

審査の結果の要旨

氏名 金洪稷

Japan is facing the fastest rate of population aging in the world. To improve older adults' quality of life and health condition, the government aims to facilitate their participation in recreational group activities. Given that interventions related to land use are possible through urban planning, which affects all the people who reside in the area, urban facilities within older adults' neighborhoods can be considered a key factor in facilitating their participation. Previous studies suggest that there is a positive correlation between the number of facilities in a neighborhood and the participation of older adults; however, little is known about the optimal benefit of the number of facilities and their geographical distribution (the latter of which is especially important for a district plan for health promotion) on facilitating older adults' participation.

The major research objective of this dissertation is to clarify whether the development of urban facilities within neighborhoods can facilitate older adults' participation in recreational group activities, if so, how urban facilities affect. First, the thesis takes into account the nonlinear relationship between facility density and participation of older adults in hobby clubs and sports groups, and test whether there is a certain facility density that has the highest likelihood of increases in the frequency of activity participation. Second, the thesis tests the significance of the direct and indirect effects of the spatial agglomeration/dispersion of neighborhood facilities and their accessibility on the changes in the participation of older adults. Finally, it formulates an allocation problem which does not assume that people always participate in group activities and use the closest facility. Using the allocation model, it tests which geographical settings of facilities and residents bring more activity participation.

When analyzing the effect of neighborhood facilities on the changes in activity participation, many factors must be considered. Chapter 2 briefly reviews previous studies and theories regarding behavior change and urban amenities, and the

relationships between the two concepts. The literature review in the chapter elucidates several points of this dissertation's originality. The thesis utilizes panel data to test the effect of urban facilities within neighborhoods which allows to measure intra-individual changes in the frequency of participation. The longitudinal study enables to infer causal relationships between the neighborhood environment and older adults' participation based on the temporal precedence of causes. It also helps to exclude the self-selection bias that results from selective migration (i.e., people who consider participation an important attribute for life satisfaction migrate to an amenable neighborhood) when estimating the effect of neighborhood facilities. Differences in the effect of each type of neighborhood facilities are also considered. The neighborhood facilities are categorized based on the major destinations that are frequented by older adults when they go outside their homes. Furthermore, this dissertation mathematically solves an allocation problem, which takes into account the fact that some older adults go to facilities farther away.

Chapter 3 investigates the relationship between the changes in the density of neighborhood facilities and changes in older adults' participation in hobby clubs and sports groups. This chapter aims to test the nonlinear relationship between facility density and the increases in the frequency of activity participation. The results indicate that the density of urban facilities within neighborhoods is related to the increases or decreases in older adults' participation in recreational group activities, in addition to the frequency of their activity participation. In the case of food stores, an inverted U-shaped relationship between the facility density and the increases in the frequency of participation in sports groups is found, as compared to a U-Shaped relationship in the case of medical and welfare facilities.

Chapter 4 examines whether the geographical distribution of neighborhood facilities can facilitate older adults' participation in hobby clubs and sports groups, as well as their accessibility. The results show that both accessibility and the geographical distribution of facilities are related to increases in participation. The spatial agglomeration of eating places is found to increase opportunities for meeting friends and enable participation in both hobby clubs and sports groups; dispersed eating places, however, correlate with good relationships with neighbors, which facilitates sports group participation. Additionally, the agglomeration of food stores is found to have a positive correlation with participation growth in sports groups. In general, accessibility to neighborhood facilities is found to increase older adults' participation; however, the

accessibility of city parks is found to exhibit a negative indirect effect that is mediated by relationships with neighbors regarding participation growth in sports groups.

The U-shaped relationship of the density of medical and welfare facilities and the negative indirect effect of accessibility of city parks imply that some older adults hesitate to participate in group activities at facilities that are close to their home. Self-stigma can be a factor of why older adults hesitate to participate in group activities and why some of them opt to engage in a group activity at a facility farther away. Chapter 5 formulates an allocation problem, considering both accessibility and the self-stigma of group activity participation, which does not assume that people always participate in group activities and use the closest facility, and applies the model to the case of community salons. Using the allocation model considering both accessibility and self-stigma related to community salon participation, this chapter tests which geographical settings of facilities and residents bring more participation or more intergroup contact between people with and without self-stigma. The results indicate that there could be a segregation of activity groups between people with and without self-stigma. By comparing various solutions from different geographical settings of residents and facilities, this thesis determines that a larger number of participants is expected in the case of concentrated residential location. Concentrated facility location, however, is found to be a geographical setting for more intergroup contact between people who have self-stigma and those who do not. In the case of an uneven distribution, people without self-stigma are less likely to sacrifice their accessibility to allocated facilities.

Chapter 6 concludes the findings obtained and discusses policy implications for facilitating older adults' participation in recreational group activities. The findings in this dissertation suggest that both building additional facilities and the choice of facility location within neighborhoods can be policy options for facilitating older adults' participation in recreational group activities. In this case, a broad range of facilities (both recreational and non-recreational facilities) should be considered. However, the findings also suggest that a larger number and better accessibility of facilities within neighborhoods do not always correlate to a growth in participation. Therefore, it is necessary to consider both the dynamics related to socializing, opportunities for new social connections, self-stigma related to group activity participation, and accessibility to urban facilities, when policymakers discuss an amenable neighborhood for

facilitating the participation of older adults in recreational group activities.

With these achievements, this dissertation is accepted as a dissertation required for a doctoral degree in engineering.

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