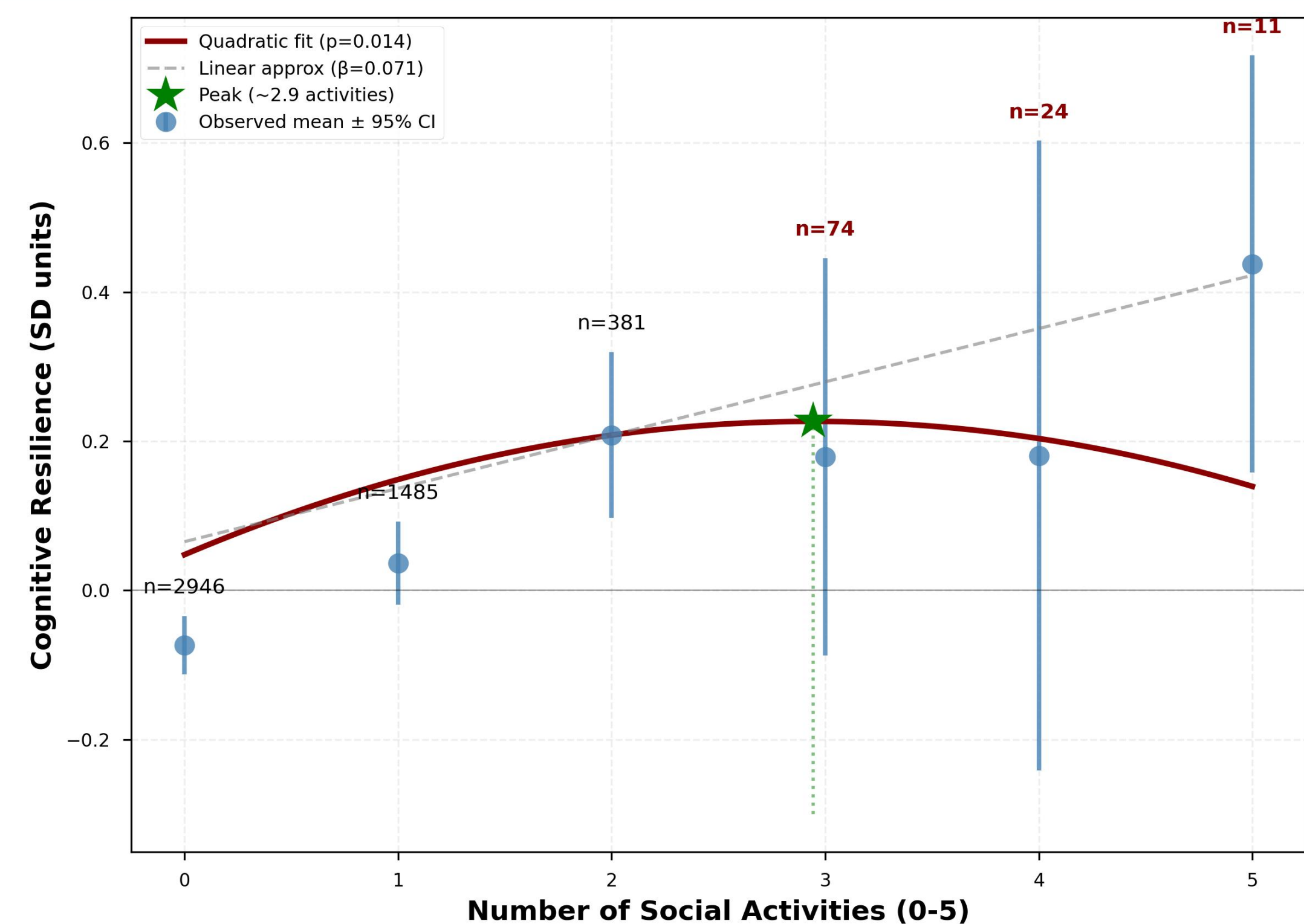
- Social participation** showed a **quadratic** dose-response, diminishing returns beyond ~3 activity types.
- Cognitive activities** showed a **sustained linear** association ($\beta=0.197$ per activity).
- Depressive symptoms did not moderate** either association (interaction $P>0.50$).
- Physical activity:** positive concurrent association in the exploratory subsample ($\beta=0.159$, $P=0.001$) but **no prospective evidence**.
- Lagged analyses supported **temporal precedence** for cognitive activities ($\beta=0.188$, $P<0.001$).

SENSITIVITY ANALYSES

Analysis	Social	Cognitive
TEMPORAL PRECEDENCE		
Lagged activity(t)→CR(t+1)	0.051	0.276 ***
Lagged (no PA)	0.067 *	0.188 ***
MODEL STRUCTURE & SPEC		
Alternative CR	0.095 **	0.173 ***
Episodic memory outcome	0.165 ***	0.165 ***
IPW	0.088	0.172
Excluding decliners	0.114 ***	0.162 ***
ALTERNATIVE INDICATORS		
Low life satisfaction	0.107 ***	0.188 ***
Poor/fair self-rated health	0.106 ***	0.186 ***

Values are β coefficients. * $P<0.05$ ** $P<0.01$ *** $P<0.001$. Robust across all pre-specified analyses.

4 DOSE-RESPONSE



5 CONCLUSION

The shape of the dose-response carried more information than engagement alone or sheer frequency: saturating for social participation, linear for cognitive activities. Recognizing these domain-specific patterns may help **community-based healthy-aging strategies** target the right activities, at the right dose, in rapidly aging populations.

Distinguish domain-specific dose-response patterns of social vs. cognitive engagement

Evaluate residual-variance CR in cohorts without neuroimaging

Apply domain-specific evidence to dementia-prevention design

Ongoing work: sex-specific patterning of these associations is currently being explored in expanded analysis.