It is difficult to trial the effect of increasing social participation which might need unacceptable, impractical and long-term interventions (in line with findings that married compared to single people have lower dementia risk). Facilitator-led social group interventions have been small and short with inconsistent effects on cognition.

Overall, the increasing, consistent and biologically plausible evidence that social participation reduces dementia risk means that interventions should begin to be included within dementia prevention guidelines and considered in policy. Public health policy should be an important component through promoting participation in those at risk and improving the accessibility of buildings and cities. This should be targeted at those who are more isolated, and this is closely linked with socio-economic deprivation.

## Impact of loneliness and social isolation in older people in Japan

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A decline in social functioning is a hallmark of dementia and is associated with worsening cognitive impairment, various behavioral and psychological symptoms, and caregiver burden. Since the feeling of loneliness is related to social function decline in people with mild cognitive impairment (MCI) and dementia, care for the social isolation that can cause loneliness is considered important in Japan, where the number of older people living alone is increasing.

In addition to dementia, late-onset psychosis is also known to be affected by loneliness and social isolation. Psychosis that develops after age 60 and does not involve organic or affective disorders is defined as very late-onset schizophrenia-like psychosis (VLOSLP) and is known to be different in quality from psychosis that develops at a younger age. Social isolation has been reported as one of risk factors of VLOSLP, and although people with VLOSLP are independent in daily life, their social functioning is impaired in a way that is different from dementia due to their abnormalities in the content of thinking. Therefore, social isolation and decline of social functioning are also major problems for VLOSLP. Longitudinally, people with VLOSLP are more likely than the general older population to progress to dementia including Lewy body disease and Alzheimer's disease subtypes. With the increasing importance of early diagnosis and intervention of these neurodegenerative diseases, identification and intervention of people with VLOSLP is a challenging but important topic.

We are now investigating the use of robots with communication capabilities aiming to improve loneliness and social isolation of older people living alone with MCI, mild dementia and VLOSLP. On the other hand, we have found that loneliness in MCI and mild dementia does not necessarily correlate with social isolation status, such as living alone, indicating that loneliness and social isolation among older people requires further research.

## Insight into impaired social functioning in dementia

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