



## Social capital and cognitive decline after a natural disaster

### Authors' reply

We thank Dr Ozaki and colleagues for their interest in our paper.<sup>1</sup> Regarding loss of a loved one, we separately examined the effects of loss of relatives versus loss of friends on the decline in cognitive function. Neither type of loss was associated with cognitive decline. We note two limitations of our study. First, our survey asked about loss of "close relatives" in the disaster, and we could not distinguish between spouses and other close relatives (such as adult children). Second, we did not inquire on the baseline survey (ie, before the disaster) about the frequency of social interactions between the survivors and the relatives or friends who were lost. In some instances, the frequency of social interactions might have been quite intense (eg, daily), in which case their loss could have contributed more to the risk of cognitive decline.

Regarding potential gender differences, we fitted a three-way interaction term for housing damage  $\times$  social capital  $\times$  gender, and found that it was significant ( $p < 0.001$ ). In further gender-stratified analysis, we found that informal socialising and social participation appeared to significantly mitigate the effect of housing damage on cognitive decline in both sexes, but the effect

was roughly twice as strong among women (coefficient  $-0.10$ , 95% CI  $-0.13$  to  $-0.08$ , for females; coefficient  $-0.04$ , 95% CI  $-0.07$  to  $-0.01$ , for males).

Regarding changes in living arrangement after the disaster, we checked the effect of changes in cohabiting with children. A change in living arrangement (ie, not living with children pre-disaster and living with children post-disaster) was adversely associated with cognitive function in women (coefficient  $0.08$ , 95% CI  $0.01$  to  $0.16$ ), but not in men (coefficient  $-0.01$ , 95% CI  $-0.08$  to  $0.06$ ). However, we believe those association reflects simultaneity bias—ie, changes in living arrangement triggered by a deterioration in cognitive function. The causal effect of changes in household composition might be difficult to identify because of this type of bias.

The Iwanuma city area was fortunately not affected by the radiation fallout from the Fukushima nuclear plant disaster. Thus, most of the survivors chose to stay, or relocated within the same city after the disaster. Indeed, the census population was not significantly changed before versus after the disaster (44 187 in 2010 vs 44 704 in 2015). Even among our baseline respondents, only 92 people (approximately 2% of valid baseline respondents) moved out from Iwanuma city during the follow-up period (see also figure 2 in our paper<sup>1</sup>). We agree with Dr Ozaki and colleagues that the availability of potential

caregivers in the vicinity (eg, adult children) might have contributed to the cognitive resilience of survivors in the Iwanuma area.

In our most recent paper,<sup>2</sup> we examined the predictors of changes in social capital (informal socialising and social participation) in the aftermath of the 2011 Japan earthquake and tsunami, based on the same cohort sample. In that study, we found that changes in household composition (whether the individual was living alone or not) was not correlated with changes in social capital, using fixed effect models.

We declare no competing interests.

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