Level of and Change in Cognitive Functioning Among Dutch Older Adults: Does Neighborhood Socioeconomic Status Matter?

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Due to demographic changes during the last decades, the number of older adults has strongly increased, and it is predicted to further increase in the future (United Nations, 2013). Thus, issues of age-related cognitive decline and impaired cognitive functioning are becoming more prevalent. The term *cognitive functioning* typically captures the abilities to attend, think, reason and recall information, and low levels of cognitive functioning are a constituent feature of dementias (Badgio & Worden, 2007). Even mildly impaired cognitive functioning comes with burdens for affected individuals (Joosten-Weyn Banningh, Vernooij-Dassen, Rikkert, & Teunisse, 2008). More severe forms of cognitive impairment hint at demented diseases, which put high demands on caregivers (Haro et al., 2014) and cause high costs to health care and social care systems, especially in wealthier countries (Wimo et al., 2011; Wimo, Jönsson, Bond, Prince, & Winblad, 2013). As no effective cure for impaired cognitive functioning is accessible yet (Petersen et al., 2014), it is important to understand the determinants of cognitive functioning in advanced age in order to develop preventive strategies.

Recent studies, predominantly from the US-American context, report that the neighborhood context of older adults is associated with differences in their cognitive functioning (see the review by Wu, Prina, & Brayne, 2015). More specifically, the findings implicate that socioeconomic disadvantage or deprivation at the neighborhood level is associated with lower levels of cognitive functioning. It is often argued that neighborhood differences are less strongly developed in some Western European countries including the Netherlands. Thus, the present study examines whether previous findings on the association of the socioeconomic status of a neighborhood and the cognitive functioning of its older inhabitants hold true in a sample of Dutch older adults.

Furthermore, only very few studies (Al Hazzouri et al., 2011; Boardman, Barnes, Wilson, Evans, & Mendes de Leon, 2012; Sheffield & Peek, 2009) have so far considered the change of cognitive functioning over time. This is however necessary for assessing whether the socioeconomic status of a neighborhood is capable of speeding up or slowing down the

deterioration of cognitive functioning in advanced age. Therefore, the current study additionally investigates the change of cognitive functioning over time in order to see whether the rate of decline actually differs by neighborhoods socioeconomic status.

Theoretical efforts to explain effects of neighborhood socioeconomic status on cognitive functioning have so far predominantly focused on differences in the availability of physical and social resources in the neighborhood (see Sheffield & Peek, 2009; Wight et al., 2006). This would imply that older adults living in a neighborhood with a higher (vs. lower) socioeconomic status find more opportunities to engage in physical and social activities within short distance, both of which have been shown to be positively linked to cognitive functioning (Sheffield & Peek, 2009; Wight et al., 2006). Additionally, neighborhoods with a higher (vs. lower) socioeconomic status might provide more cognitively stimulating resources like bookstores and libraries (Sheffield & Peek, 2009; Wight et al., 2006).

Besides these neighborhood resources that point towards a contextual neighborhood effect, the alternative explanation of neighborhood composition has to be taken into account. This compositional explanation suggests that neighborhood differences in the level and the change of cognitive functioning are due to the socioeconomic status of the individuals (and factors associated with it). Since individuals with a similar socioeconomic status tend to gather in neighborhoods that correspond to their socioeconomic status, neighborhood differences in the level of cognitive functioning and its decline might not actually be brought about by the neighborhood context, but rather by the composition of older adults that live in these neighborhoods.

Based on these considerations and previous findings, we expect that older adults in neighborhoods with a higher (vs. lower) socioeconomic status show (1) higher levels of cognitive functioning and (2) less decline in cognitive functioning over time.

These hypotheses are tested using data from the third, fourth and fifth wave of the Longitudinal Aging Study Amsterdam (LASA; Huisman et al., 2011) in combination with official statistics on neighborhood socioeconomic status. Respondents were aged 57 to 88 years at baseline in 1995. Methods of data analysis include multilevel modeling to account for the nesting of individuals into neighborhoods. These multilevel models are extended to growth curve models by adding assessments of individuals' cognitive functioning at different time points over a period of 6 years. In order to test whether neighborhood differences in the

level and the change of cognitive functioning are actually due to the neighborhood context or due to the composition of neighborhoods, individual indicators of socioeconomic status are added to these models.

Preliminary results indicate that the level, but not the change in cognitive functioning, differs by the socioeconomic status of neighborhoods. Furthermore, the level differences in cognitive functioning are strongly diminished once individual socioeconomic status is taken into account. This suggests that a lower socioeconomic status of the neighborhood is only a minor risk factor for low cognitive functioning. Consequently, the results imply that there is no contextual neighborhood effect. Rather, the socioeconomic status of a neighborhood indicates that a neighborhood is composed by individuals with a certain risk of low cognitive functioning.

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