



Long-term effects of an intergenerational program on functional capacity in older adults: Results from a seven-year follow-up of the REPRINTS study



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ABSTRACT

Background: Social engagement activities can help older adults maintain mental and physical functioning levels. This study examined the long-term effects of the intergenerational picture-book reading program “REPRINTS” (**R**esearch of **P**roductivity by **I**ntergenerational **S**ympathy) on older adults.

Methods: After baseline assessment, participants were allowed to decide which condition they wanted to participate in: the REPRINTS intervention or control group involving only assessments. REPRINTS participants participated in group activities that involved playing a hand game and reading picture books to children at kindergartens, elementary schools, and public childcare centers, once every one–two weeks. A follow-up assessment, which focused on functional capacity (i.e., instrumental activities of daily living, intellectual activity, and social function), was conducted after seven years. The analysis included responses from 62 REPRINTS (mean age [SD] = 66.2 [5.7]) and 100 control-group participants (mean age [SD] = 68.0 [4.7]).

Results: A logistic regression analysis examining intervention effects revealed that control-group participants were more likely to reduce intellectual activity and interactions with children compared to REPRINTS participants ($p = .013$ and $.003$, respectively). Furthermore, the REPRINTS group maintained greater functional reach compared to the control group ($p < .001$). However, the REPRINTS group was likely to stay indoors more often, compared to the control group ($p = .045$).

Conclusion: The present study indicates that the REPRINTS intergenerational program has long-term, positive effects that help maintain and promote intellectual activity, physical functioning, and intergenerational exchange, although the effect of the increasing amount of physical activity is unclear.

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1. Introduction

In several developed countries, including Japan, the growing aged population and low birthrate is a critical social issue; the economic burden on the younger generation due to the expected

growth of the older generation's welfare and healthcare costs is immense. Early support is necessary to help older adults maintain functional health, reducing the need for long-term healthcare (e.g., bedridden individuals). Thus, developing an effective and sustainable program for health promotion among older adults is an important global issue.

Regarding functional health in older adults, previous studies have suggested that social engagement, such as community volunteer activities, may positively contribute to maintaining/improved health status (Antonucci, Fuhrer, & Dartigues, 1997;

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Arbuckle, Gold, Andres, Schwartzman, & Chaikelson, 1992; Fried et al., 2004). Experience Corps[®]—designed to train and place volunteers in participating elementary schools for an academic year during which time they assist teachers in grades kindergarten–third grade with literacy and library functions—is one good example (Fried et al., 2004). Experience Corps[®] was associated with improved risk factors of increased physical, cognitive, and social activities and generative fulfillment (Barron et al., 2009; Carlson et al., 2008; Fried et al., 2004; Glass et al., 2004; Tan et al., 2006); and Experience Corps[®] participants reported fewer functional limitations after 2 years of participation in the program, compared to controls (Hong and Morrow-Howell, 2010). Furthermore, children whose schools were randomly selected for Experience Corps[®] had significantly higher scores on a standardized reading test than children in the control schools (Rebok et al., 2004). These results indicate that an intergenerational program has the potential of maintaining/improved older adults' health status as well as improving the academic success of young children.

In older adults, maintaining functional capacity is critically important for independent living. Functional capacity consists of three subscales based on Lawton's model (1972) that categorize stages of competence from the most basic functions to the most advanced: Instrumental Activities of Daily Living (IADL, i.e., instrumental self-maintenance), intellectual activity, and social function (Lawton, 1972). Older adults need to maintain intellectual activity and social function for general health because these decline with advancing age, prior to reduced IADL (Fujiwara et al., 2003a,b). Effective intergenerational programs which could be designed to provide older adults with generative roles that help children grow up may be meaningful for older adults' functional capacity. With this theoretical background, we launched "REPRINTS" (Research of Productivity by Intergenerational Sympathy) in 2004, an intergenerational program that focuses on increasing intellectual activity and social function (Fujiwara et al., 2006).

Health promotion efforts for older adults must meet social policy in the creation of meaningful service programs for older adults on a large social scale (Fried, Freedman, Endres, & Wasik, 1997). REPRINTS involves engaging older adults in reading picture books to kindergarten and elementary school-aged children, with the expectation that it will maintain/improve their functional capacity, social networks (e.g., with friends and children), and physical/psychological functioning as well as healthy upbringing of children. REPRINTS has demonstrated relatively short-term interventional effects (within three years) on grip strength (Fujiwara et al., 2006), social network (e.g., frequency of interchange with grandchildren) (Fujiwara et al., 2009b), subjective health (Fujiwara et al., 2009b) and sense of coherence (Murayama et al., 2015) among older adults, and on stress reduction for school children (Takeuchi et al., 2012). However, these studies have not reported interventional effects on functional capacity because participants in both the REPRINTS and control group were extremely healthy, and there were negligible differences in their functional capacities. This suggests that long-term follow-ups that amplify aging-related individual differences could help accurately determine whether REPRINTS helps maintain/improve functional capacity in older adults.

The present study investigated the long-term effects of REPRINTS, focusing on functional capacity and physical function. We conducted a follow-up for REPRINTS and observation group (i.e., control-group) participants after seven years. At the baseline and follow-up assessments, participants were examined for functional capacity using the Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG-IC) (Koyano, Shibata, Nakazato, Haga, & Suyama, 1991), a questionnaire comprising

three subscales that measure older adults' functional capacity: IADL, intellectual activity, and social function. We also measured physical functioning, and psychological and social variables.

2. Methods

2.1. Participants

The study protocol was similar to a previous study (Fujiwara et al., 2006, 2009b; Murayama et al., 2015). Both the REPRINTS and control-group participants were community-dwelling older adults recruited from three types of areas—urban (Chuo Ward, Tokyo), suburban (Kawasaki city, Kanagawa), and rural (Nagahama city, Shiga)—from 2004 to 2006, through community newsletters and meetings. Control-group participants were only administered annual assessments. We included participants who were aged 55 years or older. Participants who received additional assistance with activities of daily living (ADLs), had serious medical conditions or injuries within the three months prior to the study (e.g., stroke and heart disease), had problems with motor function (use of a walking aid such as a cane), had diagnosable mental disorders (15-item short version of Geriatric Depression Scale score >9; GDS-15), cognitive impairments (Mini-Mental State Examination <25); or did not complete all baseline assessments were excluded. In total, 349 older adults (mean age [SD], 67.7 [5.7] years, 82.8% women) were included in the study.

Written informed consent was obtained from all participants prior to the study. The study was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki, and the research protocol was approved by the Ethics Committee of the Tokyo Metropolitan Institute of Gerontology.

2.2. Intervention

After the baseline assessment, participants were allowed to self-select into a treatment condition rather than being randomly assigned. Although randomization of participants into either the REPRINTS or the control condition is the gold standard to which we aspired, political realities in the local municipality in which the study was conducted made it impossible to randomize. The REPRINTS group ($n = 163$) first attended a three-month intensive weekly training seminar conducted by research project members (professionals in geriatric gerontology, community health, social science, and cognitive science), book reading trainers, librarians, social welfare conference officers, and school staff. The classes involved learning about book selection and reading techniques, basic knowledge of children's school life, and school-based volunteer-activity rules. After completing the seminar, REPRINTS participants conducted group activities (six to ten REPRINTS members per group) in six elementary schools, three kindergartens, and six public childcare centers, once every one to two weeks. At kindergartens, they played a hand game (e.g., exercising the hands to the rhythm/song) and read three or four picture books for 30 min per class. In elementary schools, they read one–two picture books in the morning for 15 min per class. In addition, they sometimes (about once every one–two weeks) read picture books for children during lunch breaks in the library. At public childcare centers, they freely read picture books and played with children after school.

Each group had regular meetings before and after reading sessions to share information, discuss ways to improve the quality of reading techniques, and receive organizational updates. Furthermore, monthly meetings for area-wise groups (i.e., urban, suburban, and rural) were held for mutual learning. Additionally, book-reading trainers and other professionals were invited to area meetings to share their knowledge about picture books,

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