



Social Engagement Patterns and Dementia Prevalence Among Older Adults in Singapore

Magadi Gopalakrishna Harish, Yuan Qi

Background

Social engagement is increasingly recognized as a key modifiable factor in dementia prevention, yet the specific patterns of social participation that confer the greatest benefit remain unclear, particularly in Asian populations. This study aimed to explore the patterns of social activity among older adults in Singapore and examine their relationship with dementia prevalence, in order to identify the types of social engagement most strongly associated with reduced risk of dementia.



Results

A three-class solution was optimal. The classes were low social engagement/class 3 (13.58%), high social engagement/class 2 (54.05%), and frequent social-contact engagement/class1 (32.37%). In cross tabulation with the 1066 dementia diagnosis, the weighted prevalence of dementia was 4.23% in Class 1, 2.86% in Class 2, and 13.54% in Class 3. Please refer to Table 2 for the details.

Table 2. Class Membership and Data

Class Membership	10 66 Dementia			
	No %	N	Yes %	N
Frequent Social-Contact Engagement	95.77	165	4.231	19
High Social Engagement	97.14	586	2.857	27
Low Social Engagement	86.46	731	13.54	270

Weighted Logistic regression confirmed that low social engagement was linked to a significantly higher dementia risk compared to both high social engagement and frequent social-contact engagement groups (Table 3).

Table 3. Weighted Logistics Regression Results

	Odd ratio (OR)	SE	Bonferroni		Bonferroni	
			t	P> t	95% CI	
2 vs 1	0.67	0.37	-0.74	1.00	0.18	2.48
3 vs 1	3.54	1.59	2.82	0.015	1.21	10.39
3 vs 2	5.32	1.94	4.58	0.000	2.22	12.77

Note. 1 = Frequent social-contact engagement; 2 = high social engagement ; 3= low social engagement

Discussion and Implications

These results underscore that the diversity of social engagement matters for dementia prevalence. Broader and more active forms of social engagement may be more strongly associated with lower dementia risk. As such, simply maintaining contact with others may not be sufficient; instead, engaging in meaningful, stimulating and socially integrated activities may be especially important. More importantly, dementia prevention strategies should focus on prioritizing meaningful, community-oriented social activities over simply reducing social isolation and increasing contact frequency. Future studies could aim to examine which specific forms of social engagement may prove beneficial, as well as examine the underlying mechanisms between social engagement and dementia risk.

Methods

Data were obtained from the Well-being of the Singapore Elderly (WiSE) 2023, a nationally representative cross-sectional survey of adults aged 60 and above. Participants were randomly selected using a disproportionate stratified sampling method from a national-level administrative database. Out of the 2,565 respondents, 1,798 completed questions on social engagement activity. Latent class analysis (LCA) was conducted to identify social engagement patterns, and weighted logistic regression was used to explore their association with dementia prevalence.

Latent Class Analysis

Latent class analysis (LCA) was conducted using Mplus version 8.8 with type = mixture complex to account for the stratified sampling design. Sampling weights and stratification variables were specified to produce population-level estimates and design-adjusted standard errors. This approach incorporates both weighting and complex survey corrections, ensuring that parameter estimates, and their variances reflect the survey design. Model selection was guided by multiple criteria, including Bayesian Information Criterion (BIC), Akaike Information Criterion (AIC), sample-size adjusted BIC, entropy, class sizes, and substantive interpretability, consistent with best practices for mixture modelling under complex survey conditions. Likelihood-based tests such as tech14 (bootstrap likelihood ratio test) are not available under type = mixture complex model. Hence, comparisons of fit models relied primarily on information criteria and classification diagnostics rather than bootstrap-based tests.

We estimated latent class models with two, three, and four classes and compared fit using multiple criteria. The BIC decreased across models (2-class = 17,019.79; 3-class = 16,986.91; 4-class = 16,964.56), and entropy improved from 0.711 (2-class) to 0.742 (3-class) and 0.775 (4-class). Although the 4-class model had the lowest BIC, it included a very small class (<5%), raising concerns about over-extraction and interpretability. The 3-class model provided a better balance of fit, classification quality, and substantive interpretability than the 2-class model. Therefore, we retained the 3-class solution was selected as the most parsimonious and substantively meaningful model for subsequent analyses.

Table 1. LCA Model Fit Summary

Model	# Parameters	Loglikelihood	AIC	BIC	SABIC	Entropy	Class Proportions
1-Class	7	-8941.103	17896.205	17935.446	17913.207	—	1.000
2-Class	15	-8452.851	16935.702	17019.79	16972.134	0.711	0.450 / 0.55
3-Class	23	-8405.988	16857.976	16986.912	16913.84	0.742	0.136 / 0.324 / 0.541
4-Class	31	-8364.388	16790.776	16964.559	16866.07	0.775	0.320 / 0.105 / 0.041 / 0.533

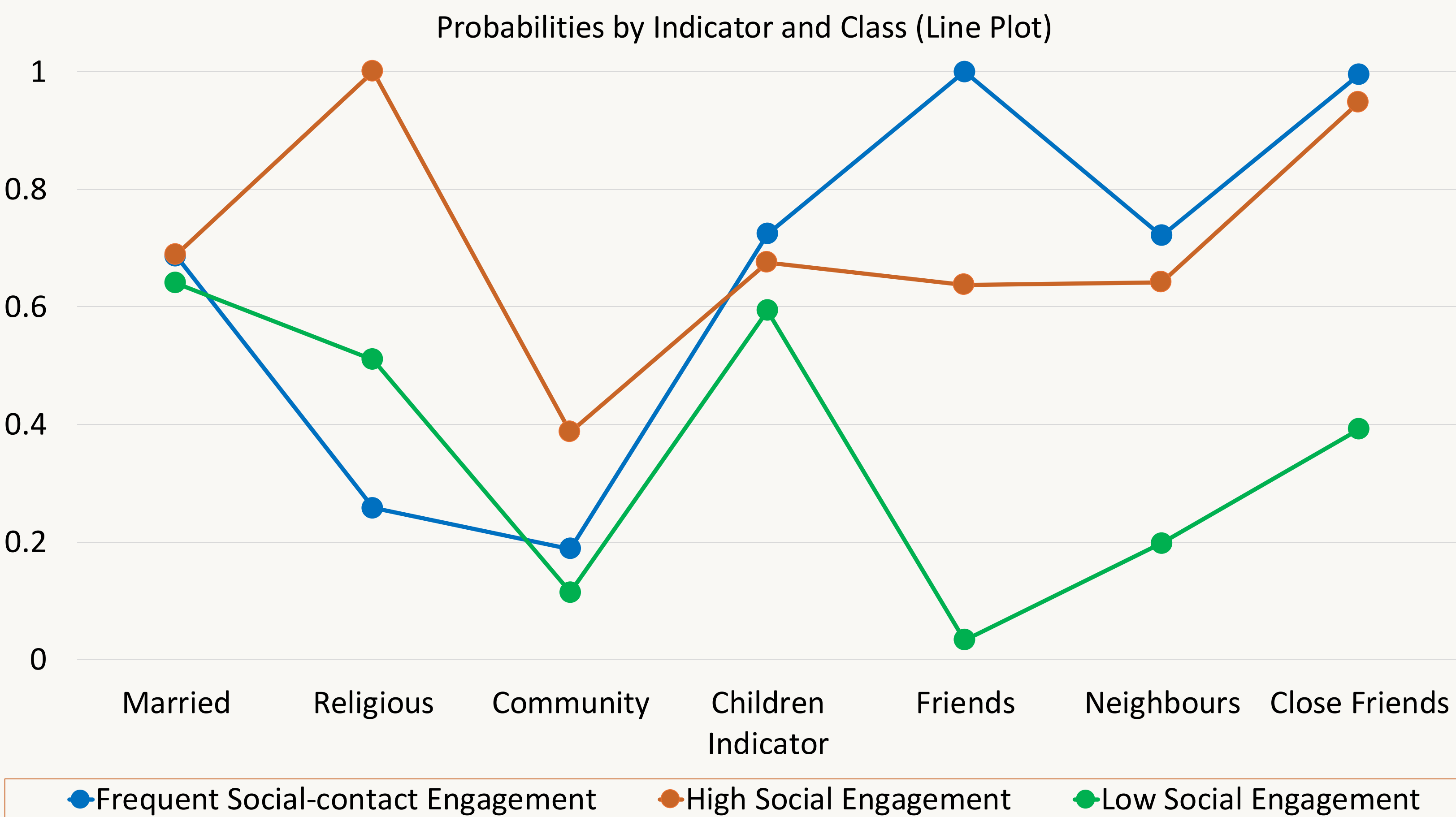


Figure 1. Item Probabilities for 3 Classes Model