

# SONIC: A longitudinal study based on the framework of gerontology considering the super-aging society

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## Abstract

Considering the ever-increasing aging of society, research on aging, especially those called the oldest old, is needed. The purpose of the SONIC study is to elucidate the aging process from young old (70+) to oldest old (90+) and the factors involved in healthy longevity and well-being for them. The SONIC study has reported various results, from micro-level results on identification of plasma protein glycans as potential markers of cognitive decline to macro-level results on the relationship between the local environment, social capital, and mental health.

## Background & Results

Medical schools have led most epidemiological studies of older people in Japan. A larger number of results have been reported on factors related to physical health and negative aspects of psychological health, such as depression and dementia. However, few studies focus on positive aspects such as happiness and well-being, especially in the oldest old. Our previous research has shown that psychological health does not decline in the oldest old, while physical functions and abilities of daily living decline. To clarify such complex phenomena across multiple research areas, the SONIC study was started in collaboration with members at Osaka University and other external research institutions under the gerontology framework (Figure 1). In total, over 3000 older adults from 70 to 90 participated. A large number of variables from different discipline were collected (Table 1).

The most striking feature of the SONIC study is the focus on the psychological concept called gerotranscendence. In a cross-sectional analysis, physical health and cognitive function significantly decline in older age groups. In contrast, mental health and well-being do not differ across age groups. Gerotranscendence was higher in the older age groups (Figure 2). It was also found that gerotranscendence was related to mental health in all age groups, with the association becoming stronger the older the age group. Follow-up studies have revealed that gerotranscendence increases significantly from age 70 to 80 but does not increase much after age 80. Furthermore, gerotranscendence was also associated with self-evaluation of oral function. As mentioned above, we could confirm that the development of gerotranscendence is related to the various dimensions of well-being in older adults.

## Significance of the research and Future perspective

Aging phenomena in a human take place with reciprocal influences on physical, psychological, and social aspects. Therefore, a study designed interdisciplinary and gerontological framework is necessary. In addition, considering human aging, it is necessary to accumulate data longitudinally over a long period. 12 years

have passed since SONIC data collection started, and the oldest participant has exceeded 100 years of age. To date, the SONIC study has reported that psychological changes associated with aging, called gerotranscendence, are important for well-being in older adults (Figure 2). We believe continued research will allow us to construct an ideal interdisciplinary aging model for 100 years of life.

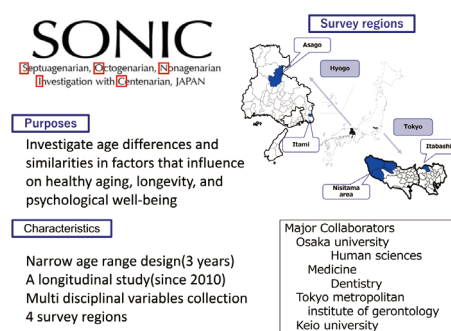


Figure 1 Outline of SONIC study

Common outcome	Cognitive functions(MoCA), Physical function(SPPB), Frailty
Socio-demographic	Education, Abilities during elementary school(language and arithmetic), Economic status, Care-levels
Medical and Biological	Medical history(interview), Lifestyle(alcohol, smoke, sleep), Subjective audiovisual function, General exam(blood pressure, home blood pressure, lung capacity) General biochemical exam(serum albumin, creatinine) DNA(ANRIL, Klotho, APOE4, FOXO3 etc.), RNA expression, Proteomic analysis
Dentistry	Remaining teeth, Occlusion(Eichner's), Occlusal force, Periodontal disease(genetic), Salivary flow rate, Taste sensitivity, Swallowing ability, Oral related quality of life(GOHAL)
Nutrition	Brief self-administered diet-history questionnaire(BDHC), Salt intake, Solitary eating
Psychology	Personality(NEO-PI), Health behavior, Life events, Well-being(Subjective well-being, Life satisfaction), Mental health(GDS, WHO-5), Psychological adaptation(SOC, Valuation of Life) Psychological development(Generativity, Gerotranscendence) Cognitive Functions(reasoning, memory, emotional processing, spatial perception)
Sociology	Social network, Social support, Social capital, Neighborhood environments, Mid-life work experiences(work complexity, stress) Leisure activities(past, present)

Table 1 Measurements in SONIC study

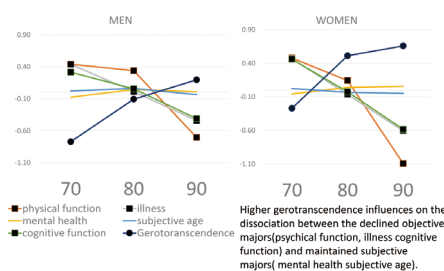


Figure 2 Higher gerotranscendence in the oldest old

### Patent

Gondo, Yasuyuki; Masui, Yukie; Kamide, Kei et al. SONIC Study: A Longitudinal Cohort Study of the Older People as Part of a Centenarian Study. In N.A. Pachana (ed.), Encyclopedia of Geropsychology, Springer Science Business Media Singapore. 2015. doi: 10.1007/978-981-287-080-3\_182-1  
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### Treatise

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### URL

<http://www.sonic-study.jp/>  
<http://gerontology-osaka.jp/index.html>

### Keyword

oldest old, gerotranscendence, well-being