The Effect of Retirement on Mental Health and Cognitive Functioning, and Its Implications for Policy

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Introduction

The government has instituted various policy measures to encourage social participation among middle-aged and older adults, with a view to helping them prevent mental health problems and promote healthy aging. The Act on Supporting Preparation for Later Life and Integrated Health Promotion Programs together constitute an infrastructure of material and human resources with which to support middle-aged and older adults prepare for a healthy old age.

Middle-aged and older people around the time of their retirement have been found to be exposed, as a result of lack of stimulation and loss of self-esteem, to risks of cognitive decline and depressive disorder, which, for society as a whole as well as for those afflicted and their families, cause a great burden.[1] The number of Koreans diagnosed with mild cognitive impairment nearly tripled from 62,919 in 2012 to 185,967 in 2017. It has been reported that about 80 percent of those diagnosed with cognitive impairment develop dementia within 5 years. The amount spent by the National Health Insurance on dementia has increased from KRW928.8 billion in 2012 to KRW1.9588 trillion in 2017. The suicide rate for those aged 65 and older is higher in Korea than just about any other OECD country. Depression, long regarded as a leading cause of suicide, has in recent years been identified as a main cause of "lonely deaths" in people middle-aged and older.[2]

It's not only curative medical treatment that is essential to mental health and cognitive functioning. Prevention is just as important. Depression and cognitive decline in people middle-aged and older, occurring as they usually do unaccompanied by visible signs, are considered part of the natural process of aging and thus perceived as less serious than they in fact are.[3]

Thus, it is worthy to examine changes that take place, and factors responsible for these changes, in mental health and cognitive functioning in middle-aged and older adults after retirement. Korean baby boomers are aging out of the workforce. As they are better educated, and expected to live longer in good health, than older retirees, their urge to continue working in productive activities may likewise be stronger. This study looks at the effect of retirement on mental health and cognitive functioning in people middle-aged and older, and consider, based on the findings, what should to be done at individual and government levels to maintain or even promote mental health and cognitive functioning in retirement.

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1 Hurt, C. I., Bhattacharryya, S., Burns, A., Camus, V., Liperoti, R., Marriott, A., ... & Byrne, E. J. (2008). Patient and caregiver perspectives of quality of life in dementia. Dementia and Geriatric Cognitive Disorders, 26(2), 138-146.
2 Hirsch, J. K., Duberstein, P. R., Chapman, B., & Lyness, J. M. (2007). Positive affect and suicide ideation in older adult primary care patients. Psychology and Aging, 22(2), 380-385.
3 Koenig, H. G. (1999). Late life depression: How to treat patients with comorbid chronic illness. Geriatrics, 54(5), 56-61.

The effect of retirement on mental health and cognitive functioning in middle-aged and older adults

This study used data from the 1st~6th waves of the Korean Longitudinal Survey of Aging (KLoSA). We define retirement as in Table 1.

[Table 1] Variables of retirement, mental health and cognitive function

Variables	Definition
Retirement	Retirement is defined as a state in which one is partially or completely withdrawn from career work and is likely to remain so unless there is a significant change in circumstances.
Working again after retirement	Labor force re-entry after retirement
Depression: CES-D10[4]	The scale consists of 10 questions, each taking either the value 1 or 0, with the total score ranging from 0 to 10. Higher scores are associated with higher likelihood of depressive symptoms.
Variables	Definition
SAH (self-assessed health)	How would you rate your health status? 1. Bad 2. Moderate 3. Good 4. Very good 5. Best
Cognitive functioning: MMSE-K (time orientation, memory registration, calculation, memory recall,	-Time orientation test: year, month, day, date -Memory registration test: three words -Attention and calculation: Five calculation questions -Memory recall: test for remembering the three words presented for memory registration -Comprehension and judgment: verbal description of the use of two of the items one carries -Executive function: drawing a replica of an image presented (for example, a couple of overlapping pentagons)

This study used an individual fixed effect model (IFEM) to avoid the issue of endogeneity that may arise from various variables affecting mental health and cognitive functioning. This is because if there are some unobservable individual idiosyncrasies that affect mental health and cognitive functioning, it becomes hard to clarify whether and to what the effect is due to retirement. To rule out the reverse causality issue that may arise between mental health and cognitive functioning on the one hand and retirement on the other, our analysis excluded those who retired for health reasons. The model we used for our analysis can be represented as: $H_{ti} = \beta_{0} + \beta_{1} R(W)_{ti} + \beta_{3} X_{ti} + \tau_{i} + \gamma_{t} + \epsilon_{ti}$. Here, the term H_{ti} is a health outcome for individual i at time t; $R(W)_{ti}$ is a dummy variable which takes the value 1, if individual i after retirement continues working at time t, or 0, if he or she stays retired, not working; X_{ti} denotes a set of observable characteristics of individuals, including age, educational attainment, having or not having a spouse, number of family member, area of residence, and gross household income (as represented in terms of its natural logarithm); τ_{ti} indicates time-invariant, unobservable individual factors; γ_{t} represents year-fixed (time-variant) effects; ϵ_{ti} is the residual component. In the analysis of the effect of retirement on mental health and cognitive functioning, we omitted the

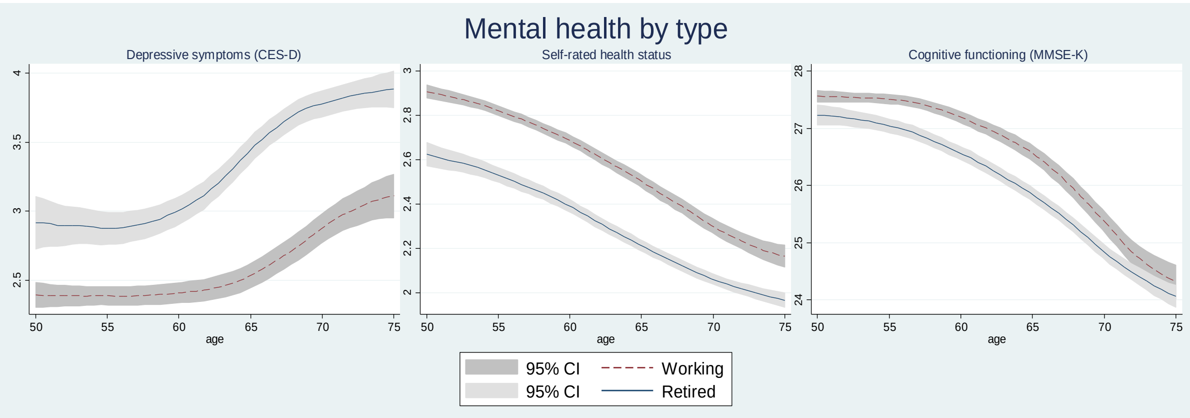
[4] KLoSA in its 1st~4th waves used 10 questions selected from CES-D20 (Anderson form). For the 5th and 6th waves, CES-10 (Boston form) was used. The way the two indices were used in combination in this study was acknowledged by the Korea Employment Information Service as acceptable.

effect of rework by excluding those who continued working after retirement. In our analysis of the effect of working after retirement on mental health and cognitive functioning, we compared retirees and those who continued working.

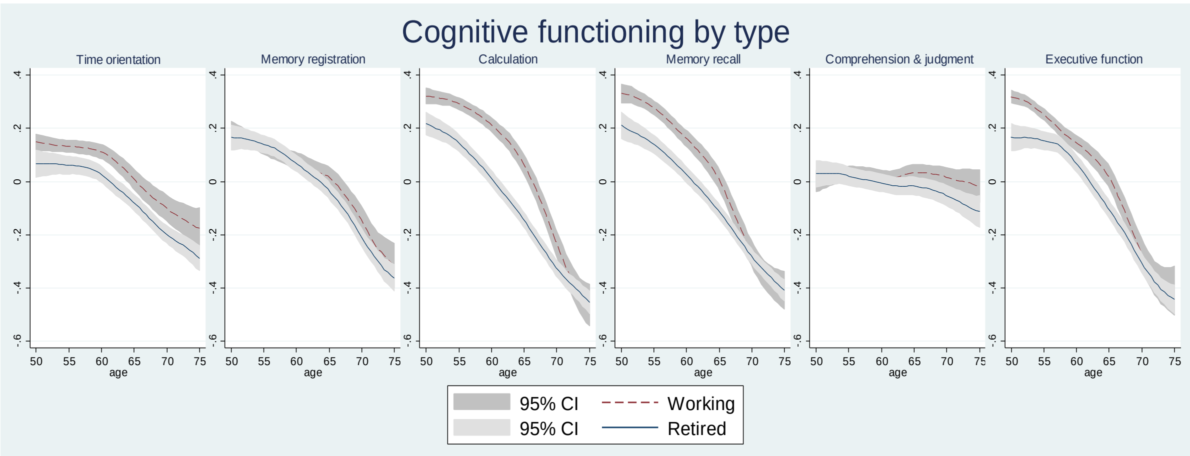
Retirement, mental health and cognitive functioning

We looked at changes in mental health in people in their late 50s and older, in whom retirees account for a higher percentage than in younger people. We found that the difference in CES-D scores, which represent levels of depressive symptoms, were significant between retirees who continued working after retirement and retirees who remained retired. Cognitive decline—in calculation, memory recall, and executive function—was slower in those who continued working than in those who did not. There were differences in comprehension and judgment tasks between the two groups among individuals aged 60 and older. Cognitive functioning can in the main be classified into two categories: fluid intelligence and crystallized intelligence. Fluid intelligence has to do with inborn, individual abilities that clearly decline with age. In comparison, crystallized intelligence—human capital and knowledge individuals acquire and accumulate over time through education and learning—is slow in declining.[5]

[Figure 1] Changes in mental health and cognitive decline in retirees and those continuing working



[Figure 2] Changes in cognitive measures in retirees and those continuing working



5 For further discussion of psychological theory of fluid crystallized intelligence and human capital production function, refer to Rohwedder, S., & Willis. R. J. (2010). Mental Retirement. Journal of Economic Perspective, 24(1), 119-138.

Retirement has been found to increase the risk of depressive symptoms and negatively affect self-rated health. The effect of retirement on cognitive functioning is not immediate but occurs cumulatively over time. The negative effect retirement has on self-rated health tapers off as time elapses. The effect of retirement on depressive symptoms reduces over time, but remains significant. Mental health and cognitive functioning after retirement change for the worse, if to different extents, for male and female, with men over twice as likely as women to suffer from depression right after retirement.

[Table 2] The effect of retirement on mental health and cognitive functioning

Dependent variables		Effect of retirement on health			Effect accrued over the years in retirement		
		All	Men	Women	All	Men	Women
Depression		0.398***	0.545***	0.219	0.061***	0.063***	0.057*
N (cluster)		17,977 (4,371)	10,456 (2,384)	7,521 (1,987)	14,932 (3,595)	9,379 (2,178)	5,553 (1,417)
R-squared		0.024	0.031	0.022	0.024	0.028	0.024
Self-rated health		-0.054*	-0.060	-0.053	-0.009	-0.006	-0.013
N (cluster)		18,034 (4,371)	10,479 (2,384)	7,555 (1,987)	14,969 (3,597)	9,396 (2,178)	5,573 (1,419)
R-squared		0.030	0,038	0.022	0.030	0.037	0.024
Cognitive functioning		-0.098	-0.171	0.024	-0.079***	-0.061**	-0.113***
N (cluster)		12,576 (4,102)	7,577 (2,275)	4,999 (1,827)	14,457 (3,576)	9,047 (2,164)	5,410 (1,412)
R-squared		0.075	0.093	0.049	0.096	0.120	0.069
Cognitive functioning	Time orientation	-0.035	-0.043	-0.029	-0.010	-0.008	-0.013
	Memory registration	-0.002	0.004	-0.010	-0.024***	-0.018**	-0.035***
	Attention and calculation	-0.035	-0.032	-0.036	-0.014**	-0.018**	-0.007
	Memory recall	0.047	-0.039	0.190**	0.006	0.011	-0.005
	Comprehension and judgment	-0.143**	-0.116	-0.181*	-0.009*	-0.015**	0.002
	Executive function	-0.066	0.027	-0.232***	-0.027***	-0.019***	-0.042***

Note: 1) Standard errors are robust, clustered at the individual level.

2) ***p<0.01, **p<0.05, *p<0.1

3) Years in retirement = [(one's present age – age at which one retired) + 1]; if not retired, then '0'.

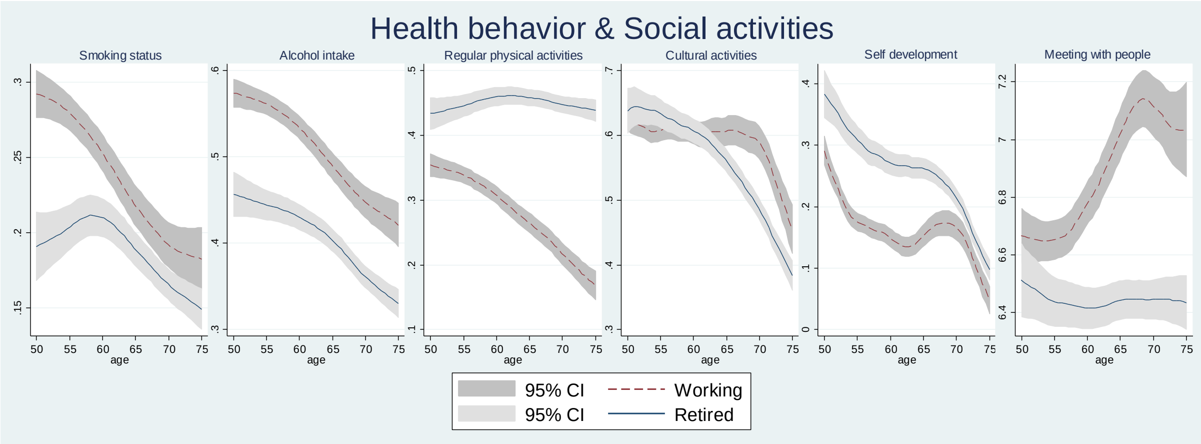
Source: 1st~6th waves, Korean Longitudinal Survey of Aging

Mechanisms via which retirement affects mental health and cognitive functioning

Retirement as a life event may have a direct effect on mental health. But its effect may well be indirect, resulting from an increase in one's available time budget and the changes that follow in one's time use pattern. After retirement comes a period of behavioral adjustments through which individuals bring changes to their health, social activities and interpersonal relationships.

Health-related behaviors tend to change for the better with age. It was found in this study that retirees are more likely than those who continue working to do physical activities regularly. However, when it comes to cultural activities and interpersonal relationships, it is those who continue working who are less likely to participate. This study found that retirees who stayed retired were more likely than those who continued working to engage in self-development activities. However, it should also be noted that the rate of participation of the sample population in self-development activities was as low as 6 percent.

[Figure 3] Changes in behavior adjustment among those working and those retired



Note: Cultural activities include traveling, going to cinema, visiting museums and galleries and attending sport events; self-development activities include participating capacity-building programs, hobby programs, and volunteering.
Source: 1st~6th waves, Korean Longitudinal Survey of Aging

[Table 3] Behavioral adjustment mediators: a mediation analysis

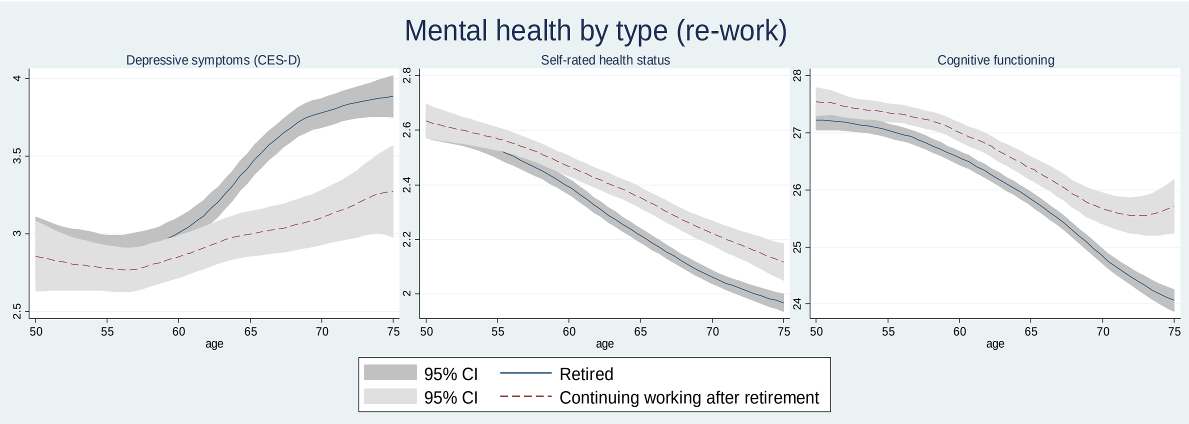
			Model 1	Model 2	Model 3	Model 4
Dependent variables	Mental health	Depressive symptoms	0.398***	0.266***	0.413***	0.266***
		Self-rated health status	-0.054*	-0.029	-0.059**	-0.031
	Cognitive functioning	Cognitive functioning	-0.098	-0.069	-0.074	-0.041
		Time orientation	-0.035	-0.046	-0.031	-0.039
		Memory registration	-0.002	-0.015	0.005	-0.010
		Attention and calculation	-0.035	-0.049	-0.033	-0.045
		Memory recall	-0.047	0.096*	0.053	0.105*
		Comprehension and judgment	-0.143**	-0.118*	-0.135**	-0.113*
		Executive function	-0.066	-0.068	-0.063	-0.062
Mediators		Social activities	Executive function	v		v
		Interpersonal relationships		v		v
		Health behavior			v	v

Note: 1) Standard errors are robust, clustered at the individual level.
2) ***p<0.01, **p<0.05, *p<0.1
3) Health behavior mediators that are used in this study are "smoking status," "alcohol intake," and "regular physical activity"; mediators of social activities and interpersonal relationships are "frequency of participation in cultural activities," "status of participation in self-development programs," and "frequency of meeting with people in person."
Source: 1st~6th waves, Korean Longitudinal Survey of Aging

Our mediation analysis finds that social participation and interpersonal relationship greatly reduce (as shown in Models 2 and 4) the negative effect of retirement on mental health and cognitive functioning. If behavioral adjustment affects mental health, and to a great extent at that, the effect of retirement *per se* may fall off or even disappear altogether over time. With social participation and interpersonal relationship added as mediators, the negative effect of retirement on depressive symptoms moderates. The effect of retirement in this case is found to be inconsequential on self-rated health status; also, less likely to lead to cognitive decline in comprehension and judgment.

Negative changes in participation in social activities and interpersonal relationships are found to have a negative effect on mental health and cognitive functioning. In Korea work is an essential pathway out into society. For this reason, one's retirement is highly likely to negatively affect one's formation of social capital and social network.[6]

[Figure 4] Changes in mental health and cognitive functioning among retirees and those who continue working after retirement



Source: 1st~6th waves, Korean Longitudinal Survey of Aging

From our comparison of retirees and those who continue working after retirement, we found that economically productive activities slow mental health decline and moderate the risk of depressive symptoms. Work is found to positively affect self-rated health status and cognitive functioning. This is presumably because work settings, as compared to non-work settings, provide an environment that is cognitively more challenging and stimulating.[7] In addition, economic activities can positively affect mental health and alleviate depressive symptoms, as they help individuals build up a positive self-concept through role support and the sense of social belongingness.[8]

[Table 4] The effect of working after retirement on mental health

	Dependent variables		
	Depressive symptoms	Self-rated health status	Cognitive functioning
Working after retirement	-0.477***	0.188***	0.225*
N (cluster)	8,271 (2,667)	8,300 (2,669)	5,044 (2,150)
R-squared	0.030	0.025	0.079

Note: 1) Standard errors are robust, clustered at the individual level.
2) ***p<0.01, **p<0.05, *p<0.1
Source: 1st~6th waves, Korean Longitudinal Survey of Aging

Concluding remarks

6 d'Hombres, B., Rocco, L., Suhrcke, M., & Mckee, M. (2010). Does social capital determine health? Evidence from eight transition countries. Health Economics, 19(1), 56-74.
7 Rohwedder, S., & Willis, R. J. (2010). Mental Retirement. Journal of Economic Perspective, 24(1), 119-138. Mazzonna, F., & Peracchi, F. (2012). Ageing, cognitive abilities and retirement. European Economic Review, 56(4), 691-710.
8 Taylor, B. A., & Bengtson, V. L. (2001). Sociological perspective on productive aging. In N. Morrow-Howell, J. Hinterlong, & M. W. Sherraden (Eds.), Productive aging: Concepts and challenges (pp. 120-144). Baltimore, Johns Hopkins University.

Preventing declines in mental health and cognitive functioning in middle-aged and older adults would require not only a strong health care sector but also a wide range of policies that encourage people to continue, after retirement, engaging in productive and social activities. Middle-aged and older Koreans after retirement experience changes in their social activities and interpersonal relationships that may deprive them of self-esteem and cognitive stimulation and negatively affect their mental health.

A wide variety of programs—cultural and art-related activities, volunteering programs and social contribution jobs—have been developed and provided for middle-aged and older Koreans, with a view to encouraging their social participation and thus to preventing their cognitive decline. However, there is much to improve in terms of infrastructure, as there is much left to be taken care of at the individual level and by the private sector. Also, as it's likely that the more experienced one is with social participation, the more likely one is to participate in yet more social activities, as social participation is something of an experience good, there is a need for expanding participation opportunities.

Assessments should be conducted of the characteristics and needs of those who are retired or about to retire, and the findings thereof should be used to find ways to expand opportunities for these individuals to participate in social and productive activities of their preference and interest. The existing support mechanism is not effective enough to maintain, or slow the decline in, mental health and cognitive functioning for the baby boom generation, who on average are more educated and have a longer healthy life expectancy than existing retirees. Those among middle-aged and older Koreans who look forward to building up skills, knowledge and experience will need to have policy support which, going beyond one-off, cut-and-dried assistance, accommodates their varying interests and needs in social activities. Although many in middle-aged and older adults in Korea who wish to continue working still do so for financial reasons, productive activities are increasingly undertaken less for pecuniary gain and more for reasons having to do with "meaningfulness of work", "social participation through work," and "social contribution aspect of work." The suggested support requires more than public programs. The corporate sector lacks a system of support for retirees to engage in self-development, social participation, volunteering and social contribution activities. In this regard, ways should be found to link public programs to communities and the corporate sector.