

Supplemental Material

Air Pollution and Depressive Symptoms in Elderly Adults

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Supplemental Material, Table S1 Pearson's correlation coefficients among SGDS-K items, factor loading from a principal factor analysis, and reliability of a test-retest analysis

Items	Reliability ^a / Eigen value (% of variance) ^c	Pearson's correlation coefficients ^f														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SGDS-K score (1-15)	0.92															
1. Satisfied with life	0.68	1														
2. Dropped activities/interests	0.86	0.24	1													
3. Life is empty	1.00	0.31	0.29	1												
4. Often get bored	0.67	0.37	0.34	0.44	1											
5. In good spirits	0.84	0.4	0.28	0.33	0.41	1										
6. Fear bad things	0.84	0.27	0.16	0.32	0.35	0.32	1									
7. Happy most of the time	0.84	0.49	0.22	0.31	0.39	0.58	0.29	1								
8. Often feel helpless	0.84	0.3	0.14	0.25	0.28	0.27	0.36	0.33	1							
9. Prefer to stay home	0.37	0.3	0.12	0.1	0.23	0.2	0.14	0.28	0.32	1						
10. Problems with memory	0.81	0.07	0.12	0.08	0.12	0.12	0.12	0.08	0.13	0.26	1					
11. Wonderful to be alive	0.84	0.3	0.26	0.39	0.39	0.47	0.3	0.5	0.29	0.08	0.09	1				
12. Feel pretty worthless	0.65	0.27	0.28	0.28	0.33	0.22	0.15	0.23	0.22	0.06	0.1	0.34	1			
13. Full of energy	0.78	0.31	0.29	0.18	0.23	0.2	0.19	0.28	0.2	0.22	0.2	0.25	0.25	1		
14. Situation is hopeless	1.00	0.24	0.34	0.32	0.38	0.28	0.23	0.3	0.31	0.12	0.15	0.31	0.36	0.14	1	
15. Others are better off	0.65	0.33	0.2	0.33	0.41	0.37	0.22	0.35	0.31	0.17	0.14	0.34	0.33	0.19	0.49	1
Factor 1 (Emotional)	4.9 (32%) ^e	0.62 ^b	0.10	0.44	0.49	0.73 ^b	0.54 ^b	0.78 ^b	0.49 ^b	0.32	-0.10	0.60 ^b	0.12	0.20	0.20	0.37
Factor 2 (Somatic)	1.1 (8%) ^e	0.25	0.18	-0.06	0.12	0.04	0.11	0.12	0.35	0.72 ^c	0.71 ^c	-0.08	0.07	0.49 ^c	0.11	0.11
Factor 3 (Affective)	1.3 (9%) ^e	0.16	0.62 ^d	0.48 ^d	0.50 ^d	0.20	0.14	0.13	0.14	-0.12	0.19	0.39	0.69 ^d	0.27	0.69 ^d	0.54 ^d

^a Reliability coefficients were derived from a test-retest analysis.

Pearson's correlation coefficient for SGDS-K score (1-15 points) and Kappa score for item-by-item responses (positive or negative) were used.

Factor loading values at the last three rows are clustered into three factors (^b Factor 1; ^c Factor 2; ^d Factor3)

^e Eigen value and percent of variance were derived from a factor analysis based on the baseline data (i.e. first visit only data).

^f Pearson's correlation coefficients were based on the baseline data (i.e., first visit only data).

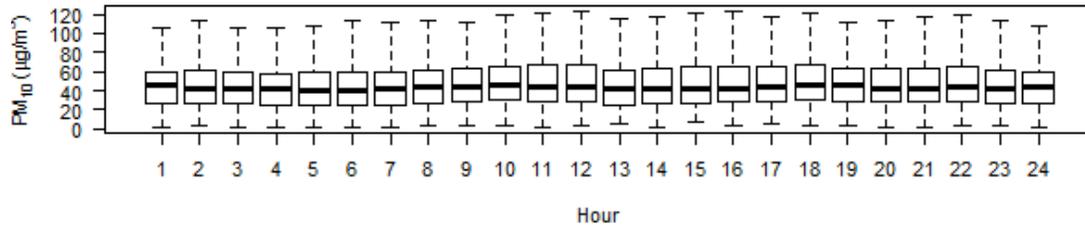
Supplemental Material, Table S2: Pearson correlation coefficients among five pollutants by follow-up times.

Air Pollutants	Mean PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Mean SO ₂ (ppb)	Mean NO ₂ (ppb)	Max CO (10ppm)
3-year repeated measurements				
Mean SO ₂ (ppb)	0.69*			
Mean NO ₂ (ppb)	0.65*	0.60*		
Max CO (10ppm)	0.69*	0.69*	0.69*	
Max O ₃ (ppb)	-0.06	-0.18*	-0.15*	-0.30*
1st follow-up: August - December, 2008 (N=383)				
Mean SO ₂ (ppb)	0.72*			
Mean NO ₂ (ppb)	0.75*	0.68*		
Max CO (10ppm)	0.78*	0.78*	0.77*	
Max O ₃ (ppb)	-0.32*	-0.49*	-0.39*	-0.49*
2nd follow-up: April - December, 2009 (N=368)				
Mean SO ₂ (ppb)	0.67*			
Mean NO ₂ (ppb)	0.71*	0.56*		
Max CO (10ppm)	0.67*	0.50*	0.65*	
Max O ₃ (ppb)	0.38*	0.34*	0.22*	0.26*
3rd follow-up: March - August, 2010 (N=344)				
Mean SO ₂ (ppb)	0.57*			
Mean NO ₂ (ppb)	0.30*	0.40*		
Max CO (10ppm)	0.47*	0.32*	0.70*	
Max O ₃ (ppb)	0.16*	0.08	-0.02	-0.15*

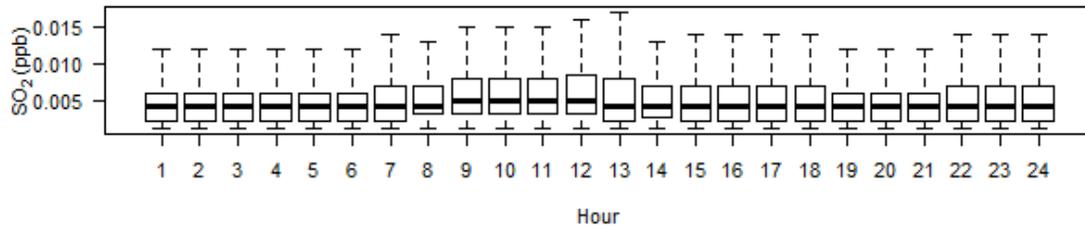
* P-value <0.05

Supplemental Material, Figure S1: Hourly air pollution concentrations ((a) PM_{10} , (b) SO_2 , (c) NO_2 , (d) CO , and (e) O_3) and (f) correlation coefficients among pollutants (Pearson correlations coefficients) during the study period (August 2008 ~ August 2010) in Seongbuk-Gu, Seoul. Three pollutants (SO_2 , NO_2 , CO) showed high value of exposure during the rush hour while O_3 exposure was peak in mid-afternoon (3 p.m.). Except O_3 , four pollutants were highly correlated with each other.

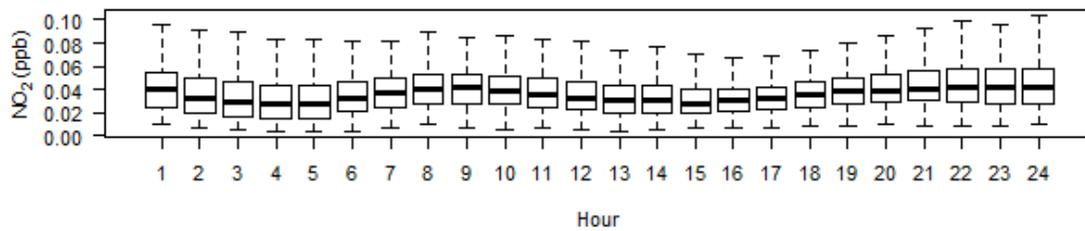
(a) Hourly Average of PM₁₀



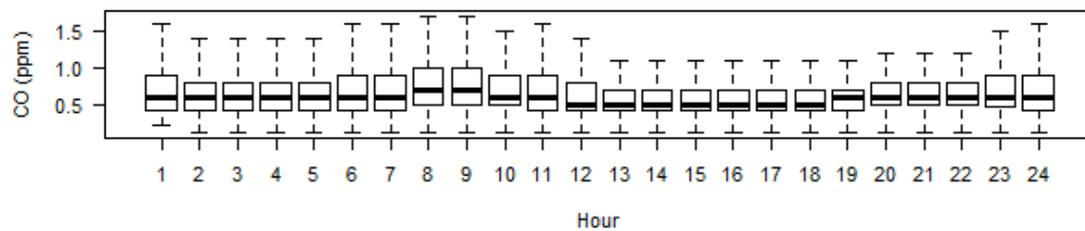
(b) Hourly Average of SO₂



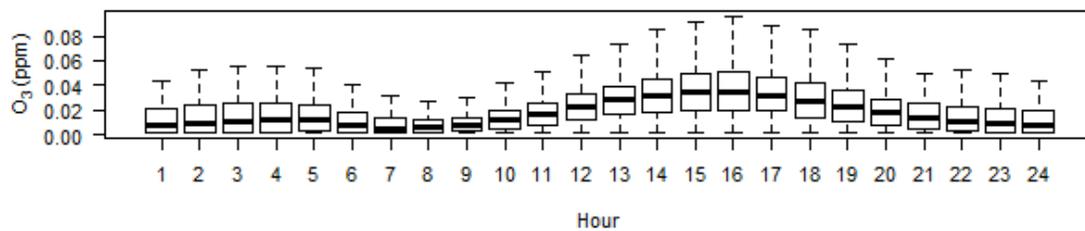
(c) Hourly Average of NO₂



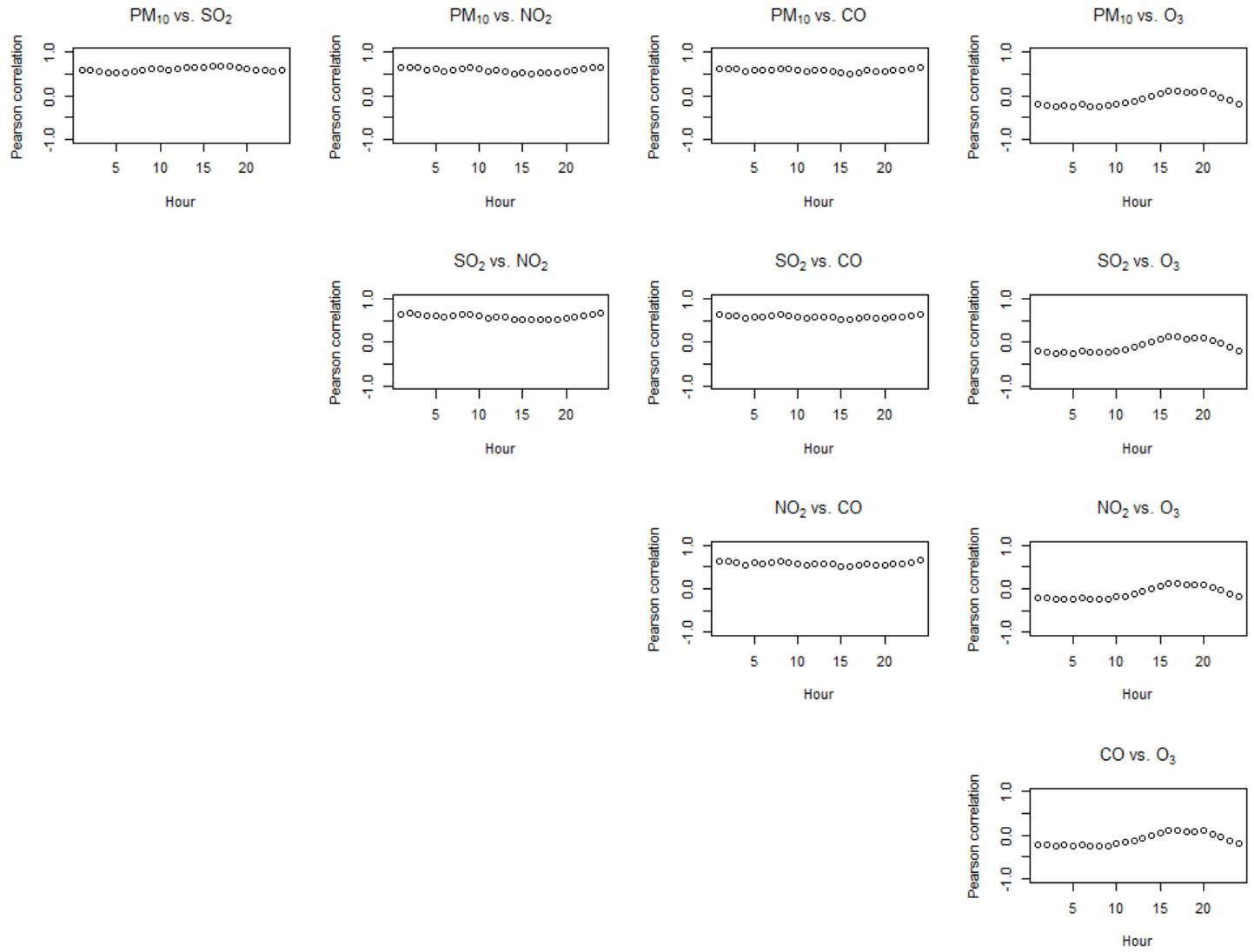
(d) Hourly Average of CO



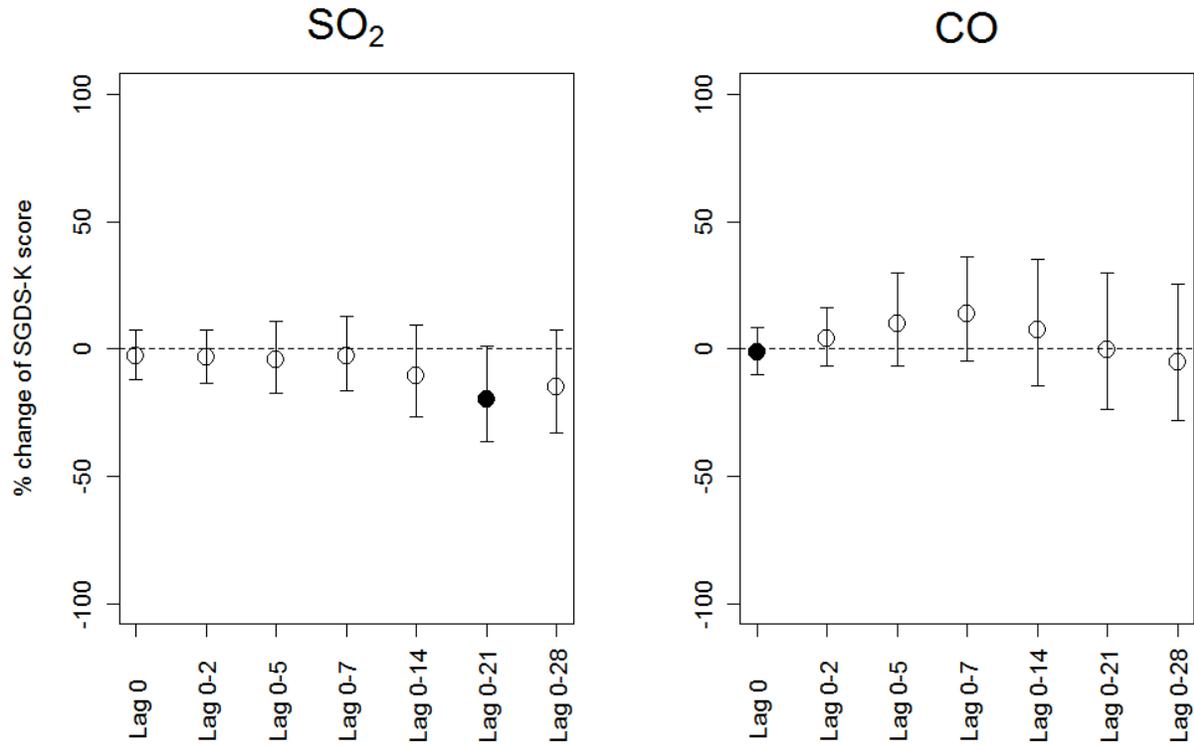
(e) Hourly Average of O₃



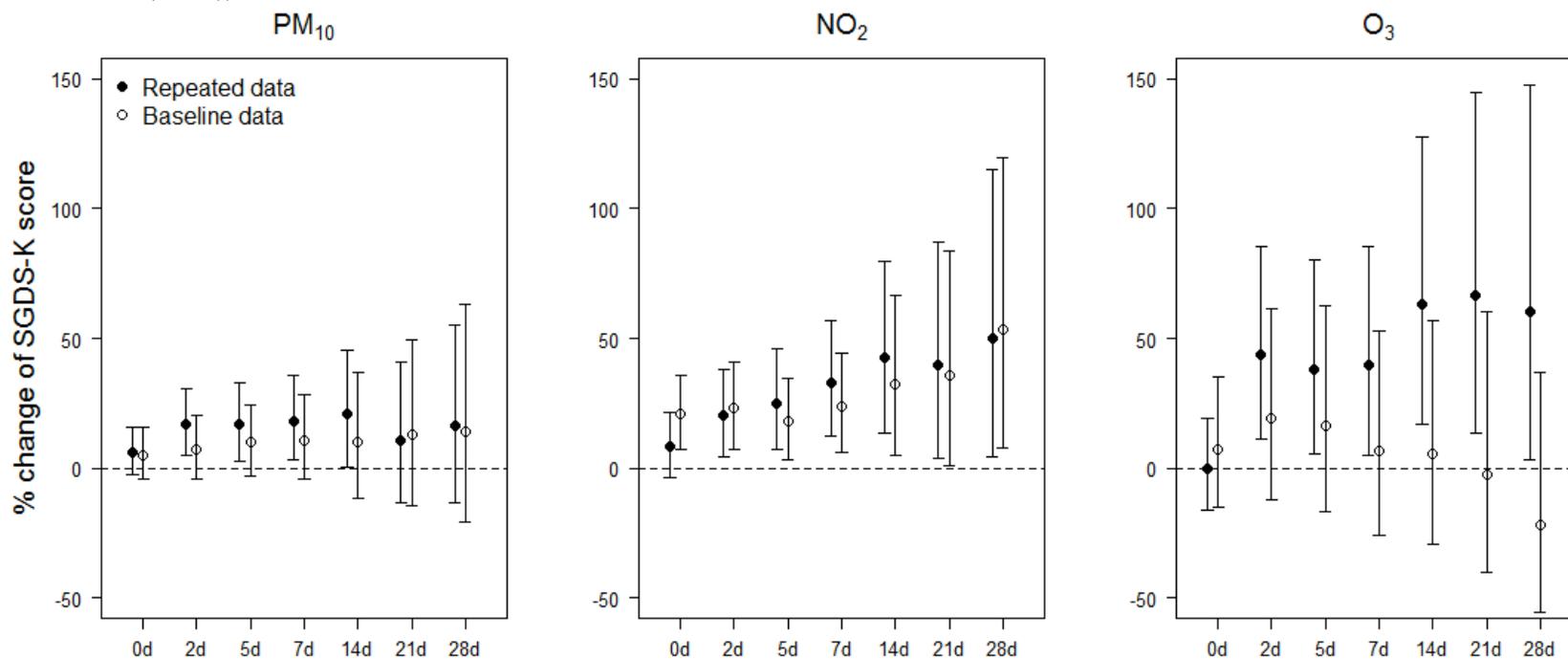
(f) Correlation coefficients among pollutants (Pearson correlations coefficients)



Supplemental Material, Figure S2: Percentage change of increasing Korean version of the Geriatric Depression Scale-Short Form (SGDS-K) score per interquartile range (IQR) of SO₂ and CO

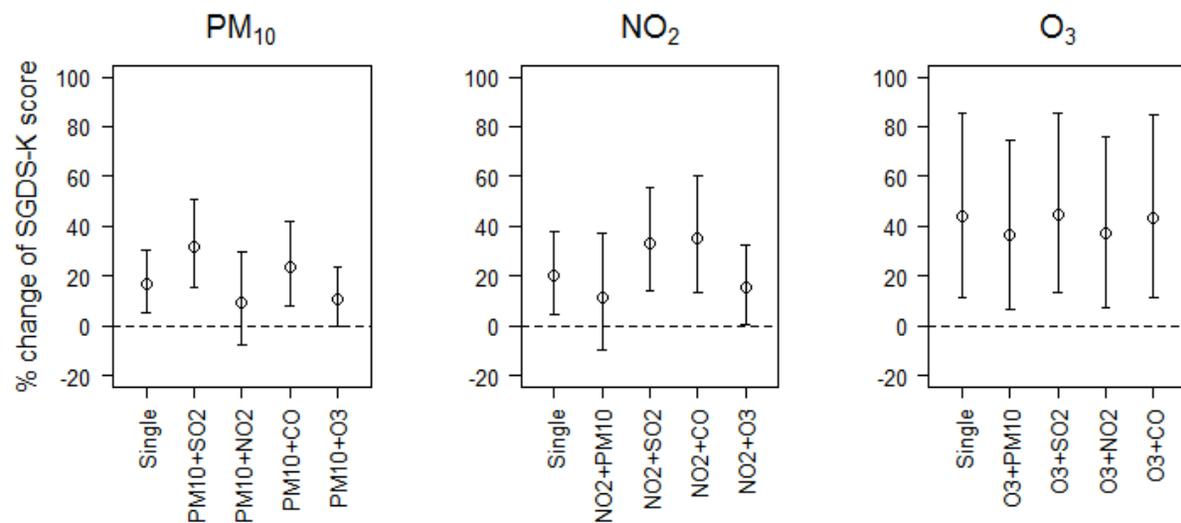


Supplemental Material, Figure S3: Percentage change of increasing Korean version of the Geriatric Depression Scale-Short Form (SGDS-K) score per interquartile range (IQR) of air pollutants (3-year-followup study using repeated measurement (solid circle) vs. cross-sectional study using baseline data (circle))



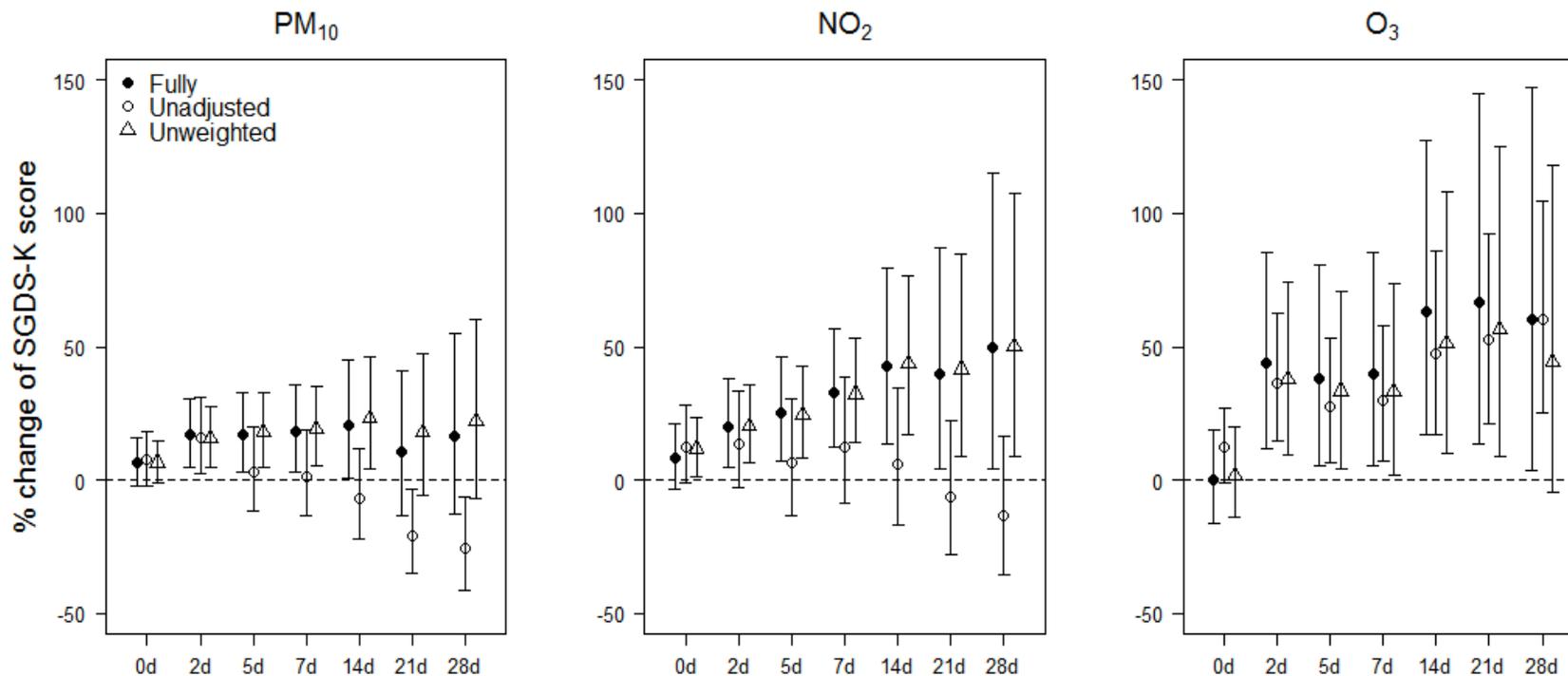
The model for each lag structure included the following variables: age, sex, number of years of schooling, body mass index, alcohol consumption, regular exercise, creatinine-adjusted cotinine level, systolic blood pressure, triglyceride, daily mean temperature, rainfall, follow-up time, and day of the week. A label of '0d' in X-axis means for concurrent exposure to air pollution, '2d' for moving average lag days from concurrent to two previous days, '5d' for 0-5 days of moving average, '7d' for 0-7 days, and '14d' for 0-14 days.

Supplemental Material, Figure S4: Percentage change of increasing Korean version of the Geriatric Depression Scale-Short Form (SGDS-K) score per interquartile range (IQR) of air pollutants at lag 0-2 in single- and two-pollutant models.



Single- and two-pollutant models included the following variables: age, sex, number of years of schooling, body mass index, alcohol consumption, regular exercise, creatinine-adjusted cotinine level, systolic blood pressure, triglyceride, daily mean temperature, rainfall, follow-up time, and day of the week.

Supplemental Material, Figure S5: Percentage change of increasing Korean version of the Geriatric Depression Scale-Short Form (SGDS-K) score per interquartile range (IQR) of air pollutants (Estimated effects derived from fully adjusted/weighted (solid circle) vs. unadjusted (circle) vs. unweighted (triangle) models)



Fully models for each lag structure included the following variables: age, sex, number of years of schooling, body mass index, alcohol consumption, regular exercise, creatinine-adjusted cotinine level, systolic blood pressure, triglyceride, daily mean temperature, rainfall, follow-up time, and day of the week. Unadjusted model includes only response variable and each lag days of air pollution concentrations. Unweighted model includes all variables used in full model except weight of loss of follow-up. A label of '0d' in X-axis means for concurrent exposure to air pollution, '2d' for moving average lag days from concurrent to two previous days, '5d' for 0-5 days of moving average, '7d' for 0-7 days, '14d' for 0-14 days, '21d' for 0-21 days, and '28d' for 0-28 days.