From Greenery to Community: Exploring the Mediating Role of Loneliness in Social Cohesion

Appendix A

Table A1. Data information (District level)

	Data	Description	Source
1	Vegetation Density Indices (EVI, NDVI	For NDVI and EVI, which are designed to minimize canopy background variations and maintain sensitivity in densely vegetated areas, we utilized the MODIS/Terra vegetation indices product (MOD13Q1.061). This product offers a spatial resolution of 250 meters and a temporal resolution of 16 days. The greenness data derived from these satellite-based indices were aggregated to yield mean annual values for each administrative district. (a) Enhanced Vegetation Index (EVI): EVI is designed to optimize the vegetation signal by correcting for canopy background signals and reducing atmospheric influences, including those from aerosols. EVI is particularly useful in areas with dense vegetation, where it improves sensitivity to variations in vegetation. The formula for EVI is: $$EVI = G \times \frac{(NIR - RED)}{NIR + C_1 \times RED - C_2 \times BLUE + L}$$ Where NIR is the near-infrared reflectance, RED is the red reflectance, BLUE is the blue reflectance, L is the canopy background adjustment, and G, C_1, and C_2 are coefficients.	For EVI and NDVI, EVMODIS/Terra vegetation indices product (MOD13Q1.061)/

		(b) Normalized Difference Vegetation Index (NVDI): NDVI is a widely used index that measures the difference between near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs). NDVI values range from -1 to +1, with higher values indicating healthier and denser vegetation. The formula for NDVI is: $$\text{NVDI} = \frac{(\text{NIR} - \text{RED})}{(\text{NIR} + \text{RED})}$$	
2	Income	Average Income	Democratic Party (https://idp.theminjoo.kr/board/view/press/2128)
3	Homeownership	$\frac{\text{Households with their own houses}}{\text{Households without their own houses}}$	Korean Statistical Information Service
4	Age	Average age of population	Ministry of the Interior and Safety of South Korea
5	Sex	$\frac{\text{Male population}}{\text{Female population}}$	Korean Statistical Information Service
6	Urbanization	$\frac{\text{Population living in urban area}}{\text{Population}}$	Ministry of Land, Infrastructure and Transport of South Korea
7	Air pollution	PM10. PM10 refers to particulate matter with a diameter of 10 micrometers (μm) or smaller. These particles are small enough to be inhaled into the respiratory system.	Korean Statistical Information Service

Table A2. Data information (Survey)

1	2021-2022 Koreans' Happiness Survey	Happiness levels, inequality, and their determinants in Korea, providing insights into subjective well-being, attitudes, beliefs, and social values	National Assembly Futures Institute (https://kossda.snu.ac.kr/handle/20.500.12236/25423/simple-search)

Table A3. Variables (Survey data)

	Variable	**Description**		**Note**
1	Loneliness	"How frequently did you feel loneliness yesterday?" Respondents use a scale ranging from 0 (not at all) to 10 (all day)		
2	Distrust	Q: In the society where I live, most people are trustworthy. A: Strongly agree = 1 – Strongly disagree = 5		
3	Exploitation	Q: Most people will take advantage of me whenever they can. A: Strongly disagree = 1 – Strongly agree = 5		
4	Indifference	Q: Most people try to help each other when it is necessary. A: Strongly agree = 1 – Strongly disagree = 5		
5	Income	Individual Income from various sources, including earned, business, property, and transfer income.		Unit: 10000KRW As of July 10, 2024, the exchange rate between the United States Dollar (USD) and the South Korean Won (KRW) stands at 1USD to 1,288.60KRW
		None = 1 Less than 100 = 2 100 ~ 200 = 3 200 ~ 300 = 4 300 ~ 400 = 5 400 ~ 500 = 6	500 ~ 600 = 7 600 ~ 700 = 8 700 ~ 800 = 9 800 ~ 900 = 10 900 ~ 1000 = 11 Over 1000 = 12	
6	Education	None = 0 Primary = 1 Middle school = 2		

		High school = 3 College (less than 4 years) = 4 College (for years) or over = 5	
7	Homeownership	Homeownership = 1 Otherwise = 0	
8	Age	10s and 20s = 1 30s = 2 40s = 3 50s = 4 60s = 5 70s or over = 6	
9	Sex	Female = 1 Otherwise = 0	
10	Marital status	Living with spouse or partner = 1 Otherwise = 0	
11	Religion	Having a religion = 1 Otherwise = 0	